RECORD OF DECISION

As the Deputy Assistant Chief of Staff for Installation Management, I have reviewed the *Final Fort Carson Transformation Environmental Impact Statement* (EIS), which is incorporated by reference. The EIS adequately assesses the environmental impacts of implementing Army transformation programs at Fort Carson and related alternatives. As indicated in this Record of Decision (ROD), the Army will proceed with its selected action of implementing the Preferred Alternative.

1.0 Background

The U.S. Army (Army) is currently undergoing transformational activities across a full spectrum of military operations to respond more rapidly to enemy threats. These changes would affect most, if not all, aspects of the Army's doctrine, training, leader development, organizations, installations, materiel acquisition and fielding, and Soldiers. As part of this process, the Army is realigning and transforming the Fort Carson military installation. Changes are expected to occur between 2007 and 2011.

The Army prepared the EIS in compliance with its responsibilities under the National Environmental Policy Act (NEPA) to assess the direct, indirect, and cumulative environmental and socioeconomic effects of implementing three specific Army transformational programs at Fort Carson: 1) the Base Realignment and Closure (BRAC) Program (BRAC 2005), authorized under the Base Closure and Realignment Act of 1990 (Public Law 101-510), as amended; 2) the Global Defense Posture Realignment (GDPR), formerly known as Integrated Global Presence and Basing Strategy (IGPBS); and 3) the Army Modular Force (AMF) initiative. Implementing these programs will involve constructing new facilities to support additional Soldiers and their dependents; modifying range and training areas, including new construction; and using live-fire training ranges and maneuver areas at Fort Carson more frequently.

2.0 Preferred Alternative

The Preferred Alternative evaluated in the EIS includes three primary components: 1) changes in force structure resulting in a net gain of military units and personnel, 2) facility demolition and construction, and 3) increased frequency of live-fire and maneuver training. The Preferred Alternative is the Army's selected action. Under the Preferred Alternative, the number of troops at Fort Carson will increase by approximately 8,500 Soldiers. Military dependent, civilian, and contractor worker populations supported by Fort Carson will also increase. In total, Soldiers, their dependents, and support personnel will grow to about 59,700 by 2011, an increase of approximately 21,300 persons (60 percent) during the implementation period.

The Preferred Alternative includes demolishing facilities and infrastructure no longer needed; relocating facilities to support new construction; and renovating existing facilities and infrastructure to support the new population and training activities. In addition, the Army will construct a number of new facilities and infrastructure and increase the use of Fort Carson's training lands to accommodate the additional troops. Twenty-five construction projects are proposed at Fort Carson, primarily in the cantonment area.

The Preferred Alternative will provide for increased training activity for existing and new units stationed at Fort Carson. The increased training requirements of additional Active and Reserve Components will result in greater frequency of use of the training areas. The installation's range area will be heavily used for individual and crew live-fire, maneuver, and combined live-fire and

maneuver training. Fort Carson will continue to follow its existing land and environmental management programs to balance training requirements and land sustainability. Large-area maneuver training for Fort Carson's troops will continue to occur at the Pinon Canyon Maneuver Site (PCMS), Fort Carson's maneuver training area located approximately 150 miles southeast of Fort Carson. This training is the subject of the separate *Final PCMS Transformation EIS*. The Army determined that the difference in the proposed actions for the two sites, the difference in the affected environment, and convenience to the public made the preparation of two separate EISs a logical choice.

3.0 Purpose of and Need for the Selected Action

The purpose of the selected action is to implement three major Army programs affecting Fort Carson: 1) BRAC, 2) GDPR, formerly known as IGPBS; and 3) the AMF.

The need for the selected action is to advance the goals of transformation, improve military capabilities, and enhance military value. Transformation goals were a central component of the BRAC 2005 process. The BRAC Commission noted that this round of BRAC focused not just on reducing costs and closing unneeded military installations but also on "facilitating the transformation of our armed forces to meet the challenges of the new century" (Defense BRAC Commission, 2005). The Preferred alternative evaluated in the EIS is the Army's selected action to achieve the objectives for which Congress established the BRAC process.

4.0 Alternatives to the Selected Action

The EIS evaluated two alternatives in detail: the Preferred Alternative and the No Action Alternative. The implementation of the Preferred Alternative, which is described in Section 2.0, above, is the Army's selected action.

The No Action Alternative was included in the EIS in accordance with the Council on Environmental Quality (CEQ) and Army NEPA-implementing regulations. Under the No Action Alternative, the changes required by BRAC 2005, IGPBS, and AMF would not be implemented at Fort Carson, and the force structure, assigned personnel, and equipment would remain as they existed prior to the development of these programs. The No Action Alternative is not feasible, however, because realignment has been directed by BRAC 2005. The No Action Alternative was included in the EIS to provide a benchmark against which to compare the magnitude of environmental effects of the selected action.

The Army considered several alternatives to balance training requirements and land availability. These alternatives included training troops at other locales, acquiring additional land, or varying training schedules to account for operational deployments. These alternatives were determined not to be reasonable because they either were not feasible or unreasonably restricted the Army's ability to react to changing conditions. Therefore, only the Preferred Alternative and the No Action Alternative were carried forward for detailed environmental analyses in the EIS.

Alternatives to restationing troops to Fort Carson were not considered in the EIS. Under the Base Closure and Realignment Act of 1990, decisions regarding restationing troops to alternate installations are not revisited in NEPA documents. The Army also prepared a *Programmatic EIS for Army Transformation* to address environmental impacts of transformational activities on a national level. The EIS tiers from that analysis and provides site-specific analysis of impacts at Fort Carson.

5.0 Environmental Consequences

The EIS identified the direct, indirect, and cumulative impacts of implementing the selected action in the following resource areas: land use; air quality; noise; geology and soils; water resources; biological resources; cultural resources; socioeconomics, including environmental justice; transportation; utilities; and hazardous and toxic substances. These impacts are described below. With implementation of mitigation and best management practices (BMPs) (as described in Section 6.0), there would be no significant environmental impacts associated with the selected action.

Land Use, Plans, and Policies. Minor adverse impacts will occur to land use, both on and off of Fort Carson. On Fort Carson, encroachment of cantonment-type facilities along Wilderness Road could reduce availability of range lands for training activities. Increased training could degrade training lands and affect the long-term availability of training lands for military use. Some residential land uses surrounding the installation are incompatible with noise generated by military training activities. This incompatibility will persist.

Air Quality. Minor long-term and short-term adverse impacts to air quality will occur. Short-term increases in air emissions from construction and demolition will also occur. Long-term increases in emissions from operational emissions from additional external combustion sources (such as boilers and hot water heaters) and increases in mobile emissions will result. Vehicular emissions will increase, both on and off post, from additional personnel traveling throughout the installation and in the surrounding region, and from minor increases in exhaust emissions attributable to construction and increased traffic congestion. Fugitive dust emissions attributable to increased off-road vehicle travel also will increase. Air quality modeling results, however, indicate that air emissions for all sources will be below the thresholds of National Ambient Air Quality Standards (NAAQS), will conform to the State Implementation Plan for the Colorado Springs Carbon Monoxide Maintenance Area, and/or will be less than the Prevention of Significant Deterioration (PSD) major modification applicability thresholds for all criteria pollutants.

Noise. There will be temporary increases in noise levels adjacent to construction sites that could affect sensitive receptors on Fort Carson during construction. Noise from construction, however, is not expected to extend outside the boundaries of Fort Carson. No new permanent noise impacts are expected for residences on or off Fort Carson. Residential areas surrounding Fort Carson, including El Rancho, Midway Ranch, and Turkey Canyon Ranch, will continue to be located within high-noise contours. Although the frequency of training will increase, noise contours (areas of high noise) will be the same as under the No Action Alternative (that is, there will be no change in noise impacts under the selected action) because no new weapons will be used under the selected action.

Geology/Soils. Increased training activities, such as tank defilades, tank traps, neutral pivot turns, repeated vehicle passes, and bivouacking may cause direct impacts to soils such as compaction and ruts. Training on wet soil could increase rutting and permanently destroy vegetative cover (root systems). In addition, increased wind and water erosion could occur in areas where vegetative cover is affected. Ground disturbance associated with construction and demolition projects could result in erosion and sedimentation.

Water Resources. Increased erosion from increased training activities, including mechanized maneuvers, crossing dry drainages, and training in wet conditions, could result in increased sedimentation of surface waters. Increases in impervious surfaces (from buildings and paved areas) will increase stormwater runoff and the potential for pollutants to affect surface water quality and floodplains. Increased use of groundwater to support increased training activities could reduce water supply or stress aquifers. Increased use of fuels and solvents during training has the potential to result

in accidental spills that could adversely affect water quality. Ground disturbance from construction and demolition activities could result in erosion and sediment transport to surface water. Spills of fuels, solvents, or other hazardous materials used during construction could adversely affect water resources.

Biological Resources. Both long- and short-term adverse effects to vegetation will occur. Increased training activities may result in greater vegetation damage, including loss of cover, injury to shallow roots, and altered plant species composition. Live-fire training activities could result in greater damage to vegetation from shells and other ammunition, and more firing of live-fire tracer rounds could result in more accidental wildfires and burn vegetation. Construction in the Cantonment and training areas will result in temporary ground disturbance and permanent loss of small areas of native vegetation. Most of the construction areas are either disturbed or small in footprint and, therefore, impacts to native vegetation will be minimal.

As a result of increases in training, greater impacts to wildlife, such as disturbance of habitat or movement to avoid impact of munitions, noise, or Soldiers and vehicles, could occur.

Fort Carson is home to several State-listed sensitive wildlife species. The black-tailed prairie dog (*Cynomys ludovicianus*), burrowing owl (*Athene cunicularia*), and mountain plover (*Charadrius montanus*) could be adversely affected if training activities occur near these species and buffers are not maintained around prairie dog towns or nests. Training restrictions and buffers around active golden eagle (*Aquila chrysaetos*) nests could minimize impacts to golden eagles during the nesting season. Other sensitive species will not be affected.

Cultural Resources. Increased training increases the possibility of adverse effects and inadvertent impact to historical and archaeological sites. Construction under the selected action could also result in inadvertent impact to previously unidentified archaeological sites.

Socioeconomics. Minor temporary economic benefits associated with construction expenditures and employment will occur in the region of influence (ROI) (El Paso, Fremont, Pueblo, and Teller counties). In addition, minor long-term economic benefits (increased sales volume, employment, and income in the ROI) will occur as a result of the population expansion at Fort Carson. The increased population will result in minor increases in the demand for schools, housing, and public services/amenities in the ROI, but sufficient capacity exists within these services to accommodate the growth.

Transportation. The increase in troop and dependent populations will result in increased demand at access control points and increases in traffic congestion on installation roadways. Traffic volumes on regional roadway networks will also increase as a result of the additional troops and dependents relocated to Fort Carson. Traffic congestion on regional roadways, however, is projected to increase regardless of the effect from implementing the selected action. Transit ridership on buses serving Fort Carson will increase but Mountain Metropolitan Transit has sufficient capacity to accommodate these increases. Construction will result in temporary traffic increases.

Utilities. Fort Carson's utility infrastructure does not have sufficient capacity to support the increased demand that will occur. Utilities to be upgraded or extended include potable water, sanitary sewer, stormwater conveyance, natural gas, and communication lines.

Hazardous and Toxic Substances. Increases in the number of on-post personnel will result in the increased use of hazardous materials, the occurrence of special hazards (from additional training activities and the use of hazardous and medically-related radiological materials), and generation of hazardous and non-hazardous wastes from construction and operation of new facilities. Construction

of new facilities, depending upon the siting of those facilities, could result in disturbance of existing contaminated sites.

Cumulative Effects. In accordance with CEQ regulations implementing NEPA, the EIS evaluated the cumulative effects of relevant past, present, and reasonably foreseeable actions, both at Fort Carson and in the surrounding community. This effort included coordination with surrounding municipalities and counties, state agencies, and Department of Defense installations. Transformation actions at the PCMS, which are evaluated in the *Final PCMS Transformation EIS*, were not considered cumulative to the Fort Carson actions because of the distance between the installations and the differing functions and impacts at the two sites. Cumulative effects were assessed by resource areas (air quality, cultural resources, water resources, biological resources, and transportation) and summarized in Table 3-24 of the EIS. Cumulative effects identified included increased air emissions (within NAAQS), increased potential for destruction of cultural resources, increased impervious surfaces and sedimentation and more disturbance to floodplains, more loss of native plant communities and disturbance and displacement of species, and increased congestion of the urban and rural transportation network during peak travel.

The mitigation measures described in Section 6.0 of the EIS will minimize or avoid incremental impacts and no cumulatively significant impacts will occur.

6.0 Mitigation

The selected action includes compliance with BMPs, existing management plans and programs; and federal laws that support the sustainability of Fort Carson's military mission and mitigate the majority of the adverse impacts. The Army will continue to implement existing management plans, as periodically revised and updated, including the *Integrated Natural Resource Management Plan* (DECAM, 2002a); *Integrated Cultural Resources Management Plan* (DECAM, 2002b); *Installation Pest Management Plan* (DECAM, 2004h); *Fugitive Dust Control Plan* (DECAM, 2004a); and the *Prescribed Fire Plan* (DECAM, 2003).

Implementation of training activities is dependent on a number of factors, such as troop deployment and climate, and is defined as a process-driven approach that responds to those needs. Mitigation for training activities, therefore, will be included as appropriate to the activities that occur in a given training-year calendar. The ROD commits that the Army will follow the coordination of training development outlined in Section 2.2.4.2 of the EIS. The types of mitigations that will be considered are presented herein. The construction component of the selected action is well-defined, and impacts and mitigation, therefore, are also well-defined and presented herein.

The following resource-area mitigation measures will be included in the implementation of the selected action. All practicable means to avoid or minimize environmental harm resulting from the selected action have been adopted. Before beginning facilities construction or training, the Garrison Commander will develop and implement procedures, consistent with Appendix C of Title 32 of the Code of Federal Regulations (CFR), Part 651 (32 CFR 651) (*Mitigation and Monitoring*), for mitigation measures outlined below.

Land Use, Plans, and Policies. The Army will continue to coordinate among the Directorate of Public Works Master Planning Division, G-3, and Directorate of Plans, Training and Mobilization - Range Division staff in siting of new facilities. The Army will continue to follow Army Regulation (AR) 200-1 and the *Installation Environmental Noise Management Plan* to monitor noise and discourage incompatible new development around Fort Carson. In addition, the Army will continue to

implement land management and environmental programs to balance training requirements and the need to maintain quality training lands for sustained military use.

Air Quality. Measures will be implemented to mitigate long-term effects from training and increased personal vehicle travel, and the short-term effects from construction. The Army will continue working with Mountain Metropolitan Transit and the Pikes Peak Area Council of Governments (PPACG) to encourage transit ridership and carpooling to reduce vehicle travel miles. The Army also will complete needed on-post roadway improvement projects to reduce congestion. For training exercises, the Army will continue to follow Fort Carson's *Fugitive Dust Control Plan*, Air Quality Control Commission (AQCC) Regulation No. 1 (opacity), Construction Permit No. 96EP340-14 (fog oil smoke), and other federal, state, and local regulations and permits governing air quality. The Army also will implement dust suppression and establish speed limits during training exercises. In managing prescribed burning, the Army will continue to adhere to the requirements of AQCC Regulation No. 9, "Open Burning, Prescribed Fire and Permitting," to ensure that conditions are acceptable for prescribed fires and that air quality is not compromised. For construction projects, the Army will obtain required land disturbance permits and follow permit conditions and other regulations. The Army also will track changes in the potential to emit air emissions outlined in the EIS and will update PSD analyses as necessary with the Colorado Department of Public Health and Environment.

Noise. The Army will continue to follow AR 200-1 and the *Installation Environmental Noise Management Plan*. Procedures and policies in the plan for avoiding or reducing noise impacts to surrounding communities include identification of areas most likely to experience noise impacts and establishment of no-fly zones. The Army also will continue to implement (in cooperation with El Paso County) the Army Compatible Use Buffer program to maintain a 1.5- to 2-mile (2.4- to 3.2-kilometer) buffer around Fort Carson. This will address impacts to sensitive receptors in development and encroachment areas adjacent to Fort Carson. Construction practices, such as nighttime construction and use of backup alarms, will be modified as appropriate to reduce effects of possible construction noise impacts to Fort Carson residences and parks.

Geology and Soils. The Army will continue to follow existing plans and implement standard BMPs to minimize the potential for soil erosion during construction and demolition activities. BMPs include grading of roads to ensure proper drainage, installation and maintenance of erosion control features (such as check dams, water bars, and hardened crossings), maintenance of erosion control dams, and installation and maintenance of diversion dams. Plans and programs developed and implemented to reduce the effects of erosion and sediment include Fort Carson (FC) Regulations 350-12, 385-63, and 350-19; AR 350-9; and the *Integrated Natural Resource Management Plan*, *Fugitive Dust Control Plan*, and Section 404 Regional Permit No. 2002-00707. The Army will continue to implement land management and environmental programs, such as the Integrated Training and Management (ITAM) program, to balance training requirements and the need to maintain quality training lands for sustained military use and stabilize areas against erosion. Additional erosion control and maneuver damage repair or reclamation projects will be implemented for areas damaged by increased training activities. The Army will continue to educate troops and implement training guidelines to minimize impacts of training activities on soils.

Water Resources. The Army will implement erosion control measures as described above for geology and soils to reduce the turbidity or sedimentation impacts to water resources from increased erosion. Fort Carson will continue to implement the *Spill Prevention Control and Countermeasures Plan* and *Lead Management Plan* to address leaks or spills of fuels, solvents, and other hazardous and toxic substances used during training exercises. Vehicle and equipment fueling and maintenance will be

restricted to approved areas unless emergent field maintenance is required. If field maintenance is required, appropriate control and containment measures will be implemented to prevent accidental contamination of surface water.

To protect water quality during construction of new facilities, the Army will continue to implement existing BMPs, follow permitting requirements, and adhere to FC Regulation 200-1. For all construction projects, contractors performing work at Fort Carson will submit a notice of intent to obtain coverage under the National Pollutant Discharge Elimination System General Permit for Storm Water Discharges from Construction Activities for each construction project that disturbs 1 acre or more of land. In addition, contractors will develop and implement a Stormwater Pollution Prevention Plan and Post Construction Stormwater Management Plan. These plans will specify mitigation strategies to reduce impacts from stormwater runoff during and after construction. Construction projects in the Cantonment will be sited to avoid discharge of dredged or fill material into "B"-Ditch, "I"-Ditch, "U"-Ditch, or any other jurisdictional waterways. If avoidance is not possible, a Department of the Army permit under Section 404 of the Clean Water Act will be obtained and any required mitigations from the Section 404 permit will be implemented. All potential impacts requiring 404 permitting will be coordinated with the U.S. Army Corps of Engineers, Albuquerque District and mitigations will be implemented, as necessary.

Biological Resources. The Army will continue to use its land and environmental management programs at Fort Carson to provide for sustainable land management to minimize impacts to training. The Army will continue to follow environmental plans and regulations, and use ITAM programs to repair vegetation damage. The Army will continue to use prescribed burning to create buffer areas for wildlife and provide additional protection from wildfires near live-fire training activities. Buffer zones around sensitive wildlife locations, such as bird nests, will be accommodated where feasible. Existing species management plans will continue to be implemented. The Army will continue to coordinate training activities among Fort Carson's directorates and continue to follow environmental plans and regulations, and use ITAM to repair vegetation damage.

Areas disturbed during construction will be reclaimed and revegetated with native or other suitable vegetation, as appropriate. Wildlife displacement during construction will be temporary and, therefore, no mitigation is necessary.

Cultural Resources. Activities with the potential to result in adverse effects to cultural resources will be evaluated and resolved under the Section 106 effect determination and mitigation processes. The Army will apply and enforce Fort Carson's "Inadvertent Discovery of Archaeological Resources or Burials" Standard Operating Procedure (SOP) and the "Native American Graves Protection and Repatriation Act of 1990" SOP. The Army is updating the 2006-2010 Installation Cultural Resources Management Plan and developing a Programmatic Agreement with the Colorado State Historic Preservation Officer, the Advisory Council on Historic Preservation, and four Native American Tribes with a cultural affiliation to Fort Carson-administered lands. The Army will follow the procedures in the plan and the agreement.

Socioeconomics. No mitigation is required because adverse impacts to socioeconomics or environmental justice would not occur.

Transportation. The EIS recommended implementing the suggested transportation improvements outlined in the *Fort Carson Transportation Study* and opening Gates 6 and 19 to Installation personnel as possible mitigation to adverse traffic conditions on Fort Carson attributable to the Preferred Alternative. The Army is not currently resourced to execute these projects, and therefore they are not practicable and are not being adopted. As the proposed action proceeds, these projects may be submitted for Army funding. The Army will continue to coordinate with local agencies to plan and program future transportation improvements to accommodate Fort Carson traffic growth outside its boundaries. Programmed improvements contained in the PPACG Transportation Improvement Plan would accommodate traffic growth associated with Fort Carson and other regional growth. The Installation Transportation Officer will schedule rail shipments in advance of training activities to minimize the effects of increased use of the rail system. The Army will continue to coordinate with Mountain Metropolitan Transit to assess Fort Carson's transit needs. The Army will implement standard traffic-control procedures during construction and limit construction vehicle movements during rush hours and within administrative, housing, and school areas to minimize temporary traffic delays and disturbance during construction.

Utilities. The Army will implement planned upgrades of water lines and construction of new potable service and supply lines and water pumps. The Army will install additional sanitary sewer lines to connect training ranges to the Fort Carson Wastewater Treatment Plant. The Army will upgrade stormwater system and implement post-construction BMPs for newly constructed facilities.

The Army will upgrade its natural gas system and coordinate with Colorado Springs Utilities to provide additional capacity. The Army will install an additional electric substation, perform transformer upgrades, and coordinate with Colorado Springs Utilities to provide additional electrical capacity. Fort Carson will continue renewable energy commitments and energy-efficient projects. The Army will continue to manage generated solid wastes in accordance with the existing *Integrated Solid Waste Management Plan.*

Hazardous and Toxic Substances. The Army will continue to implement existing management plans to minimize impacts from increased use of hazardous materials and management of hazardous wastes from increased personnel. The Army will continue to implement management plans and SOPs for munitions handling, unexploded ordnance removal, lead management, and reduction of fire hazards to minimize impacts from increased training. The Army will continue to implement hazardous waste and radon management plans to minimize impacts from increased waste use and generation during construction, and to minimize radon exposure in new facilities. The Army will manage radiological materials (and waste) in accordance with existing plans to minimize impacts from construction of new medical/dental facilities. The Army will coordinate with Fort Carson's environmental staff on plans and documents to address design, avoidance, and project siting to avoid or minimize impacts to existing contaminated sites.

7.0 Decision

I have considered the results of the analysis presented in the EIS, supporting studies, and comments provided during formal comment and review periods. These factors as well as the description of the purpose and need for the selected action guided my decision on whether to approve the selected action.

On behalf of the Army, I have decided to implement the selected action. I have determined that implementing the selected action meets the purpose and need for achieving the Army's mission requirements consistent with the BRAC law and other transformation programs, and reflects a proper balance among initiatives for protection of the environment, appropriate mitigation, and mission accomplishment. I also took into account the fact that the No Action alternative would not meet the Army's purpose and need for the action. Other alternatives were considered and dismissed from detailed analysis because they did not meet the Army's purpose and need for the action. Furthermore, I have determined that the Army has identified and adopted all practicable means to avoid or minimize harm to the environment that could be caused by implementation of the selected action.

Craig E. College

CRAIG E. COLLEGE
Deputy Assistant Chief of Staff
for Installation Management

2 Aug 2007
Date

Final

Fort Carson Transformation Environmental Impact Statement

Prepared under contract for

U.S. Army Corps of Engineers, Mobile District

for

Fort Carson, Colorado

June 2007

This document is printed on recycled and recyclable paper

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Final Fort Carson Transformation Environmental Impact Statement

Prepared by:

U.S. ARMY CORPS OF ENGINEERS, MOBILE DISTRICT

CRAIG A. WELLS
LTC, Corps of Engineers
Deputy Commander

Reviewed by:

FORT CARSON, COLORADO

THOMAS L. WARREN
Director, Environmental Compliance and Management

Approved by:

FORT CARSON, COLORADO

EUGENE B. SMITH
COL, FA
Garrison Commander

Final Environmental Impact Statement

Lead Agency: Department of the Army, Office of the Secretary of the Army, Washington, D.C.

Cooperating Agencies: None

Coverage of Environmental Impact Statement (EIS): Implementation of transformational programs at Fort Carson, including draft Clean Air Act general conformity determination and evaluation of continued land and mineral withdrawal under Public Law 104-201

Affected Jurisdictions: El Paso, Pueblo, and Fremont counties, Colorado

Document Designation: Final Environmental Impact Statement (FEIS)

Abstract: This EIS evaluates the environmental effects of implementing the Army's transformation programs at the Fort Carson military installation near Colorado Springs, Colorado. The transformation programs, which are Base Realignment and Closure 2005, Integrated Global Presence and Basing Strategy (also known as Global Defense Posture Realignment), and the Army Modular Force, are needed to prepare the Army's combat forces for deployment around the world. The Proposed Action, which is the Army's preferred alternative, includes stationing of approximately 8,500 additional Soldiers at Fort Carson, providing facilities for Soldiers and their dependents, and increasing the frequency of maneuver and live-fire training exercises. This EIS also documents the compliance of the Proposed Action with the General Conformity Rule requirements of the Clean Air Act and serves as the evaluation of the environmental effects, as required by Section 2908 of Public Law 104-201, of renewal of the current withdrawal and reservation of public lands and minerals at Fort Carson. The adverse impacts identified in this EIS include effects to land use, air quality, geology and soils, water resources, biological resources, cultural resources, transportation, utilities, and cumulative environmental effects. With implementation of mitigation and best management practices, there would be no significant impacts.

Final Environmental Impact Statement (FEIS) Publication: The U.S. Environmental Protection Agency announced the publication of the EIS in the *Federal Register*. Not less than 30 days after publication of the *Federal Register*, the Army will sign a Record of Decision (ROD) that will include an overview of the range of alternatives considered for Fort Carson, state which of the alternatives considered in the FEIS will be implemented, and include mitigation measures associated with the chosen alternative. During the period between publication of the *Federal Register* and the ROD, copies of the FEIS can be obtained by contacting the Fort Carson NEPA Coordinator, Directorate of Environmental Compliance and Management, 1638 Elwell Street, Building 6236, Fort Carson, Colorado 80913-4000; phone: 719-526-4666; fax: 719-526-1705; or e mail: carsdecamnepa@conus.army.mil. The document is available online at the following web address: http://www.hqda.army.mil/acsim/brac/nepa_eis_docs.htm. Copies have also been provided to the libraries listed in Section 5.0 of the FEIS.

Executive Summary

Introduction

The U.S. Army (Army) is currently undergoing transformational activities across the full spectrum of military operations to respond more rapidly to enemy threats. These changes would affect most, if not all, aspects of the Army's doctrine, training, leader development, organizations, installations, materiel acquisition and fielding, and Soldiers. The Army proposes to realign and transform the Fort Carson military installation to implement its transformation plan at Fort Carson. Changes are expected to occur between 2006 and 2011.

The Army is preparing this *Fort Carson Transformation Environmental Impact Statement (EIS)* in compliance with its responsibilities under the National Environmental Policy Act (NEPA) to assess the direct, indirect, and cumulative environmental and socioeconomic effects of implementing three specific Army transformational programs at Fort Carson. The Army's transformation plan, which was initiated in 1999 and is now known as the Army Campaign Plan, seeks to transform its forces and meet the emerging military needs of the 21st century. The particular transformation programs evaluated in this EIS are: 1) the Base Realignment and Closure (BRAC) Program (BRAC 2005), authorized under the Base Closure and Realignment Act of 1990 (Public Law 101-510), as amended; 2) the Integrated Global Presence and Basing Strategy (IGPBS), also called Global Defense Posture Realignment; and 3) the Army Modular Force (AMF). Implementing these programs would involve constructing new facilities to support additional Soldiers and their dependents; modifying range and training areas, including new construction; and increasing the use of live-fire training ranges and maneuver areas at Fort Carson.

The Army also has made a determination of a need for the continued withdrawal of 3,133.02 acres of public land and 11,415.16 acres of federally owned minerals from the public domain. Public Law 104-201, the National Defense Authorization Act for Fiscal Year 1997 extended until 2011 the withdrawal of these lands and mineral rights. This law requires that, if the Secretary of the Army determines that there is a continuing need for these withdrawals, he or she will evaluate the environmental effects of renewal of the withdrawals and hold at least one public hearing concerning that evaluation. This EIS provides the evaluation of the environmental effects of the continued military use of the withdrawn lands and mineral rights. The public meeting for review of the DEIS served as the required public hearing.

Installation Setting and Mission

Fort Carson is an approximately 137,000-acre military installation located south of Colorado Springs, Colorado, east of the Rocky Mountain Front Range, and occupies portions of El Paso, Pueblo, and Fremont counties. Fort Carson is generally bounded by Colorado State Highway (SH) 115 on the west and by Interstate 25 to the east. The City of Denver is approximately 65 miles (mi) to the north of Fort Carson, and the City of Pueblo is

approximately 10 mi south of Fort Carson's southern boundary. The City of Fountain is immediately east of Fort Carson, and Colorado Springs is just to the north.

Fort Carson is responsible for supporting the living and training requirements of Army troops stationed at the installation. Soldier support facilities are provided in the Cantonment, which contains most of the facilities on Fort Carson such as troop and family housing, administrative, maintenance, community support, recreation, and supply and storage facilities, utilities, and classroom and simulation training facilities. Fort Carson's downrange area is an active military training facility for both weapons qualification and field training. The downrange area comprises the land area outside the Cantonment, including firing ranges, training areas, and impact areas. Training lands at Fort Carson are actively managed to maintain sustainability of the area for continued use in supporting the Army's training mission.

Alternatives

No Action Alternative

Under the No Action alternative, the changes required by the BRAC 2005, IGPBS, and AMF actions would not be implemented at Fort Carson. Force structure, assigned personnel, and equipment would be as existed prior to the development of these programs. This alternative is not feasible because realignment has been determined to be necessary by the Army and Congress, and Fort Carson must provide adequate housing, support, and training facilities to support the new troops. Nevertheless, this alternative is included as required by the Council on Environmental Quality (CEQ) and Army NEPA-implementing regulations, and provides a benchmark to compare the magnitude of environmental effects of the Proposed Action.

The force structure under the No Action alternative equates to a total military troop population of approximately 14,500. The baseline total population of Fort Carson under the No Action alternative is approximately 38,300, which includes the 14,500 military troops, along with 2,700 civilian workers, 1,600 contract employees, and 19,500 military dependents.

Under the No Action alternative, construction, maintenance, and repair of Fort Carson's existing infrastructure would continue. Other projects planned for or under construction would be completed. No other major capital improvements would occur because the only future capital improvements anticipated are those associated with BRAC 2005, IGPBS, and AMF. (Construction underway at Fort Carson has been previously evaluated under NEPA and is part of the No Action.) Any new facility construction on Fort Carson under the No Action alternative would be subject to separate NEPA review, in accordance with Army regulations and practice.

Under the No Action alternative, Fort Carson would continue to support maneuver training and live-fire training of stationed Active Component units, Reserve Component units, and other visiting forces, such as other Department of Defense agencies, the North Atlantic Treaty Organization, and other federal, state, and local government forces. Training requirements under the No Action alternative would be in accordance with standards outlined in Training Circular (TC) 25-1 and TC 25-8, which were adopted in 2004. These recent training standards require larger training areas and a greater number of training

rotations. Training requirements under the No Action alternative, therefore, are increased over the recent use of Fort Carson's training areas. Under the No Action alternative, maneuver training on Fort Carson would occur at least 28 weeks per year along with heavy use of live-fire ranges. Existing land and environmental management programs would continue to balance training requirements with land sustainability.

Proposed Action

The Proposed Action of implementing transformation programs at Fort Carson includes three primary components: increased troop levels, facility demolition and construction, and increased live-fire and maneuver training. Changes associated with each of these are summarized below. The Proposed Action is the Army's preferred alternative.

Fort Carson would experience a net gain of units and personnel under the Proposed Action. The number of troops would increase by approximately 8,500 Soldiers. Military dependent, civilian, and contractor worker populations supported by Fort Carson also would increase. In total, Soldiers, their dependents, and support personnel would increase from approximately 38,300 under the No Action to about 59,700 by 2011, an increase of approximately 21,300 persons (60 percent) during the implementation period.

Twenty-five construction and renovation projects are proposed at Fort Carson, including 18 projects in the Cantonment. The total estimated cost of these projects is approximately $300 million. In conjunction with these construction projects, the Army proposes the demolition of seven buildings and one warehouse that are no longer needed. There are also a number of construction projects at Fort Carson already underway that have been previously analyzed under NEPA and which will be used by units and organizations that are part of the transformation programs being studied in this EIS. The combined total cost of construction during the transformation implementation period (2006 to 2011) is approximately $1.2 billion.

The Army also proposes to use Fort Carson's training lands more frequently to accommodate the increased troops. The types of training and maneuver activities that would occur under the Proposed Action would be similar to the No Action alternative. The increased training requirements of additional Active and Reserve Components, however, would result in more frequent use of training areas. Fort Carson's downrange area would be heavily used for individual and crew live-fire, maneuver, and combined live-fire and maneuver training. Fort Carson would continue to follow its existing land and environmental management programs to balance training requirements and land sustainability.

To document that the Proposed Action complies with the General Conformity Rule requirements of the Clean Air Act Amendments of 1990 and demonstrate that the action conforms with the Colorado State Implementation Plan (SIP) for air quality, the Army prepared a Final General Conformity Determination pursuant to the requirements of Title 40 of the Code of Federal Regulations (CFR), Part 93, Subpart B. The Colorado Springs area is currently in attainment with air quality standards for all criteria pollutants and is in a maintenance area for carbon monoxide (CO). After conducting appropriate air quality analyses, the Army has concluded that the Proposed Action will not cause or contribute to new violations of the CO National Ambient Air Quality Standards (NAAQS) in the

Colorado Springs maintenance area. The Army coordinated with the Pikes Peak Area Council of Governments (PPACG), U.S. Environmental Protection Agency (EPA), and Colorado Department of Public Health and Environment (CDPHE) in preparation of the conformity determination. The PPACG reviewed and concurred with the Army's findings (see Appendix C for agency correspondence). EPA acknowledged agreement on the conformity analysis (see Appendix C).

Other Alternatives

In developing the Proposed Action, the Army considered several alternatives to balance training requirements and land availability. These alternatives included training troops at other locales, acquiring additional land, or varying training schedules to account for operational deployments. None of these alternatives was determined to be reasonable because they either were not feasible or unreasonably restricted the Army's ability to react to changing conditions. Therefore, only the Proposed Action and the No Action alternative were carried forward for detailed environmental analyses in the EIS.

Alternatives to restationing troops to Fort Carson were not considered in this EIS. Under the Base Closure and Realignment Act of 1990, decisions regarding restationing troops to alternate installations are not evaluated in NEPA documents. The Army also prepared a *Programmatic EIS for Army Transformation* to address environmental impacts of transformational activities on a national level. This EIS tiers from that analysis and provides site-specific analysis of impacts at Fort Carson.

Public Outreach

The Army has invited public participation in the NEPA process. The Fort Carson NEPA Coordinator (phone number: 719-526-4666; fax number: 719-526-1705; or email: carsdecamnepa@conus.army.mil) has been available throughout the process to answer questions about the scope, status, and progress of the EIS.

To identify the issues to be addressed in the EIS, the Army conducted public and agency scoping early in the project development. A Notice of Intent (NOI) to prepare an EIS was published in the *Federal Register* on November 23, 2005, and agency and public scoping meetings were held in April 2006. An agency scoping meeting was held in Pueblo, and a public scoping meeting was held in Fountain. Approximately 2 weeks before the public scoping meetings, notice was published in 10 general-circulation papers. In addition, the Army sent individual letters to invite agencies to the scoping meeting, and notice of a public service announcement was released.

No specific comments or concerns were raised by agencies regarding the Proposed Action at Fort Carson. Individuals and organizations provided few written or verbal comments on the scope of the EIS during the public scoping period. Those comments received generally addressed potential effects to water supplies and biological resources on and around the installation as well as noise effects on the El Rancho development near the installation boundary. The DEIS addressed those issues.

The DEIS was published for public review on October 13, 2006. The Army provided an initial 45-day public comment period that ended on November 27, 2006. In response to

public and elected officials' requests, the Army extended the public comment period by an additional 45 days. The comment period on the DEIS ended on January 11, 2007.

The Army held a public meeting on November 1, 2006, in Fountain, Colorado, to receive comments on the DEIS, as described in Section 1.4 of the FEIS. Approximately 200 people attended this meeting, and 22 chose to provide oral comments. During the public comment period, approximately 15 additional individual comment letters were received. In total, 69 individual comments were received. All comments that were received have been considered in preparing the FEIS. Copies of all comments received on the DEIS and the Army's responses to those comments are provided in Appendix H of this FEIS.

Environmental Consequences

The Army determined that the actions associated with the BRAC 2005, IGPBS, and AMF transformation programs had the potential to result in significant environmental impacts at Fort Carson and decided to prepare an EIS to evaluate the environmental consequences that may result from implementation of these programs.

Implementation of the Proposed Action would result in adverse impacts to some environmental resources. Noise associated with large-caliber weapons training would continue to affect communities surrounding Fort Carson, including El Rancho, Midway Ranch, Turkey Canyon Ranch, and Fountain. Areas that are within high-noise contours (as presented in Appendix D of the FEIS) are the same under the No Action alternative and the Proposed Action. (That is, no new noise impacts would occur from implementing the Proposed Action but incompatibility of the residential development and military training would continue.) Air quality would be adversely affected by increased emissions from operation of new combustion sources (associated with new facilities), increased traffic, and increased training. None of the increased emissions, however, would lead to violations of NAAQS, current Title V operating permit emissions limits, or exceed the limits established in the SIP inventory. New impervious surfaces associated with new facility construction would decrease vegetated areas and increase stormwater runoff. Increased stormwater runoff could carry pollutants, particularly sediment, into surrounding surface waters, which could affect water quality and alter floodplains. Vegetated areas and wildlife habitat would be disturbed during training exercises, and less mobile and burrowing wildlife species could be directly affected by training exercises. Most disturbed areas would be repaired after training. Increased movement of vehicles across training areas would increase potential for wind and water erosion, and would result in some unavoidable impacts to training lands. The Army would continue to implement its environmental and land management programs to minimize environmental impacts at Fort Carson. Cumulative impacts to air, water, biological, and transportation resources could result from the combination of the Proposed Action with other development and growth in the region.

In response to public and agency comments on the DEIS, additional information or clarification has been provided in the following portions of Section 3.0 of the FEIS: biological resources (Section 3.7), wetlands (Section 3.7), transportation (Section 3.10), and utilities (Section 3.11). The additional information does not change the findings and conclusions of the DEIS.

Table ES-1, below, presents a summary of impacts and mitigation measures.

TABLE ES-1
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Practice/Mitigation
Land Use, Plans, and Policies		
Encroachment of Cantonment-type facilities along Wilderness Road may reduce availability of the downrange area for training activities.	Further encroachment on the downrange area from additional development around Wilderness Road.	Continue to coordinate among Directorate of Public Works Master Planning Division, G-3, and Directorate of Plans, Training and Mobilization (DPTM) – Range Division staff in siting of new facilities.
Some residential land uses surrounding the installation are incompatible with noise generated by military training activities (also see Noise).	Continued residential land-use incompatibility (also see Noise).	Continue to follow Army Regulation (AR) 200-1 and *Installation Environmental Noise Management Plan* to monitor noise and discourage incompatible new development around Fort Carson (see Noise).
Increased training could degrade training lands and affect the long-term availability of training lands for military use.	Similar types of training impacts as with the No Action alternative, but magnitude could be greater because of increased frequency of training actions.	Continue to implement land management and environmental programs to balance training requirements and the need to maintain quality training lands for sustained military use.
Air Quality		
Air emissions associated with personnel or traffic at Fort Carson would continue unchanged.	Increased vehicular emissions on post and off post associated with additional personnel traveling around the installation and in the surrounding region. Air quality modeling results indicate emissions would be below NAAQS thresholds and would conform to the SIP for the Colorado Springs Carbon Monoxide (CO) Maintenance Area.	Continue working with the City of Colorado Springs Mountain Metropolitan Transit and the Pikes Peak Area Council of Governments (PPACG) to encourage transit ridership and carpooling to reduce vehicle travel miles.
Emissions associated with the annual Prescribed Burn Program would not increase over existing conditions.	Emissions associated with the annual Prescribed Burn Program would be the same as for the No Action alternative (Prescribed Burn Program is influenced more by environmental conditions than the level of training conducted).	Continue to follow annual *Prescribed Burn Plan* to limit adverse effects of prescribed burns.
Dust emissions from off-road training exercises would not increase over existing conditions.	Increased training could result in impacts to air quality from increased fugitive dust from increased off-road vehicle travel.	All training activities are subject to Fort Carson's *Fugitive Dust Control Plan*. Implementation of best management practices (BMPs), including dust suppression and setting speed limits for training exercises, could minimize impacts.

TABLE ES-1
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Practice/Mitigation
Air quality impacts from construction or demolition of facilities at Fort Carson would not increase over existing conditions.	Construction and demolition of facilities under the Proposed Action would result in impacts to air quality from exhaust emissions from construction equipment, fugitive dust from construction and demolition activities, and additional vehicle trips by construction workers. Construction impacts will be short term and limited to the duration and area of construction activities.	All construction and demolition activities are subject to Fort Carson's *Fugitive Dust Control Plan.* Site-specific dust control plans are required for all projects greater than 25 acres or disturbed for 6 months or longer (state permit) and an El Paso County permit is required for disturbed land greater than 1 acre. Implementation of BMPs, including dust suppression and establishment of speed limits in construction areas, could minimize short-term construction impacts.
Stationary source emissions from existing facilities would remain within allowable regulatory limits.	Operation of additional external combustion sources has the potential to result in impacts to air quality. Emissions from proposed stationary sources, however, including boilers/hot water heaters, would be less than the Prevention of Significant Deterioration major modification applicability thresholds for all criteria pollutants.	Increased emissions associated with stationary source operation will not exceed applicable air quality thresholds, and no further mitigation is necessary. Low NO_x burner systems are being installed for all boilers and hot water heaters to reduce emissions.
Emissions from activities at Fort Carson conform to the CO emission limits established in the SIP inventory.	Increased emissions associated with facility construction, demolition, mobile emissions, and stationary source operation for the peak year would not exceed the emission limits specified in the SIP inventory and would conform to the SIP for the Colorado Springs CO Maintenance Area.	CO emissions conform to the SIP, and no mitigation is required.
Noise		
No increase in noise levels associated with construction activities.	Temporary increase in noise levels adjacent to construction sites could affect sensitive receptors on Fort Carson. Noise associated with construction would not be expected to extend off Fort Carson.	Modification of construction activities, such as limiting nighttime construction or use of backup alarms, could be implemented to reduce noise around construction areas.
Noise contours for large-caliber weapons noise extend into adjacent noise-sensitive areas including El Rancho, Midway Ranch, and Turkey Canyon Ranch.	No new large-caliber weapons would be used although frequency of use will increase under the Proposed Action; noise, therefore, would be the same as under the No Action alternative.	Continue to follow AR 200-1 and *Installation Environmental Noise Management Plan* to evaluate noise that may be produced by ongoing and proposed Army actions/activities, and minimize impacts and annoyance to the greatest extent practicable. Continue to implement Army Compatible Use Buffer program to maximum extent possible.

TABLE ES-1
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Practice/Mitigation
Geology and Soil		
No increased ground disturbance from construction projects.	Temporary increase in potential for sedimentation and erosion due to ground disturbance associated with construction and demolition projects.	Implementation of standard BMPs would minimize potential for soil erosion during construction and demolition activities.
Increased training activities such as tank defilades, tank traps, neutral pivot turns, repeated vehicle passes, and bivouacking may cause direct impacts to soils such as compaction and ruts.	Similar types of training impacts as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Continue to implement land management and environmental programs to balance training requirements and the need to maintain quality training lands for sustained military use. Continue to implement reclamation projects to repair erosion on the downrange area. Continue to educate troops and implement training guidelines (e.g., no tank turns from a stopped position) to minimize impacts of training activities on soils.
Training on wet soils may increase rutting and permanently destroy existing vegetative cover (root systems).	Similar types of training impacts as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Continue to educate troops and implement training guidelines (e.g., no tank turns from a stopped position) to minimize impacts of training activities on soils. Continue to implement erosion control and maneuver damage repair or reclamation projects for areas damaged by training activities.
Increased wind and water erosion in areas where vegetative cover is compromised.	Similar types of training impacts as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Continue to implement erosion control and maneuver damage repair or reclamation projects for areas damaged by training activities or subject to other forms of vegetation and soil degradation.
Water Resources		
No increased ground disturbance or use of fuels, solvents, or other hazardous materials would occur from construction projects.	Ground disturbance from construction and demolition activities could result in erosion or sediment transport to surface waters. Spills of fuels, solvents, or other hazardous materials used during construction could adversely affect water resources.	Employ standard erosion control BMPs (e.g., silt fences, hay bales) during construction to reduce potential for pollutants, including sediment, to enter surface waters. Develop, implement, and enforce a Stormwater Management Plan designed to reduce the discharge of pollutants from Municipal Separate Storm Sewer System (MS4) to the maximum extent possible to protect water.

TABLE ES-1
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Practice/Mitigation
No change to impervious surface areas. No appreciable increase in stormwater flows.	Increase in impervious surfaces (from buildings and paved areas) could increase stormwater runoff and potential for pollutants to affect surface water quality and floodplains.	Comply with requirements of stormwater discharges from Federal Facility Small Municipal Separate Storm Sewer Systems permit to capture and treat runoff associated with new impervious surfaces.
Increased use of fuels and solvents during training increases chances for accidental spills and pollutants affecting water resources.	Similar potential impacts as the No Action alternative but chances for accidental spills and pollutants affecting water resources could be greater because of increased frequency of training activities.	Existing *Spill Prevention Control and Countermeasures Plan* will be updated to indicate any new sources of potential spills.
Increased erosion from increased training activities, including mechanized maneuvers, crossing dry drainages, and training in wet conditions, may cause erosion and result in increased sedimentation of surface waters.	Similar types of training impacts as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Continue to implement environmental and land management programs to minimize the potential for wind and water erosion of soils and indirect impacts to water quality. Continue to develop and implement Integrated Training Area Management (ITAM) projects to repair training land damage and stabilize areas against erosion.
Increased use of groundwater to support increased training activities could affect water supply or stress aquifer.	Similar types of training impacts as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Fort Carson has sufficient water rights to accommodate groundwater use, and no mitigation is required.
Biological Resources		
No impacts to wildlife or vegetation would occur as a result of construction activities.	Construction in the Cantonment and training areas would result in temporary ground disturbance, permanent loss of small areas of native vegetation, and minimal loss of native wildlife habitat.	Areas disturbed during construction would be reclaimed and revegetated with native or other suitable vegetation, as appropriate. Wildlife displacement and most wildlife habitat loss will be temporary and, therefore, no mitigation is necessary.
Mechanized training activities and pedestrian traffic would result in continued damage to vegetation, including loss of cover, injury to shallow roots, and altered plant species composition.	Similar types of training impacts as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Continue to use the Army's land and environmental management programs on Fort Carson to provide for sustainable land management. Continue to coordinate training activities among G-3, DPTM-Range Division, and the Directorate of Environmental Compliance and Management (DECAM) staff. Continue to follow environmental plans and regulations, and use ITAM to repair vegetation damage.

TABLE ES-1
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Practice/Mitigation
Live-fire training activities can result in damage from ammunition impacts. Firing of live-fire tracer rounds could result in accidental wildfires.	Similar types of training impacts to biological resources as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Continue to follow existing land and environmental management programs as noted above. Continue to use prescribed burning to create buffer areas and provide additional protection from wildfires near live-fire training activities.
Continued impacts to wildlife would occur as a result of training activities.	Similar types of impacts to wildlife as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Continue to implement the Army's land and environmental management programs as noted above. Buffer zones around sensitive wildlife locations, such as bird nests, would be accommodated where feasible. Existing species management plans would continue to be implemented.
Cultural Resources		
No impacts associated with construction or demolition projects.	No effect to known National Register of Historic Places (National Register)-eligible sites expected from construction of facilities under the Proposed Action. Potential for inadvertent impact to cultural materials and/or human remains uncovered in the course of ground-disturbing activities during construction.	Construction areas have been surveyed, and no National Register-eligible properties are present and, therefore, no mitigation is required. Fort Carson's "Inadvertent Discovery of Archaeological Resources or Burials Standard Operating Procedure (SOP)" and the "Native American Graves Protection and Repatriation Act of 1990" SOP will be applied and enforced.
Potential for adverse effects to the National Register-eligible Turkey Creek Rock Art District site because of increased training activity.	Same as the No Action alternative but potential could be greater because of increased frequency of training activities.	Any activities with the potential to adversely affect cultural resources will be evaluated and resolved under the Section 106 effect determination and mitigation processes.

TABLE ES-1
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Practice/Mitigation
Potential for inadvertent impact to cultural materials and/or human remains uncovered in the course of training activities.	Same as the No Action alternative but potential could be greater because of increased frequency of training activities.	No mitigation required for use of areas inventoried for cultural resources that contain no National Register-eligible historic properties. Areas that contain known National Register-eligible historic properties or that have not yet been surveyed will be used for dismounted training only until the proposed use area has been evaluated to determine that cultural resources can be protected against adverse impacts. If impacts cannot be avoided, further consultation with the Colorado State Historic Preservation Office and/or Native American Tribes, if applicable, regarding mitigation would occur prior to ground-disturbing activities. Fort Carson's "Inadvertent Discovery of Archaeological Resources or Burials SOP" and "NAGPRA SOP" will be applied and enforced.
Socioeconomics		
No change to socioeconomic conditions.	Minor temporary economic benefits to the region of influence (ROI) associated with construction expenditures and employment. Minor long-term economic benefits (increased sales volume, employment, and income in the ROI) associated with population expansion at Fort Carson. Minor increase in demand on schools, housing, and public services/amenities in the ROI.	The economic and social measures within the ROI are adequate to absorb the population increases and construction demand. No mitigation is required.
Transportation		
No impacts to traffic associated with construction projects.	Temporary increase in traffic on the roadways in the Cantonment and surrounding Fort Carson due to construction.	Implementation of standard traffic control procedures during construction and limiting construction vehicle movements during rush hours and within administrative, housing, and school areas would minimize temporary construction impacts.

TABLE ES-1
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Practice/Mitigation
Minor increase in congestion on installation roadways.	Increased demand at access control points and traffic congestion on installation roadways from higher troop and dependent population.	Implementation of the suggested transportation improvements outlined in the *Fort Carson Comprehensive Transportation Study* would minimize impacts of increased traffic volumes. Opening Gates 6 and 19 would accommodate additional traffic demand.
Continued regional growth would increase traffic volumes on regional roadway systems by at least one-third in the vicinity of Fort Carson.	Further increase of traffic volumes on regional roadway networks resulting from additional troops and dependents relocated to Fort Carson.	Implementation by local agencies of programmed improvements contained in the PPACG Transportation Improvement Plan would accommodate Fort Carson traffic growth.
No change to rail, aviation, or transit systems.	Additional use of the rail line connecting Fort Carson and the Pinon Canyon Maneuver Site (PCMS) due to increased training at the PCMS. Potential increased transit ridership on buses serving Fort Carson. No change to aviation systems.	Advanced scheduling of rail shipments through the Installation Transportation Officer would minimize the effects of increased use of the rail system. Continue to coordinate with Mountain Metropolitan Transit to assess Fort Carson's transit needs would accommodate for increased bus ridership.
Utilities		
Potable water system sufficient to support the No Action alternative.	Existing water lines would not support the addition of personnel at Fort Carson.	Planned upgrades of water lines as well as construction of new service and supply lines and water pump would minimize impacts to the potable water supply.
Sanitary sewer is not available for the Training Support Complex, Ammunition Supply Point, and training areas along Wilderness Road.	Increased personnel would result in an additional load on sanitary sewage facilities, which may exceed the capacity of existing septic tanks, portable toilets, dry vault, and latrine toilets. The increase of personnel will further stress the inadequate sanitary sewer system.	Installation of additional sanitary sewer lines and connection to the Fort Carson Wastewater Treatment Plant will eliminate need for septic tanks, portable toilets, and vault latrine toilets during training activities and minimize impacts resulting from increased training. Modification to wastewater treatment plant to meet new ammonia effluent limitations if necessary.
Stormwater system is at or near capacity. Flooding occurs in some areas.	Construction of new facilities will generate increased stormwater runoff from additional impervious surfaces. Stormwater conveyance system may be inadequate to handle increased stormwater flows.	Upgrade to stormwater system and implementation of post-construction BMPs would minimize impacts.

TABLE ES-1
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Practice/Mitigation
Existing natural gas system is inadequate to meet training needs.	Increased personnel and training would result in increased natural gas demand at Fort Carson. System is inadequate to meet demand.	Planned upgrades to electrical and natural gas systems and coordination with Colorado Springs Utilities to provide additional capacity would satisfy increased demand.
Existing electrical system is sufficient.	Increased personnel and training would result in increased electricity demand at Fort Carson.	Installation of an additional electric substation, transformer upgrades, and coordination with Colorado Springs Utilities to provide additional capacity would minimize impacts from increased demand on the energy supply.
Fort Carson will obtain a portion of its electricity from renewable energy resources and is installing a 2 megawatt solar array on the installation.	Commitments to renewable energy will continue under the Proposed Action.	Continue renewable energy commitments and energy efficient projects.
Upgrades to the communications system are needed within the Cantonment and downrange area.	Proposed action would upgrade the existing communications system on Fort Carson, improving communications for personnel and training activities.	Planned upgrades to the communication system included in the Proposed Action would satisfy demand.
No changes anticipated to solid waste generation or management.	Solid waste generation will increase with additional personnel and increased training.	Continue to manage generated solid wastes in accordance with the existing *Integrated Solid Waste Management Plan* would reduce the impact of increased solid waste generation.
Hazardous and Toxic Substances		
Quantity or frequency of use or exposure to hazardous materials would not change.	Increased personnel would result in an increased use of hazardous materials associated with routine vehicle and equipment maintenance.	Continue to implement existing management plans.
Increased training would result in an increase in special hazards (munitions and unexploded ordnance [UXO]),	Similar types of training impacts as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Continue to implement management plans and SOPs for munitions handling and UXO removal.
No increase in use or exposure to hazardous materials would result from construction.	Construction/demolition and operation of new facilities would result in an increase in the use of petroleum-based products; an increase in the generation of and exposure to lead, asbestos, polychlorinated biphenyls, and chlorofluorocarbon wastes; and a potential increased risk within the Cantonment and downrange area to the exposure of naturally occurring radon.	Continue to implement hazardous waste and radon management plans to minimize impacts from increased waste use and production during construction, and to minimize potential for radon exposure in new facilities.

TABLE ES-1
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Practice/Mitigation
No change in the generation of or exposure to radiological wastes.	Generation of/exposure to radiological materials would increase as a result of the new medical and dental facilities.	Management of radiological materials (and waste) in accordance with existing plans would minimize adverse impacts from exposure to increased materials and wastes.
No disturbance to existing Solid Waste Management Units (SWMUs) would result from construction.	Potential for disturbance of SWMUs during construction activities.	Coordination with CDPHE and the Restoration Program and consultation with plans, site documents, and DECAM staff to address design, avoidance, and project siting would help to avoid or minimize impacts to existing contaminated sites.

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1.0 Purpose, Need, and Scope

This section presents the Purpose and Need for the Proposed Action, the scope of the environmental analysis under the National Environmental Policy Act (NEPA), a summary of the public involvement conducted in support of this *Fort Carson Transformation Environmental Impact Statement* (EIS), and the legal framework for the EIS analysis.

1.1 Introduction

The U.S. Army (Army) is currently undergoing transformational activities to respond to the emerging challenges of the 21st century. Chief among these challenges is the need to be able to respond more rapidly to enemy threats across the full spectrum of military operations. These changes would affect most, if not all, aspects of the Army's doctrine, training, leader development, organizations, installations, materiel acquisition and fielding, and Soldiers.

The restationing and transformation actions for Fort Carson are expected to occur between 2006 and 2011. The Army is preparing this *Fort Carson Transformation EIS* in compliance with its responsibilities under NEPA to assess the direct, indirect, and cumulative environmental and socioeconomic effects of implementing three Army transformation programs at Fort Carson, Colorado. According to its vision statement, Fort Carson, "…as one of the Army's Flagship installations, conducts Joint enabled, Multi-Component Battle Command Training to provide equipped and ready Soldiers, units and leaders for Combatant Commanders. We continue to increase strategic responsiveness and flexibility, and quality of life for our Soldiers and families, while remaining a committed community partner."

The Pinon Canyon Maneuver Site (PCMS) is a separate maneuver training facility under the command and administrative responsibility of Fort Carson. The PCMS, which is located approximately 150 miles (mi) southeast of Fort Carson, is discussed in this EIS because of the relationship between training activities at Fort Carson and the PCMS. The Army is assessing environmental and socioeconomic impacts of transformation programs at the PCMS in the *PCMS Transformation EIS*. The PCMS is discussed in this *Fort Carson Transformation EIS* in instances where doing so provides context for alternatives at Fort Carson.

1.2 Purpose and Need for the Action

The three major Army programs affecting Fort Carson are the Base Realignment and Closure (BRAC) 2005; the Integrated Global Presence and Basing Strategy (IGPBS), also called the Global Defense Posture Realignment (GDPR); and the Army Modular Force (AMF). Under the direction of these programs, Fort Carson would receive additional troops at the installation because of BRAC 2005, IGPBS, and AMF; restructure its forces under AMF; and implement new training requirements for new and existing troops. Implementing these requirements would involve constructing new facilities to support additional Soldiers and their dependents; modifying range and training areas, including new construction; and

increasing the use of live-fire training ranges and maneuver areas at Fort Carson. The needs associated with these programs are summarized below.

1.2.1 Base Realignment and Closure

BRAC 2005 provides a process by which a military installation can be closed or realigned to meet the infrastructure, training, and force structure requirements of the military while saving taxpayers' money. In previous years of BRAC activities, the explicit goal was to save money and downsize the military to reap a "peace dividend." During BRAC 2005, the Department of Defense (DoD) sought to reorganize its installation infrastructure to support its forces efficiently, increase operational readiness, and facilitate new ways of conducting its business. Recommendations of the BRAC 2005 Commission, made in conformance with the provisions of the Base Closure and Realignment Act of 1990, require the realignment of essential missions (that is, relocation of organizational units from one installation to another).

The BRAC 2005 Commission sought to help the U.S. armed forces adapt to changing threats, evolving technology, reconfigured organizational structures, and new strategies. The Commission's goal was to ensure the Army's infrastructure supported that process of adaptation. Thus, BRAC 2005 represents more than just cost savings. It supports advancing the goals of transformation, improving military capabilities, and enhancing military value.

The BRAC 2005 Commission submitted its recommendations to President George W. Bush on September 8, 2005. On September 15, 2005, President Bush notified Congress of his approval of the Commission's recommendations. Under the Base Closure and Realignment Act of 1990, as amended, Congress had until November 9, 2005, to reject those recommendations in total. When it did not do so, those recommendations became law (Defense BRAC, 2005). The Commission approved the following recommendations relevant to Fort Carson:

- Realign Fort Hood, Texas, by relocating a Brigade Combat Team (BCT) and Unit of Employment (UEx) Headquarters (HQ) to Fort Carson, Colorado.
- Realign the U.S. Air Force Academy (USAFA), Colorado Springs, Colorado, by relocating (to Fort Carson) the inpatient mission of the 10th Medical Group and converting it into a clinic with an ambulatory surgery center.

The BRAC 2005 actions would result in a new division HQ to provide command and control for four BCTs, including the restationed Heavy BCT (HBCT) from Fort Hood to Fort Carson. Fort Carson would be responsible for housing troops and supporting the needs of the Soldiers and their dependents. Fort Carson also would be responsible for providing live-fire and ground-maneuver training for most platoon-level and some company-level exercises. The PCMS would provide training for units or activities that cannot be accommodated on Fort Carson because of its limited size.

1.2.2 Integrated Global Presence and Basing Strategy

The IGPBS is a blueprint of recommendations outlining the size, character, and location of long-term overseas force presence. Its recommendations were developed before the initiation of formal BRAC 2005 activities as part of an interagency assessment of the DoD's

long-term overseas force projection and basing needs. On the basis of the IGPBS recommendations, the Secretary of Defense announced that some forces currently based overseas would return to the United States over a period of years. BRAC 2005 takes into account and incorporates some of the basing recommendations of the IGPBS.

Following IGPBS recommendations, the Secretary of Defense made a decision to station temporarily an Infantry BCT (IBCT) from Korea to Fort Carson in 2005. The Army has now determined that this IBCT will be stationed permanently at Fort Carson. Under its NEPA requirements, the Army issued a Record of Environmental Consideration for the temporary stationing of the IBCT at Fort Carson in 2005. The Record of Environmental Consideration concluded that no environmental impacts would result from the temporary stationing action because net troop strength would not increase because of deployments of other Fort Carson units to Iraq. Economic and traffic analyses were conducted to confirm that economic or traffic impacts did not result from the restationing action (Directorate of Environmental Compliance and Management [DECAM], 2005a).

1.2.3 Army Transformation and the Army Modular Force

In 1999, the Army initiated the Army transformation process to restructure and transform its active duty forces. In 2002, the Army prepared a *Final Programmatic EIS for Army Transformation* (U.S. Army Corps of Engineers [USACE], 2002a) and signed a Record of Decision (ROD) (Army, 2002) to proceed with a 30-year phased implementation of Army transformation. To ensure the Army would be properly postured to support ongoing operations in support of the global war on terror, an initiative was implemented to restructure combat brigades into self-sufficient and standardized BCTs and increase the number of combat brigades. This restructuring is known as the AMF. The AMF provides an operational Army that is more powerful, flexible, and rapidly deployable and allows the Army to continue its transformation to a campaign-quality force with joint and expeditionary capabilities that meet the future demands. The Army plans to implement AMF and convert all Active and Component units to BCTs by 2007, including existing forces stationed at Fort Carson, and increase the Army's overall number of Active Component BCTs across the Army from 28 to 43.

As part of AMF, the Army adopted a decision to realign the 3rd Armored Cavalry Regiment (3rd ACR) from Fort Carson to Fort Hood. Two additional HBCTs would be stationed at Fort Carson, and new engineering, explosive ordnance, and military police units would be activated. The Army would activate and inactivate other smaller and supporting units throughout the implementation period to support AMF and transformation.

Transformation also addresses changes in weapons systems. Future weapons systems would be more lethal and have targeting capabilities that far surpass current weapons systems. Both aerial and ground-operated robotics will be integrated into the transformed future force. Digital command and control of units will become the standard, and digital ranges must be built to support these digitally enhanced units. These technological changes will enable BCTs to operate on expanded battlefields and will require larger maneuver training areas to train effectively.

One of the substantive results of the AMF is the growing and evolving training requirements. Because changes to training requirements influence the land area required for

training at both Fort Carson and the PCMS, these requirements are addressed separately under Section 1.2.4.

1.2.4 Army Training Strategy and Doctrine

Current training needs have been shaped by AMF and transformation, operational experience in Afghanistan and Iraq, and new equipment capabilities. Training requirements are outlined in Training Circular (TC) 25-1, *Training Land* (Army, 2004a), and TC 25-8, *Training Ranges* (Army, 2004b).

Training in the current operational environment requires large maneuver or training areas of varying characteristics with complex terrain. The Army has an increased need to conduct urban training operations. Trends toward greater urbanization in operational theaters across the globe require the Army to provide security, stability, and counterinsurgency operations in populated urban environments. The military's experiences from Iraq and Afghanistan have demonstrated that Special Forces operations, intelligence gathering, and the use of joint multi-service and multinational (sister service and coalition) assets are also critical to mission success and defeat of a poorly defined and dispersed enemy force. Therefore, the Army is making efforts to emphasize urban, Special Forces, intelligence gathering, and joint and multinational training at Fort Carson and the PCMS to ensure mission success in the operational theater, now and in the future.

High-quality training that prepares Soldiers for what will be encountered in the operational environment is essential to ensuring the success of the nation's strategic defense objectives, national security, and the safety of Soldiers. Home stations, such as Fort Carson, must prepare Soldiers for operational deployments and missions. This preparation includes live-fire mission support and maneuver training, each of which is discussed below.

1.2.4.1 Live-Fire Mission Support Requirements

Training ranges provide live-fire training opportunities to develop and improve Soldier and team proficiency and competence in the use of sophisticated weaponry. Individual Soldier proficiency and collective training ranges realistically portray combat conditions to mold the team into an effective fighting unit. This capability can be validated only on a live-fire range or complex.

The training of the critical tasks that individual, crew, platoon, and companies must accomplish to be combat ready is directly related to the availability and capability of using live-fire ranges and maneuver areas. To train one modular HBCT to standard and to qualify Soldiers on individual weapons requires proficiency on a "set" of live-fire ranges, as determined by TC 25-8, *Training Ranges* (Army, 2004b). Tank crews and individual Soldiers from battalions, companies, and platoons rotate through the necessary gunnery, live-fire, and qualification ranges on a sustained basis. The number of available training days and range throughput capacity determine the number of ranges required for qualification in a given training cycle (typically 1 year). The throughput capacity of a given range is determined by the number of Soldiers or crews it can accommodate at one time and the duration required for each rotation to fire or qualify. Training additional BCTs or support units does not necessarily require a duplicate set of all types of ranges. As the number of BCTs increases, however, the number of platoons and companies that require training

increase substantially. Consequently, the requirements for certain types of ranges increase accordingly.

1.2.4.2 Maneuver Training Tasks and Maneuver Area Requirements

Ground forces need large, contiguous maneuver or training areas with urban training range complexes and road networks to support "free-flowing" exercises that replicate the contemporary operating environment. Aviation, communication and reconnaissance, and artillery units operate above the ground and/or over large areas of often non-contiguous land remote from other units. The effective integration of these units with ground maneuver is increasingly critical to the success of Army operations and requires intensive training and rehearsal at home stations. Many units in Iraq and Afghanistan have been required to provide security across vast operational areas while responding to the range of unpredictable enemy activities with a disciplined and measured response in a moment's notice.

Army BCTs and battalions are required to conduct training missions across the spectrum of operations likely to be executed "in theater," from peace support and stability operations (humanitarian aid, riot control), to low-intensity conflict response (counter-insurgency operations), through missions simulating high-intensity conflict (battlefield engagements against an equipped, armed, and organized opposing force). Effective live training, carried out to a high doctrinal standard, is the cornerstone of operational success. Simulating non-contiguous training increases the depth of the battlefield and requires increased reliance on command, control, communications, and reconnaissance/intelligence gathering systems. It requires flexibility and the movement of units to support combat maneuver elements of the BCT in their given area of operations. Combat support and combat service support units may be located in brigade or battalion areas that are distant from the forward combat and maneuver elements, but such units also must be prepared to relocate and respond to enemy actions as the operation and tactical situation changes. Extensive land areas (30 mi by 10 mi [48 kilometers (km) by 16 km]) are required to test such skills and capabilities adequately, especially for aviation and artillery units that use small fixed positions but require large operational areas in terms of airspace. The BCT is responsible for areas approximately the same size as areas covered by an entire division during World War II.

Additional training considerations include the need to conduct realistic maneuver training at night, without interference from point source light pollution, which is especially important because the Army fights at night and uses night capabilities to its advantage. Operating at night is a critical task for both ground maneuver and aviation units, especially for aviation units using night vision equipment. As with non-contiguous area training, night exercises require large areas and flight corridors located away from base camps and other light sources.

In addition to having adequate space to conduct maneuver exercises, effective and realistic training requires types of terrain that could be encountered in various regions and ecosystems of the world where Army units may be deployed. Deserts, forests, plains, and steep terrain all present unique challenges to units conducting combat and support operations, and as discussed above, providing Soldiers with urban training complexes is becoming increasingly important to ensure their operational readiness.

Army doctrinal training requirements for the maneuver units of the two primary Army BCTs (HBCT and IBCT) and their component units are presented in Table 1-1. It should be noted that these units represent the post-modularity structure of the Army (that is, after implementation of the AMF).

TABLE 1-1
Summary of Maneuver Training Requirements by Unit Type
Fort Carson Transformation EIS, Fort Carson, Colorado

Unit Type	Number of Assigned Units	Size of Training Area Required	Training Rotation Duration (weeks)	Frequency of Training Required (number per year)
HBCT	1	48 x 16 km (29.8 x 9.9 mi)	3	1
Battalion	3	48 x 8 km (29.8 x 5.0 mi)	3	1
Company	11	16 x 6 km (9.9 x 3.7 mi)	1	5
Platoon	35	6 x 4 km (3.7 x 2.5 mi)	1	5
IBCT	1	19 x 12 km (11.8 x 7.5 mi)	3	1
Battalion	3	38 x 12 km (23.6 x 7.5 mi)	3	1
Company	8	16 x 6 km (9.9 x 3.7 mi)	1	5
Platoon	26	6 x 4 km (3.7 x 25 mi)	1	5

Source: U.S. Army Forces Command (FORSCOM, 2006).

Fort Carson can support the land-area requirements of platoon and limited company maneuver operations but does not have the contiguous maneuver acreage to support doctrinal battalion- or BCT-level training. The PCMS was established as a satellite area to support these training needs. The implementation of maneuver training requirements (platoon-level) at Fort Carson for the No Action alternative and Proposed Action analyzed in this EIS is described in detail in Sections 2.2.4 and 2.3.4, respectively.

1.2.5 Installation Sustainability

On October 1, 2004, the Secretary of the Army and the Army Chief of Staff issued the *Army Strategy for the Environment* (Army, 2004c), which focuses on the interrelationships of mission, environment, and community. A sustainable installation simultaneously meets current and future mission requirements, safeguards human health, improves quality of life, and enhances the natural environment. A sustained natural environment is necessary to allow the Army to train and maintain military readiness. This strategy is implemented by Army Regulation (AR) 200-1, "Environmental Protection and Enhancement," which reinforces the Army's commitment to applying sustainable policies and practices to safeguard the environment. It builds upon the numerous environmental plans and policies

that are developed and implemented to protect environmental resources at Fort Carson. As an installation, Fort Carson has developed Master Planning Strategy Smart Growth Principles that provide 10 specific goals for facility siting and usage that guide conservation at Fort Carson. Appendix A summarizes key plans and policies, including the Smart Growth Principles, in place at Fort Carson.

Fort Carson has implemented numerous voluntary programs to achieve a more sustainable installation. Several goals have been established, both for short-term and long-term implementation, in areas such as energy/water, transportation, air quality, buildings, green procurements, zero waste, and training lands. Fort Carson has received numerous awards and recognition from both the military community and external organizations for its commitment to the environment and its sustainability program. Some notable examples of Fort Carson's sustainability program are evident by the following recent achievements:

- Fort Carson established an alternative-fuel vehicle program, which includes 58 compressed natural gas vehicles, 129 E85/flex fuel vehicles, and 12 electric hybrid vehicles. Fort Carson began dispensing E85 (a fuel blend normally consisting of 85 percent ethanol and 15 percent gasoline) in August 2006, and by January 2007, a total of nearly 28,000 gallons of E85 had been sold for personal vehicles or issued to government-owned vehicles.
- Fort Carson signed a 5-year contract to purchase 40,000 megawatt hours (MWH)/year worth of Renewable Energy Certificates from wind and biomass power, accounting for 28 percent of Fort Carson's electrical use.
- Fort Carson incorporated an energy-efficient, indirect evaporative cooling system during the renovation of two dining facilities.
- Fort Carson entered into a "deconstruct" demolition contract, where materials from a building being removed were salvaged and used for other projects on the installation rather than being shipped to a landfill.

As noted throughout this EIS, Fort Carson will operate in compliance with applicable environmental regulations. Additionally, Fort Carson has committed to achieving a higher level of environmental performance through continued progress toward its sustainability goals. However, implementation of these voluntary measures may be subject to funding limitations. Additional information regarding Fort Carson's sustainability achievements and future goals can be found at http://sems.carson.army.mil/.

The Army recognizes that executing training to doctrinal standards to maintain the readiness of its units affects its training lands. To manage its training lands in a sustainable manner, the Army has instituted land and environmental management programs to support sound natural resource management practices and provide stewardship of its training lands. The Integrated Training Area Management (ITAM) establishes procedures to achieve optimum, sustainable use of training lands by implementing a uniform land management program, elements of which include inventorying and monitoring land condition, integrating training requirements with land carrying capacity while training to standard, educating land users to minimize adverse impacts, and prioritizing and implementing rehabilitation and maintenance projects. The program seeks to optimize training while providing sustainable land management that will ensure that training lands continue to be

available to support the Army's mission. ITAM is governed by AR 350-19 and Fort Carson (FC) Regulation 350-9. Other resource management procedures are provided in Fort Carson's *Integrated Natural Resource Management Plan* (*INRMP*) (DECAM, 2002a), *Integrated Cultural Resource Management Plan* (*ICRMP*) (DECAM, 2002b), and other plans and procedures as summarized in Appendix A. Implementation of the ITAM program and other environmental programs at Fort Carson for the No Action alternative and Proposed Action analyzed in this EIS is described in greater detail in Sections 2.2.4 and 2.3.4, respectively.

1.2.6 Public Law 104-201

Public Law 104-201, the National Defense Authorization Act for Fiscal Year 1997, extended for another 15 years the withdrawal from all forms of appropriation under the public land laws 3,133.02 acres of public land and 11,415.16 acres of federally owned minerals.

As described in Section 2902 of Public Law 104-201, these public lands and minerals, located in El Paso, Pueblo, and Fremont counties, Colorado, entirely within the boundaries of Fort Carson, are withdrawn for military purposes. The lands consist of discontiguous parcels located primarily in the southern one-third of the installation. The withdrawal requires the Secretary of the Army to determine at least 3 years before the termination (that is, September 2008) whether the withdrawal will need to be extended because of continuing military need. The law also requires the Army to determine the environmental effects of military activities on the withdrawn lands. Finally, the Army is required to hold a public hearing concerning the evaluation of the environmental effects on the public domain lands and minerals. The results of BRAC 2005, along with the other transformation actions described above, clearly reflect that the Army's military need for the Fort Carson installation will continue.

The environmental effects of the renewal of the withdrawal are essentially the effects of the Army's continued use of Fort Carson. The two possibilities for the general shape of that use are fully embodied in either the No Action alternative or the Proposed Action discussed in this EIS. Therefore, the Army will use this EIS as the required evaluation of the environmental effects of renewal of the withdrawal. The public meeting held after release of the Draft EIS (DEIS) served as the public hearing required by Public Law 104-201. Upon completion of this EIS, the Army will have satisfied its requirements under Public Law 104-201 as recited above. It will then have the authority to file an application to the U.S. Department of the Interior (USDI) for extension or renewal of the withdrawal and reservation of the public lands and mineral rights at Fort Carson. Such a renewal or extension will require congressional legislation, and such legislation will itself be subject to analysis under NEPA.

1.3 Scope of the EIS

The Army prepared this *Fort Carson Transformation EIS* in compliance with its responsibilities under NEPA to assess the direct, indirect, and cumulative environmental and socioeconomic effects of implementing transformational activities at Fort Carson, Colorado. The EIS was being prepared in accordance with the requirements of NEPA, the Council on Environmental Quality (CEQ) NEPA-implementing regulations (Title 40 of the Code of Federal Regulations [CFR], Part 1500), Army NEPA-implementing regulations

(32 CFR 651), and other relevant environmental laws, regulations, Executive Orders (EOs), and ARs.

1.3.1 Context for Environmental Analysis Under NEPA

Under the Base Closure and Realignment Act of 1990, Congress limited the scope of NEPA as it applies to the decision to close and realign bases. NEPA does not apply to the consideration of alternatives related to the realignment and restationing decisions. That is, for receiving installations such as Fort Carson, the NEPA analysis does not include considering alternative installations for restationing. Accordingly, this document does not address the need for restationing or the decision by the BRAC 2005 Commission to send units to Fort Carson but does assess potential environmental impacts associated with implementing the BRAC 2005 recommendation.

The ROD resulting from the *Programmatic EIS for Army Transformation* states that "Prior to implementation of transformation-related projects or proposed actions at specific sites, the Army will analyze each action to evaluate potential environmental effects. Identification of site- or project-specific mitigation will occur through this process" (USACE, 2002a). Accordingly, this EIS tiers from this programmatic EIS and addresses the potential environmental impacts that could result from implementing transformation actions at Fort Carson.

In 2006, Fort Carson completed an Environmental Assessment analyzing the construction of a variety of facilities at the installation Cantonment, including the IBCT complex, HBCT complex, and the 4th ID HQ Complex (USACE, 2006b). Also in 2006, Fort Carson completed an Environmental Assessment analyzing the construction of the Installation Information Infrastructure Modernization Program (I3MP), a project to upgrade and modernize communications and information systems at Fort Carson and the PCMS, which includes installation of fiber optic lines in the downrange area (DECAM, 2006d).[1] Construction of several of these projects is underway. The construction projects analyzed in this EIS complement the projects previously analyzed under NEPA and already under construction at Fort Carson and comprise support facilities necessary for Army transformation program implementation at Fort Carson.

1.3.2 Scope of Environmental Analysis

The Army has determined the actions associated with realigning and relocating troops to Fort Carson has the potential to result in significant environmental impacts to land use, air quality, geology and soils, biological resources, cultural resources, noise, traffic, socioeconomic resources, and utilities. Consequently, the Army has prepared an EIS for this action.

[1] The I3MP project was erroneously included in the DEIS analysis. This communication line was already undergoing NEPA analysis as a separate action at the time the DEIS was released. The Environmental Assessment for I3MP was completed shortly after the DEIS was released, a Finding of No Significant Impact was issued, and construction commenced. The I3MP project did not contribute significant environmental effects either on its own or in combination with the Proposed Action as discussed in the DEIS. I3MP was included in the consideration of cumulative impacts, as part of the facilities and infrastructure work mentioned in Section 3.13.1.1. The removal of the I3MP from the Proposed Action does not substantially change the findings or conclusions of the DEIS, although the actual impact of the Proposed Action is slightly less than what was presented in the DEIS in terms of overall ground disturbance and construction costs.

For some of the transformation actions affecting Fort Carson, such as planned construction projects, detailed plans have been initiated. For other actions, some information is known (for instance, new weapons will be developed) but insufficient detail is available to assess impacts of future actions. Therefore, this EIS may be used as a basis on which to tier subsequent environmental documentation for currently unforeseen future actions proposed in the mission, facility, range, or environmental management programs.

The DEIS includes, where applicable, appropriate measures to minimize and mitigate impacts that would result from implementing the Proposed Action. The ROD will specify mitigation measures to be implemented based on Army review of impacts and consultation with regulatory agencies.

1.4 Public Involvement

The Army invited public participation in the NEPA process. Consideration of the comments of all interested persons promoted open communication and enabled better decision making. All agencies, organizations, and members of the public with a potential interest in the Proposed Action, including minority, low-income, disadvantaged, and Native American groups, were provided the opportunity to participate in the decision-making process.

1.4.1 Overview of the Public Involvement Process

Public participation opportunities for this EIS and decision making on the Proposed Action were guided by 32 CFR 651. The EIS process began with involving the public, agencies, and other interested parties in the scoping process to identify the issues to be addressed in the EIS. A DEIS was then prepared and filed with the U.S. Environmental Protection Agency (EPA), and the Army published a Notice of Availability (NOA) in the *Federal Register* and in newspapers in near Fort Carson. A public meeting was held on November 1, 2006, in Fountain, Colorado, to provide an opportunity for the public, organizations, and regulatory agencies to present comments and information. This Final EIS (FEIS) addressing all comments received on the DEIS was released on June 22, 2007, and a NOA for the FEIS was published in the *Federal Register*.

A final decision on the Proposed Action will be documented in a ROD. The Army will issue the ROD after a 30-day waiting period. The NOA of the ROD will be published in the *Federal Register*.

1.4.2 Scoping and Public Notice

On November 23, 2005, the Department of the Army issued in the *Federal Register* a Notice of Intent (NOI) to "Prepare Environmental Impact Statements for Realignment Actions Resulting from the 2005 Base Closure and Realignment Commission's Recommendations" (70 FR 70793). In addition, individual letters were sent to invite agencies to a scoping meeting, and notice of a public meeting was publicized in local papers and through a public service announcement.

1.4.2.1 Agency Scoping

Agencies with permitting review responsibilities and other interested parties were invited to the agency scoping meeting held at the Pueblo Convention Center in Pueblo, Colorado,

on April 24, 2006, from 1:00 to 2:00 p.m. Of the 39 invited organizations, representatives from the following seven agencies attended the scoping meeting:

- USACE, Southern Colorado Regulatory Office
- U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS)
- Colorado Division of Wildlife
- Pikes Peak Area Council of Governments (PPACG)
- USDI, U.S. Geological Survey (USGS)
- USDI, U.S. Fish and Wildlife Service (USFWS)
- Colorado Division of Water Resources

The agency scoping meeting was conducted in a presentation format. The Director of DECAM presented information about the proposed actions at both Fort Carson and the PCMS. He was supported in his presentation by the NEPA Coordinator for Fort Carson, the NEPA Coordinator for the PCMS, and other resource area experts from Fort Carson and the PCMS. The meeting lasted approximately 45 minutes.

Agency representatives in attendance raised general questions or issues for consideration in the EIS during a question and answer period following the presentation. No specific comments or concerns were raised regarding the Fort Carson Proposed Action. All comments related to the PCMS and included questions about changes to the training schedule, soil erosion and sedimentation of surface streams, and noxious weeds. No written agency comments were received.

1.4.2.2 Public Scoping

A public scoping meeting was held at Fountain-Fort Carson High School in Fountain, Colorado, on April 25, 2006, from 6:30 to 8:00 p.m. Approximately 2 weeks before the public scoping meeting, a notice of the meeting was published in the following 10 general-circulation papers: *The Gazette, Fountain Valley News, Pueblo Chieftain, La Junta Tribune-Democrat, Bent County Democrat, Fowler Tribune, Trinidad Chronicle, Rocky Ford Daily Gazette, Ordway New Era,* and the *Ag Journal*. These public notices provided information on the background and purpose of the Proposed Action, requested public comment, and provided information on the public scoping meeting. In addition, Fort Carson released a public service announcement regarding the public scoping meeting on April 12, 2006.

The Army was represented by staff from Fort Carson DECAM, Directorate of Public Works (DPW) representatives, and supported by its consultant. Excluding Army or consultant staff, the meeting was attended by 20 people, including local media representatives.

The public was greeted on arrival and asked to sign an attendance record form, listing their name, address, affiliation (if any), and whether they would like to be added to a project mailing list. All guests were also given the option to provide written comments or concerns they would like addressed in the EIS, and were provided with comment forms. Members of

the public were asked to either complete and return the forms upon leaving the meeting or return the forms to the Army no later than the close of the scoping period on May 11, 2006.

The public scoping meeting was conducted in a workshop format. Poster displays at stations intended to serve as a self-guided tour introduced the public to the Proposed Action, the NEPA process, and resource issues. The stations were staffed by DECAM and DPW resource experts who explained the project to the public. The meeting lasted approximately 2 hours.

Individuals and organizations provided few written or verbal comments on the scope of the EIS during the public comment period. Those comments received generally addressed potential effects to water supplies and biological resources on and around the installation, and noise effects on the El Rancho development near the installation boundary.

Additional details regarding the meeting, as well as transcripts of all public comments, are available in the *Fort Carson Transformation EIS Scoping Meeting Summary Report* (USACE, 2006a).

1.4.3 Review of the DEIS

In accordance with CEQ and Army regulations for implementing NEPA, a period of public comment on the DEIS was provided prior to completion of this FEIS. This section provides an overview of the review period and public review meetings, and summarizes the types and numbers of comments received on the DEIS. All comments that were received have been considered in preparing the FEIS. Appendix H contains a complete record of the comments submitted to the Army on the *Fort Carson Transformation DEIS* and presents the Army's responses to those comments.

The public review period for the DEIS was from October 13, 2006, to January 11, 2007. The NOA of the DEIS, as well as announcement of a public review meeting, was published in the *Federal Register* on October 13, 2006 (71 FR 60509). In addition, display ads were placed in the same 10 local newspapers as the scoping announcements. Federal, state, and local agencies, as well as members of the public who participated in the scoping process were sent letters providing information on the availability of the DEIS and providing details regarding the public review meeting. Members of Congress received an informational packet that included questions and answers and a description of the DEIS. Copies of the DEIS were available online at <http://www.hqda.army.mil/acsim/brac/nepa_eis_docs.htm>, placed in local libraries, and mailed to anyone who requested a copy. Section 5.0 of this FEIS presents an updated list of those to whom the DEIS was distributed.

During the preparation and review of the DEIS, the Army also coordinated closely with local, state, and federal entities to ensure that issues of concern and relevance to the Transformation Proposed Action were considered. The EPA provided comments on the DEIS, as required by its NEPA oversight responsibilities (see Appendix H for EPA correspondence). Results of agency coordination for specific environmental resources are referenced in the respective resource areas included in Section 3.0.

The NOA provided for a 45-day public comment period, which is in accordance with NEPA regulations (40 CFR 1506.10[c]). The initial comment period ended on November 27, 2006. The Army extended the public review period by an additional 45 days in response to public

and elected officials' requests. The extension was publicized in the *Federal Register* (71 FR 69652) and local newspapers. The DEIS comment period ended on January 11, 2007.

The Army held a public meeting on November 1, 2006, from 5:30 to 9:00 p.m., at Mesa Ridge High School in Fountain, Colorado, to present the findings of the DEIS and to receive comments on the DEIS. The meeting was announced in local newspapers and through a public service announcement released by Fort Carson. The meeting notices also provided details about the meeting format and agenda, which included a self-guided review of background materials and display boards between 5:30 p.m. and 6:00 p.m., and oral comments from 6:00 to 7:30 p.m.

The public was greeted on arrival and asked to sign an attendance record form listing their name, address, and affiliation (if any). An informational packet including the following documents was provided at the sign-in:

- Copy of the "Executive Summary" of the *Fort Carson Transformation DEIS*
- NEPA Fact Sheet
- Questions and Answers about the *Fort Carson Transformation DEIS*
- Public Comment Forms

Display boards about the DEIS were also available for review in the hallway of the auditorium before the Army presentation and oral comment period began at approximately 6:15 p.m.

At the welcome table, each person was asked if he/she wished to provide oral comments during the meeting. Anyone desiring to make oral comments was asked to sign in at a separate speakers' table, where he/she was given information about providing oral comments during the meeting. Speakers were signed up to speak in the order in which they arrived; however, elected officials were given an opportunity to speak first.

At approximately 6:15 p.m., Mr. Tom Warren, Director of DECAM at Fort Carson, conducted a short slideshow presentation about the Proposed Action evaluated in the DEIS, the EIS process and its progress to date, and the process for public comment on the DEIS. An Army consultant facilitated the oral comment period beginning with an overview of the meeting logistics, including the location of emergency exits and restrooms, contents of the informational packets, speaker sign-in sheets, and meeting sign-in sheets. The facilitator explained how the oral comment period was organized. Each speaker was limited to 3 minutes and needed to be prepared to speak when his/her name was called. Speakers and the audience were asked to respect the time limits, exercise common courtesy and use appropriate language, and not to interrupt or talk when others are speaking. The facilitator also noted that all comments on the DEIS would be addressed in the FEIS regardless of the manner in which they were received, and speaking at the public meeting was one of the many options available to citizens wishing to provide input to the DEIS.

Approximately 200 people attended the public DEIS review meeting, and 22 chose to provide oral comments. Media coverage of the meeting included television and newspaper outlets. This meeting was held jointly with the *PCMS Transformation DEIS* public review meeting, and most of the comments received were related to the PCMS Proposed Action. Many of the individuals who attended this meeting were concerned about potential expansion of the PCMS and focused their comments on this issue rather than on issues

related to the *Fort Carson Transformation DEIS*. Note that comments related to the PCMS Transformation Proposed Action or to expansion of the PCMS are addressed in the *PCMS Transformation FEIS*.

During the public comment period, approximately 15 individual comment letters and one meeting transcript representing 69 individual comments were received on the *Fort Carson Transformation DEIS*. Appendix H contains the comments received, including the transcript of the public review meeting, and presents the Army's responses to those comments. In some cases, comments prompted clarification from the DEIS that are reflected in this FEIS. Those instances are noted in the applicable portions of this FEIS. None of the clarifications has changed the findings or conclusions of the DEIS.

1.4.4 Availability of the FEIS

The NOA of the FEIS was published in the *Federal Register* on June 22, 2007. Newspaper and individual letter notifications also were provided in the same manner as the DEIS notices. No public meetings will be held for the FEIS. As with the DEIS, the FEIS is available online at <http://www.hqda.army.mil/acsim/brac/nepa_eis_docs.htm>, at local libraries, and by request of the Fort Carson NEPA Coordinator using the following contact information:

Fort Carson NEPA Coordinator
Directorate of Environmental Compliance and Management
1638 Elwell Street, Building 6236
Fort Carson, CO 80913-4000
Telephone: 719-526-4666
Fax: 719-526-1705
Email: carsdecamnepa@conus.army.mil

After a 30-day review period, the Army plans to issue a ROD. The NOA for the ROD will be published in the *Federal Register*. The ROD completes the EIS process.

1.5 Legal Framework

The scope of this EIS is to evaluate how the transformational activities of the Proposed Action would be implemented at Fort Carson (see Section 1.3). The timing for implementing the Proposed Action is contingent on numerous factors, such as mission requirements, schedule, availability of funding, and environmental considerations. In addressing environmental considerations at Fort Carson, the installation is mandated by AR 200-1 to comply with all applicable federal, state, and local environmental regulations and requirements of environmental permits; EOs that establish standards and provide guidance on environmental and natural resources management and planning; and Army and Fort Carson regulations that define overall management of the land at Fort Carson. Many of these guiding statutes and regulations are discussed throughout Section 3.0, where applicable, for the resources evaluated in this EIS.

2.0 Alternatives

2.1 Introduction

This section of the EIS describes the alternatives considered for this EIS. Section 2.2 presents the No Action alternative, as required by NEPA [40 CFR 1508.25(b)], and Section 2.3 presents the Proposed Action, which is the Army's preferred alternative. Section 2.4 presents the alternatives considered but eliminated from detailed consideration because they do not meet the purpose and need.

This EIS evaluates environmental effects of implementing the No Action alternative and Proposed Action (preferred alternative) at Fort Carson. The *PCMS Transformation EIS* assesses potential environmental effects of the proposed realignment and transformation activities on the PCMS.

2.1.1 Location

Fort Carson is located south of Colorado Springs, Colorado, east of the Rocky Mountain Front Range, and occupies portions of El Paso, Pueblo, and Fremont counties (Figure 2-1). Fort Carson is generally bounded by Colorado Highway 115 on the west and by Interstate 25 (I-25) to the east. The City of Denver is located approximately 65 mi north of Fort Carson, and the City of Pueblo lies approximately 10 mi south of Fort Carson's southern boundary. The City of Fountain is immediately east of Fort Carson, and Colorado Springs is just to the north. Fort Carson comprises approximately 137,000 acres and ranges from 2 to 15 mi in width from east to west and up to 24 mi from north to south.

As discussed in Section 1.1, transformational activities at the PCMS are evaluated in the *PCMS Transformation EIS*. The PCMS is discussed in this EIS in the context of the function of the PCMS in supporting training of troops that cannot be accommodated on Fort Carson.

2.1.2 Study Area

As a result of BRAC 2005, IGPBS, and AMF actions, nearly all available land within the boundaries of Fort Carson has the potential to be affected by project alternatives. The majority of construction associated with these actions would be within the Cantonment to just south of Wilderness Road, and additional construction of several small-scale range projects planned for the downrange area. The downrange area within Fort Carson's boundaries would be subject to increased troop training (see Figure 2-2).

The primary study area includes land within the Fort Carson boundary. Effects to areas surrounding Fort Carson are described and considered as appropriate in Section 3.0 based on the Region of Influence (ROI) for environmental resource areas. For instance, effects to biological resources would primarily occur within the boundary of Fort Carson, but effects to other resource areas, such as socioeconomics, utilities, and transportation, could be regional in nature.

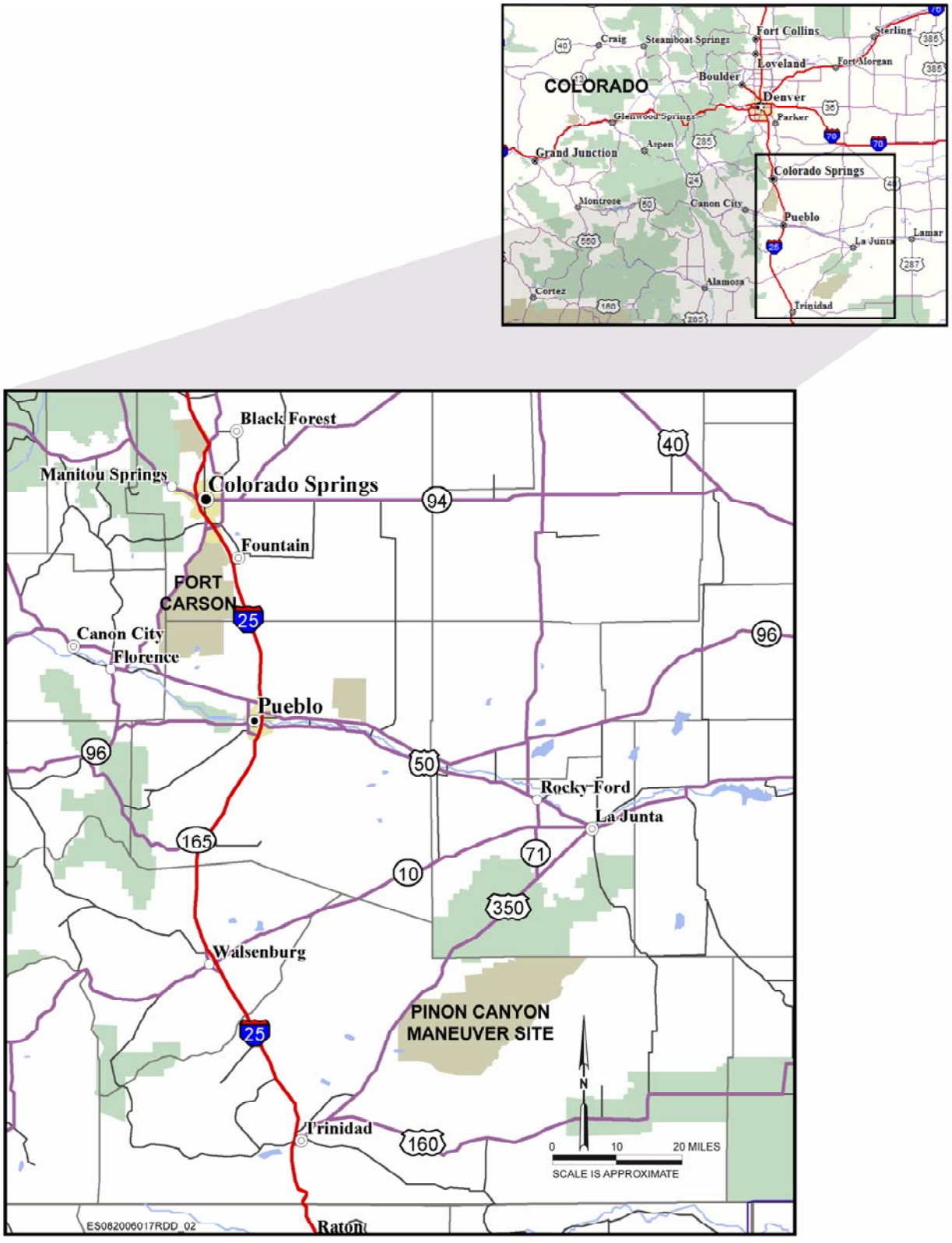
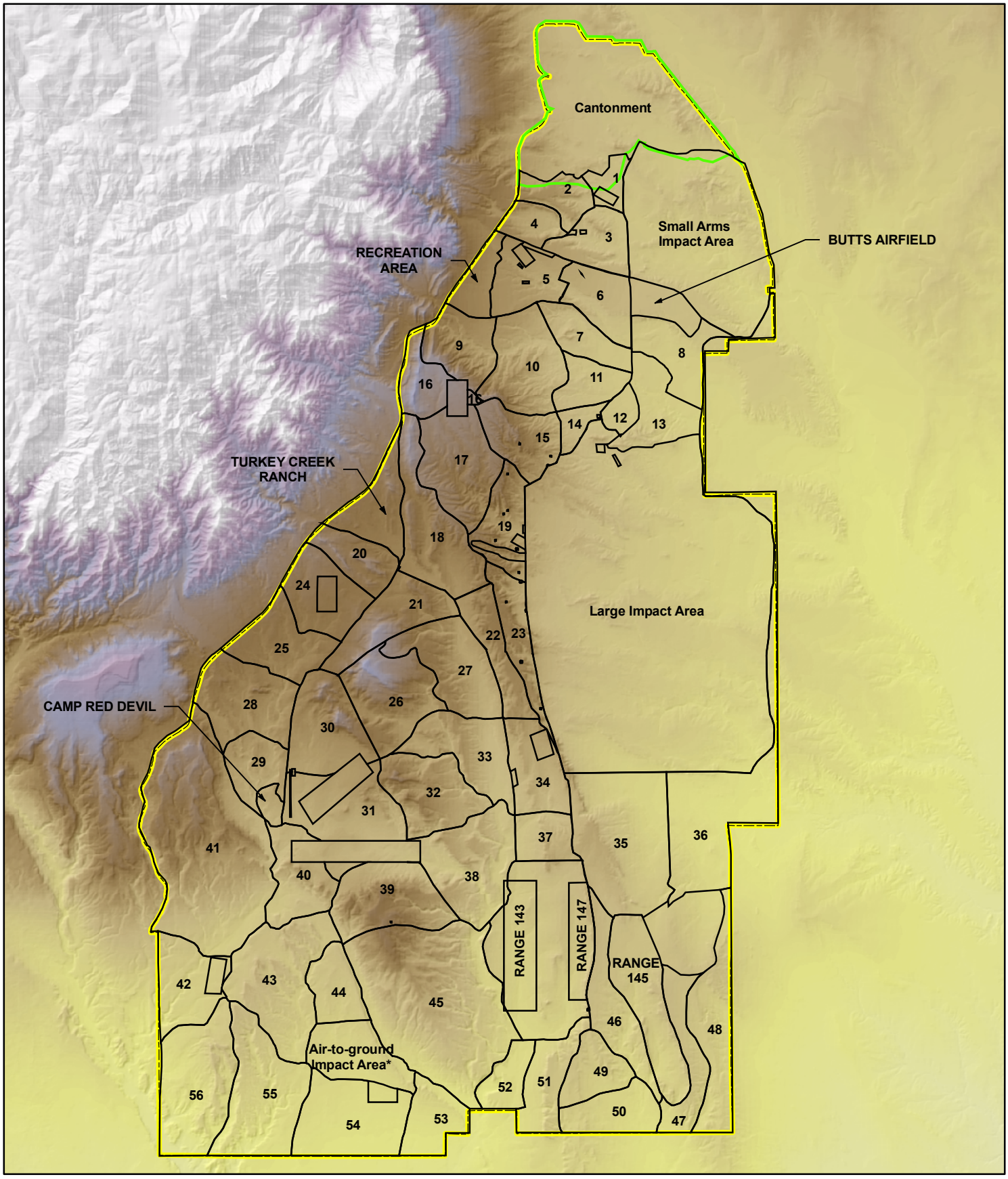


FIGURE 2-1
Regional Location Map



Legend

- Installation Boundary
- Cantonment Area
- Training Areas

*Non-dudded impact area

FIGURE 2-2
Locations of Cantonment and Training Areas at Fort Carson

N

0 1.25 2.5 5 Miles

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2.2 No Action Alternative

Under the No Action alternative, the Army would not implement changes required by the BRAC 2005, IGPBS, and AMF actions (as discussed in detail below in Section 2.3) at Fort Carson. Force structure and assigned personnel and equipment would be as existed prior to the development of these programs. Facility construction and training activities would occur as needed to support the pre-BRAC, pre-IGPBS, and pre-AMF conditions. Any new actions, such as new construction or changes in training activities, would undergo environmental review under NEPA prior to implementation, in accordance with Army regulations and current practice.

This alternative is not feasible because troops are coming, and Fort Carson must provide adequate housing, support, and training facilities to support the new troops (as discussed in Section 1.0). Nevertheless, this alternative is included as required by the CEQ and Army NEPA-implementing regulations, and provides a benchmark to compare the magnitude of environmental effects of the Proposed Action.

2.2.1 Force Structure and Population

The No Action alternative considers the force structure that was in place in the fall of 2005 when the BRAC 2005 recommendations were finalized. This baseline establishes a measure to compare the No Action alternative with the Proposed Action. The baseline is realistic in terms of overall troop levels and training needs. The stationing of units, however, is dynamic, and the description of the force structure described here does not depict the on-the-ground conditions at Fort Carson. (For instance, the 3rd ACR was restationed to Fort Hood and left Fort Carson in August 2006, and as noted later, the 2nd BCT, 2nd Infantry Division (ID) (2-2 ID) has been temporarily stationed at Fort Carson since 2005.) Additionally, deployments overseas in Iraq and Afghanistan mean that many of the troops assigned to Fort Carson are not physically located or training on the installation. Despite these overseas deployments, military dependents of deployed Soldiers and civilian and contractor personnel continue to be supported by Fort Carson and, for the most part, are living and working at the installation or in the surrounding community.

Under the No Action alternative, the following major units would be assigned to Fort Carson:

- 3rd BCT, 4th ID (3-4 ID)
- 3rd ACR
- 43rd Area Support Group (43rd ASG)
- 10th Special Forces Group (10th SFG)

The 3rd ACR consists of three cavalry (ground maneuver) squadrons (battalion-sized units comprised of 45 ground-maneuver platoons), an aviation squadron, and a support squadron. With nearly 5,000 Soldiers assigned, the 3rd ACR is the largest unit to train on Fort Carson.

The 3-4 ID consists of three maneuver battalions (two infantry battalions and one tank battalion), 10 maneuver companies, and 33 maneuver platoons. The 3-4 ID has 3,800 Soldiers and is the second-largest unit to train on Fort Carson. The 10th SFG consists of

approximately 1,200 personnel in three battalions. The 43rd ASG consists of approximately 2,800 Soldiers, and other support and smaller units comprise the remainder of Fort Carson's approximately 14,500 assigned Soldiers.

In the fall of 2005 when the BRAC 2005 recommendations were finalized, approximately 3,300 Soldiers associated with the 2-2 ID were temporarily stationed at Fort Carson. These troops are not included in the No Action alternative baseline numbers because they were not permanently assigned and did not increase the actual population at Fort Carson due to the deployment of the 3-4 ID. The permanent stationing of the 2-2 ID is included as part of the Proposed Action.

The force structure under the No Action alternative equates to a total military troop population of approximately 14,500. The baseline total population of Fort Carson under the No Action alternative is 38,300, which includes the 14,500 military troops, along with 2,700 civilian workers, 1,600 contract employees, and 19,500 military dependents.

2.2.2 Equipment

Under the No Action alternative, Fort Carson supports approximately 650 tracked vehicles, 1,800 wheeled vehicles, 85 helicopters, eight Tactical Unmanned Aerial Systems (TUASs), 48 Small Unmanned Aerial Systems (SUASs), and other non-combat vehicles. Tracked vehicles, such as tanks, utilize rotating tracks for mobilization, whereas wheeled vehicles use rubberized tires on wheels for travel. Helicopters and Unmanned Aerial Systems (UASs) generally support ground maneuvers but helicopters are sometimes used independently of other maneuvers. Note that all permanently assigned helicopters are associated with the 3rd ACR; therefore, they are only applicable to the No Action alternative because the 3rd ACR has relocated to Fort Hood and is not part of the force structure under the Proposed Action. The type, use, and environmental effects of the equipment used at Fort Carson are described in Table 2-1 and shown in Figure 2-3.

TABLE 2-1
Equipment Assigned to Fort Carson
Fort Carson Transformation EIS, Fort Carson, Colorado

Category	Equipment	Mission	Type of Training
Tracked Vehicles	M1 Abrams Main Combat Tank	Provides heavy armor superiority on the battlefield (120mm main gun)	Maneuver and Live-Fire
	M2/M3 Bradley Fighting Vehicle	Provides protected transport of an infantry squad and overwatching fires to support the dismounted infantry (25mm main gun)	
	M-109 Paladin Self-Propelled Howitzer	Provides the primary artillery support for armored and mechanized units (155mm artillery round)	
	M113 Armored Personnel (Mortar) Carrier	Provides a highly mobile, survivable, and reliable tracked-vehicle platform that is able to keep pace with Abrams and Bradleys	

TABLE 2-1
Equipment Assigned to Fort Carson
Fort Carson Transformation EIS, Fort Carson, Colorado

Category	Equipment	Mission	Type of Training
Wheeled Vehicles	Family of Medium Tactical Vehicles	Fills the Army's medium tactical-vehicle requirements for mobility and resupply, and transportation of equipment and personnel	Maneuver
	Heavy Expanded Mobility Tactical Truck	Provides heavy transport capabilities for re-supply of combat vehicles and weapons systems	
	High-Mobility Multipurpose Wheeled Vehicle	Provides a common light tactical vehicle capability	
	Palletized Loading System	Performs line haul and unit resupply; Rapid movement of combat configured loads of ammunition and all classes of supply, shelters and containers	
Engineer Equipment	Dozers, Scrapers, Loaders, Excavators, Dump Trucks	Performs horizontal construction to ensure mobility and base support for strike, sustainment, and logistics forces	Maneuver; Engineering (excavation, clearing, grubbing)
Aerial Vehicles	TUAS	Used to support integral intelligence, reconnaissance, and target acquisition at distances of up to 125 km; detects and identifies targets from a range of 3-5 km and offers automatic target tracking	Maneuver
	SUAS	Provides real-time data, intelligence, surveillance, and reconnaissance support for base perimeter defense and convoy protection	Maneuver
Indirect Fire	Towed Howitzer	Provides long-range destructive, suppressive and protective indirect and direct field artillery fires	Maneuver and Live-Fire
	Mortars	Provides medium-range indirect fire support	
Anti-Armor Weapons	Javelin Anti-Tank Missile	Provides a man-portable, highly survivable medium anti-tank weapon system	Maneuver and Live-Fire
	Tube-launched, Optically-Tracked, Wire-Guided (TOW) Missile System	Defeats threat armored vehicles and urban enclosed threats at extended ranges in all expected battlefield conditions	
Individual and Crew-Served Weapons	M2 .50-Caliber Machine Gun	Engages targets with accurate automatic direct fire (.50 caliber)	Live-Fire
	MK-19 Automatic Grenade Launcher	Engages targets with accurate automatic indirect fire (40mm grenades)	
	M240B Machine Gun	Engages targets with accurate direct automatic fire (7.62mm)	
	M249 Squad Automatic Weapon	Engages targets with accurate direct automatic fire (5.56mm)	
	M-4 Carbine	Engages targets with accurate direct fire (5.56mm)	
	M9 Pistol	Engages targets with accurate direct fire (9mm)	
	M-16 Rifle	Engages targets with accurate direct fire (5.56mm)	
	M203 Grenade Launcher	Engages targets with accurate short-range grenade fire (40mm grenades)	

Notes:
mm = millimeter



AH-64 Apache *



CH-47 Chinook*



OH-58D Kiowa Warrior *



UH-60 Blackhawk *



Raven SUAS



Shadow TUAS



Javelin Anti-Tank Missile



M1 Abrams Main Combat Tank



M2 .50 Cal Machine Gun



M2/M3 Bradley Fighting Vehicle



M113 Armored Personnel (Mortar Carrier)



Mortars



M203 Grenade Launcher



M-16 Rifle



M249 Squad Automatic Weapon



M-4 Carbine



M9 Pistol



M-109 Paladin Self-Propelled Howitzer



MK-19 Automatic Grenade Launcher



M240B Machine Gun



Family of Medium Tactical Vehicles



Palletized Loading System



Towed Howitzer



Tube-Launched, Optically-Tracked, Wire-Guided Missile System



Heavy Expanded Mobility Tactical Truck



Dozers, Scrapers, Loaders, Excavators, Dump Trucks



High-Mobility Multipurpose Wheeled Vehicle

FIGURE 2-3

Equipment Used at or Assigned to Fort Carson and the PCMS

*After implementation of transformation activities no helicopters will be permanently assigned to Fort Carson or the PCMS

2.2.3 Construction

Under the No Action alternative, maintenance and repair of Fort Carson's existing infrastructure would continue. Other projects planned for or under construction would be completed. The Army has conducted environmental review under NEPA for these planned and under-construction facilities and determined that no significant impact on the environment would occur from completing these projects (DECAM, 2006a; DECAM, 2006b; DECAM, 2005b). No other major capital improvements would occur because none is anticipated other than those associated with BRAC 2005, IGPBS, and AMF. Any new facility construction on Fort Carson under the No Action alternative would be subject to separate NEPA review in accordance with Army regulations and practice.

2.2.4 Training Requirements Under the No Action Alternative

This section provides an overview of the factors that influence how training is implemented and describes the typical training activities with the potential to result in impacts to the environment.

2.2.4.1 Training Needs

Under the No Action alternative, Fort Carson would continue to support primarily platoon- and company-sized units assigned to Fort Carson and other units as required. As noted in Section 1.2.4, Fort Carson primarily supports platoon-level maneuver training and live-fire training for individual and crew certifications for the maneuver units, as well as training for other stationed Active Component units (such as the 10th SFG). Fort Carson also supports training for Reserve Component units and other visiting forces, such as other DoD agencies, the North Atlantic Treaty Organization, and other federal, state, and local government forces.

Within the force structure under the No Action alternative, Fort Carson supports 45 platoons of the 3rd ACR and 33 platoons associated with the 3-4 ID. The land area required to train platoons is 4 km by 6 km (2.5 mi by 3.7 mi). On the basis of Fort Carson's available maneuver area-training of up to 13 platoons can be supported at one time. The 78 platoons associated with the No Action alternative force structure require five, 1-week training rotations. Thus, 390 training rotations could be supported under the No Action alternative. Scheduling of these rotations would require use of Fort Carson's training lands approximately 28 weeks (390 rotations divided by 13 that can be conducted at one time) per year.

In addition to the ground maneuver training, Fort Carson would support live-fire exercises for the 3-4 ID and 3rd ACR, and other small-area and live-fire training for the 10th SFG and 43rd ASG.

2.2.4.2 Description of Training Activities

Under the No Action alternative, two main types of training would occur as summarized here and further described in Section 3.2, Land Use.

- Maneuver training consists of equipment (tracked vehicles, wheeled vehicles, and engineer equipment) moving throughout the area according to the requirements of the training exercise. Maneuvers can occur both on- and off-road. Areas appropriate for

maneuver are present throughout Fort Carson; however, many areas are disconnected and, therefore, cannot support movement of many troops or vehicles. The largest area of unrestricted maneuver at Fort Carson, known as Sullivan Park, is located in the southwestern portion of the installation centered around Training Areas (TAs) 30 and 31. Other maneuver areas where tracked and wheeled vehicles move on roads or tank trails include live-fire training courses and roads connecting training areas. Some areas of Fort Carson, such as Booth Mountain, contain steep slopes that are unsuitable for vehicular maneuvers. Aerial maneuvers occur throughout Fort Carson's restricted airspace (that is, military use only).

- Live-fire training involves testing of weapons ranging from small arms and assault rifles to missile systems and artillery fire. During live-fire activities, a safety buffer, called a surface danger zone (SDZ), is enforced around firing activities. Some ranges and SDZ areas can be used for other purposes when they are not in use for firing. Live-fire activities generally have a limited effect on the environment because all dud-producing ammunition is fired into the large impact area, which is Fort Carson's only dudded impact area.
- Restricted areas are restricted from training. Portions of Fort Carson's downrange area are designated as restricted to protect natural and cultural resources, fragile soils, recreation areas, or other environmental values. Few if any environmental impacts result in these areas because mechanized training does not occur on the ground, and aerial equipment can operate above restricted areas with no impact.

2.2.4.3 Process for Implementing the Training Mission

Planning and implementing training exercises is a dynamic process that is dependent on the specific training needs (for instance, the type of unit or equipment being tested) and environmental conditions, such as soil saturation, vegetation condition, and temperature, at the time of the exercise. Therefore, on-the-ground training activities are variable and cannot be accurately forecast on an annual basis. The Garrison Commander issues regulations governing the process by which training is implemented and is the final decision-maker for approving training facilities and infrastructure needs and determining how best to balance the management of the installation's resources in consideration of meeting the training mission. His decision is made in compliance with all relevant environmental laws and regulations and in consultation with ITAM and DECAM staff. Decisions regarding training activities would continue to balance current training needs and necessary sustainment measures to establish the balance between the two that maintains lands suitable for training while also maximizing the achievement of the training mission. The coordination that occurs in developing training at Fort Carson and examples of the resource conditions factored into the decision process to avoid, minimize, and mitigate impacts from training are discussed below.

2.2.4.4 Coordination of Training Development

The process for implementing the training mission includes extensive coordination with ITAM, DECAM, Directorate of Plans, Training and Mobilization (DPTM) – Range Division, Unit Commanders, Troop Commanders, and other entities on the installation. These parties include but are not limited to Butts Army Airfield (BAAF), Military Police, Range Facility

Management Support System, Fort Carson Safety Officer, Reserve Component/National Guard Units, Air Liaison Officer, Air Route Traffic Control, and the Director of Public Works. DECAM coordinates changes in existing or approved training operations or land use that could have significant impacts on the environment and provides information and recommendations regarding environmental resources and environmental requirements. ITAM integrates mission requirements and land maintenance to optimize training. Other parties external to Fort Carson also are contacted regularly to ensure that safety concerns are factored into training exercises. For example, the Army could also contact the Denver Air Traffic Control Center, depending on the specific training exercise being planned.

Under the No Action alternative, existing land and environmental management programs would continue. The ITAM program would continue to be used to monitor training activities, institute projects to minimize training damage, and educate units to limit damage to training lands. Fort Carson's ITAM is a dynamic program for collection and review of maneuver data and land condition. Because the condition of training lands is highly variable depending on the amount and type of training that is occurring on the land as well as the climatic conditions during training maneuvers, the ITAM program does not set specific ratios for land rest that would be required to sustain training lands. Instead, the ITAM program provides a process by which the installation directorates (primarily the G-3, DPTM, DPW, and DECAM) work together to provide input regarding the training needs and environmental condition of the training lands.

Environmental plans developed by DECAM staff in coordination with relevant regulatory agencies and approved by the Garrison Commander would continue to be followed to manage environmental resources in a manner that complies with environmental laws and regulations, and avoids unnecessary environmental damage. Units training at Fort Carson would continue to be briefed by resource specialists regarding the need to protect resources and the mitigation measures, such as avoidance of areas with known cultural resources that have been included in specific training exercises. Decisions on training activities would continue to balance current training needs and protection measures to maintain lands suitable for training while also maximizing the training mission.

2.2.4.5 Environmental Considerations and Safety Measures

The Army considers numerous factors in implementing its training mission. Some of the factors considered include natural, climatic, biological, and cultural resource conditions of the training area and troop safety. It is in the Army's interest to sustain the land at Fort Carson for future training activities as described in Section 1.2.5. In addition, measures to ensure the safety of troops during training also include conditions that protect natural and cultural resources. By following this process, the Army effectively incorporates mitigation for environmental impacts into implementation of its training mission. The extensive coordination on range use for training includes maintaining the training areas in a way that meets the training mission and manages the training areas to avoid environmental impacts that would compromise the training mission. This coordination is documented in several ways, including preparation of a risk management assessment and maneuver live-fire certification. The entities noted above are involved in developing pre- and post-training planning and assessment.

The measures listed below are illustrative of the comprehensive consideration of the future condition of the environment in developing training exercises. Examples of the measures incorporated in the development of all training are:

- No animal may be captured, killed, taken, wounded, injured, or harassed as defined by federal and state statutes and agreements.
- Cutting or damaging live or standing dead trees or bushes is prohibited.
- Established roads should be used in areas that are reforested or reseeded.
- Removing, defacing, or vandalizing arrowheads, artifacts, or other cultural remains is prohibited.
- Burning or burying refuse is prohibited.
- Vehicle use should be avoided in wet or dry drainages.
- Unnecessary disturbance of wildlife species or their habitats is prohibited.
- The potential for the wind velocity to cause damage to the target or to cause fires is evaluated.
- The weather is monitored to avoid training in severe weather conditions whenever possible.
- Established roads should be used in environmentally sensitive areas.

Prior to use for training, DPTM-Range Division inspects ranges and training areas and evaluates them in accordance with FC Regulations 385-63 and 350-10. During each rotation, DPTM-Range Division Inspectors observe the daily training and consistently interact with military training personnel and unit leaders. During these interactions, or at other times as necessary, resource management professionals make recommendations to unit leaders regarding maneuver damage, soil moisture conditions, wildlife locations, cultural resource locations, and other locations where sensitive environmental resources could be adversely affected by training, and directions of the main axis of training. Units then make necessary adjustments to training exercises, as necessary.

After each rotation, DPTM-Range Division inspects the areas according to FC Regulations 385-63 and 350-10. DPTM-Range Division may compile a detailed "After Action Report" in conjunction with the ITAM program pertaining to all environmental elements affected by the exercise with support from DECAM resource management professionals. All maneuver damage is mapped and detailed. Fair wear-and-tear damage is listed separately from considered unnecessary, avoidable damage. Since 1996, fair wear-and-tear damage repair has been funded by the ITAM program, and ITAM funds are allocated from the operation budgets.

Several long-term monitoring programs are in place at Fort Carson to monitor land and environmental conditions. The Range and Training Land Assessment (RTLA) program is a statistically based program that primarily monitors vegetation but also monitors habitat composition. DECAM monitors wildlife populations and distribution, stream flow (quantity and quality), air quality, noise, and cultural resources, as described in the respective

resource actions of Section 3.0 of the FEIS. These data provide additional inputs to the suitability of lands for specific training exercises and are taken into account when training plans are developed.

2.2.5 Land Sustainability

Under the No Action alternative, periods of ground maneuver training would continue to be interspersed with periods of rest and recovery as determined necessary and appropriate under the procedures described above. These procedures have proven effective in maintaining the sustainability of training areas.

2.3 Proposed Action

Fort Carson's primary mission tasks are to protect the force, including Soldiers, civilian employees, family members, facilities, and equipment; train and mobilize Active and Reserve Component units; deploy, sustain, and redeploy Active and Reserve Component units; provide a quality living and working environment for Soldiers, families, employees, and retirees; manage resources and protect the environment; and enhance community relationships and partnerships.

The Proposed Action (the Army's preferred alternative) at Fort Carson includes three primary components that are necessitated by BRAC 2005, IGPBS, and the AMF:

- **Troop-Level Increases.** Accommodate an overall increase in troops, civilian and contractor personnel, and dependents that would work, live, and/or train at Fort Carson. Under the Proposed Action, approximately 8,500 new troops will be restationed to Fort Carson;
- **Facility Demolition and Construction.** Demolish facilities and infrastructure no longer needed, relocate facilities to support new construction, construct new facilities and infrastructure, and renovate existing facilities and infrastructure to support the new population and training activities; and
- **Live-Fire Training and Maneuvers.** Provide for increased training activity for existing and new units stationed at Fort Carson. Live-fire training and maneuver activities under the Proposed Action would be similar to those described for the No Action alternative (Section 2.2.4.3). The increased training requirements of additional Active and Reserve Components, however, would result in increased frequency of use of training areas. The PCMS is projected to support the majority of maneuver training requirements in excess of platoon-level operations.

The Proposed Action has been developed to ensure that the overall purpose and need, as defined in Section 1.2, are met. The Proposed Action incorporates the need to balance maneuver training, live firing, and environmental management to meet the Army's integrated goals of maintaining military training readiness and sustaining lands for continued use. In addition to the specific construction projects required to accommodate the increase in troops, the training required to respond to mission requirements in the context of additional troops is accomplished through a process-driven approach to implementing

training. The introduction to Section 3.0 discusses the approach to the analysis of impacts based on this process-driven approach.

Several factors specific to the Proposed Action influence its eventual implementation and, therefore, how the Proposed Action is described and how implementing it affects the analysis in Section 3.0 of this EIS. These factors are combat readiness, staged restationing of troops, timing of construction projects, and environmental and training conditions.

- **Combat Readiness.** In an effort to maximize the ability of commanders and managers to vary the training and the landscape conditions to meet combat readiness as described in Section 1.2, the description of the Proposed Action assumes that training would occur throughout Fort Carson in accordance with the suitability of the land for different training activities (for example, maneuver or live-fire).
- **Staged Realignment of Troops**. The realignment and transformation of Fort Carson's force structure are expected to occur in stages. Temporary actions occurred in 2005, and implementation of the full restationing and transformation is expected to be complete by 2011, with most of the large-unit restationing actions occurring by 2009. As the Army proceeds with transformation planning, the total unit strength may vary throughout the implementation period (although these variations relate to smaller units below the BCT level).
- **Timing of Construction Projects.** The timing of construction projects is contingent upon funding availability and priorities, and projects are likely to be constructed in phases throughout the implementation period. The schedule of when troops arrive at Fort Carson from restationing or from duty overseas will affect the timing of implementing new training requirements.
- **Environmental and Training Conditions**. Factors beyond the Army's control, such as world stability, troop deployments, and climatic conditions affect the implementation of training. Because environmental and training conditions are dynamic, the Proposed Action describes training activity as a process by which the Army would monitor and respond to changing conditions to sustain the land for training and provide maximum troop readiness. This process is discussed below in Section 2.3.4.

This section is organized in the following way:

- Changes in Force Structure and Population (Section 2.3.1)
- Equipment (Section 2.3.2)
- Construction of Support Facilities (Section 2.3.3)
- Training Requirements Under the Proposed Action (Section 2.3.4)

2.3.1 Changes in Force Structure and Population

This section presents the changes in force structure and population from the September 2005 when the BRAC 2005 recommendations were finalized (No Action alternative) to 2011 (end of implementation period for the Proposed Action).

2.3.1.1 Force Structure Changes

The existing force structure at Fort Carson is described in Section 2.2.1 in the description of the No Action alternative. Under the Proposed Action, the influx of additional units and the transformation of existing units would result in a total force structure that includes 4th ID HQ, three HBCTs, one IBCT, the 10th SFG, and other support units stationed at Fort Carson. Figure 2-4 provides an overview and timeline for restationing activities.

Under BRAC 2005, Fort Carson would gain the 2nd Brigade of the 4th ID (2-4 ID) (relocated from Fort Hood), a new UEx (Division) HQ, and a small medical unit. In addition to these directed relocations, Fort Carson would gain a new IBCT because of the IGPBS permanent restationing of the 2-2 ID, a new battalion of the 10th SFG, and other smaller units under the AMF. Under the AMF, the 3rd ACR would be relocated to Fort Hood, and the 2-4 ID and the 1st Brigade of the 4th ID (1-4 ID) would be activated at Fort Carson. Smaller units would be activated and inactivated at Fort Carson over the next 5 years (from 2006 to 2011) as the transformation process is implemented. Figure 2-4 illustrates the schedule for new major units currently planned to either arrive at or be relocated from Fort Carson starting in 2006 and completing by 2011. As noted in Figure 2-4, all major unit movements are expected to be completed by 2009; however, construction projects and other restationing activities would continue through 2011.

2.3.1.2 Increases in Population

Fort Carson would experience a net gain of units and personnel under the Proposed Action. The number of troops would increase by approximately 8,500 Soldiers. Military dependent, civilian, and contractor worker populations supported by Fort Carson also would increase proportionally because of the increase in active duty units assigned to the installation. In total, Soldiers, their dependents, and support personnel (excluding trainees) would increase from approximately 38,300 to about 59,700 by 2011, an approximate increase of 21,300 persons (or 60 percent) during the 5-year period. Table 2-2 shows the projected population increases for military troops and their dependents, as well as civilian and contractor personnel.

TABLE 2-2
Summary of Projected Fort Carson Population Increase
Fort Carson Transformation EIS, Fort Carson, Colorado

	No Action Alternative (Pre-BRAC, IGPBS, and AMF)	Proposed Action (End of Implementation in 2011)	Total Population Increase
Military Personnel	14,500	23,000	8,500
Civilian Personnel	2,700	3,500	800
Contractor Personnel	1,600	2,200	600
Military Dependents	19,500	31,000	11,400
Total	**38,300**	**59,700**	**21,300**

Notes:
Totals are rounded to the nearest hundred.
Source: OACSIM, 2006.

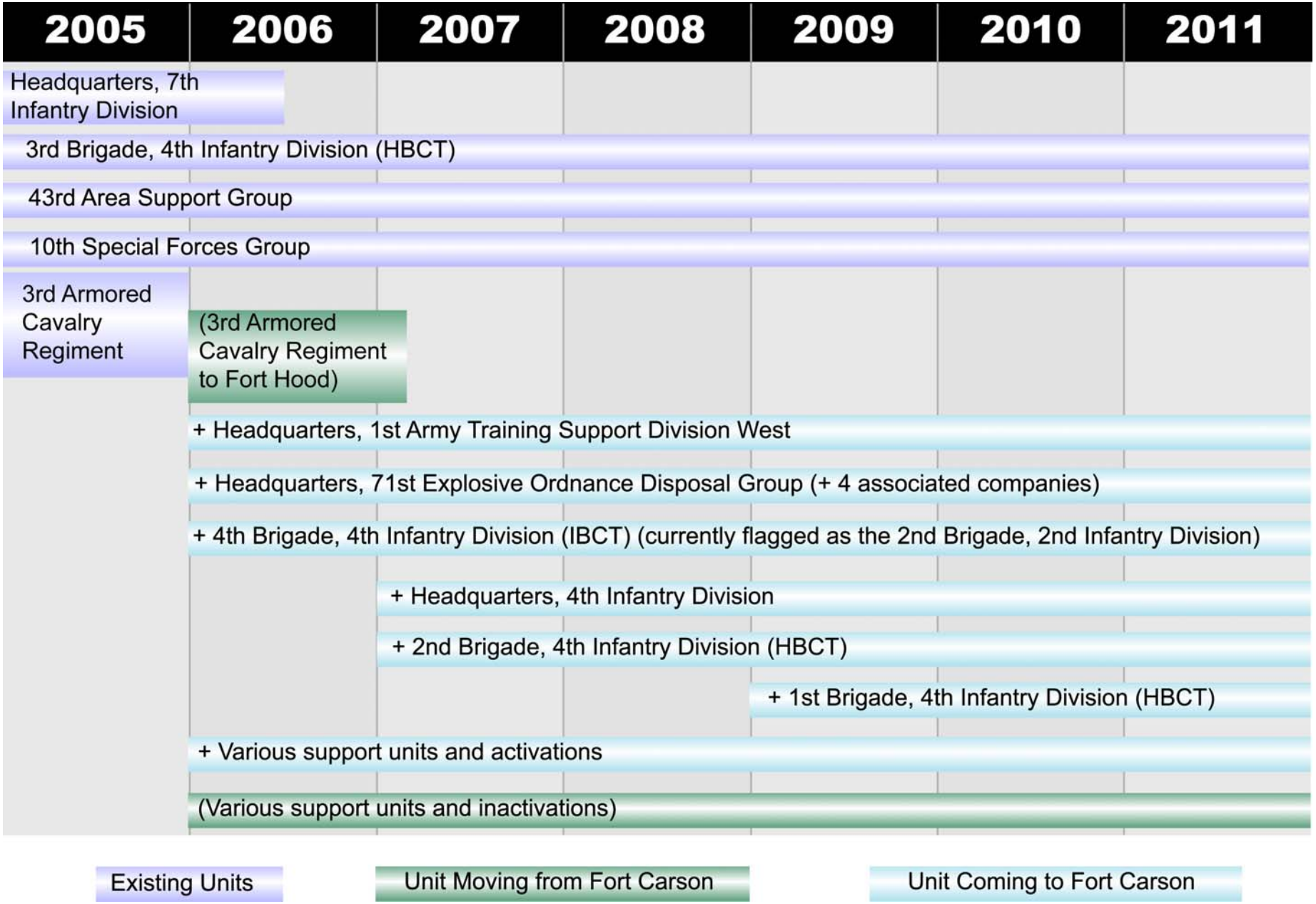


FIGURE 2-4
Military Force Structure at Fort Carson, 2005 to 2011

2.3.2 Equipment

As discussed above in Section 2.3.1, at the completion of the BRAC 2005, IGPBS, and AMF actions, Fort Carson would be assigned three HBCTs, one IBCT, and other units. The type of equipment used by each BCT is described below. Fort Carson is responsible for storing and maintaining all equipment. Not all of the equipment is used at Fort Carson for training activities because of the limited size of Fort Carson's maneuver areas. Platoon-level training, which would be the primary training implemented at Fort Carson under the Proposed Action, involves the use of four to six vehicles (tracked and wheeled) at one time.

Each HBCT would be assigned approximately 900 wheeled vehicles, 360 tracked vehicles, and 380 trailers. The IBCT would be assigned approximately 930 wheeled vehicles, two tracked vehicles, and 430 trailers. Table 2-1 and Figure 2-3 in Section 2.2 describe this equipment and its use.

Under the Proposed Action, there would be little difference in the type of equipment used at the installation in training activities. More of the same types of equipment, however, will be maintained and stored at Fort Carson because each BCT owns its assigned equipment (that is, units do not share equipment). One notable change in equipment between the No Action alternative and Proposed Action includes the loss of helicopters, which were assigned to the 3rd ACR. Helicopters could be used by visiting forces, but such use is anticipated to be infrequent. UASs would be the only permanently assigned aerial equipment and could be used throughout Fort Carson, as needed, to support training activities. Restricted airspace at Fort Carson would allow UASs to be used safely throughout the installation.

2.3.3 Construction of Support Facilities

To support transformational activities, the Army would construct facilities under the Proposed Action. Twenty-five construction projects are planned, including 18 projects in the Cantonment, six projects in the downrange area, and one at BAAF. Locations of these construction projects are displayed in Figure 2-5, and additional details regarding the scope and projected timing of these construction projects are included in Appendix B (DPW, 2006a).

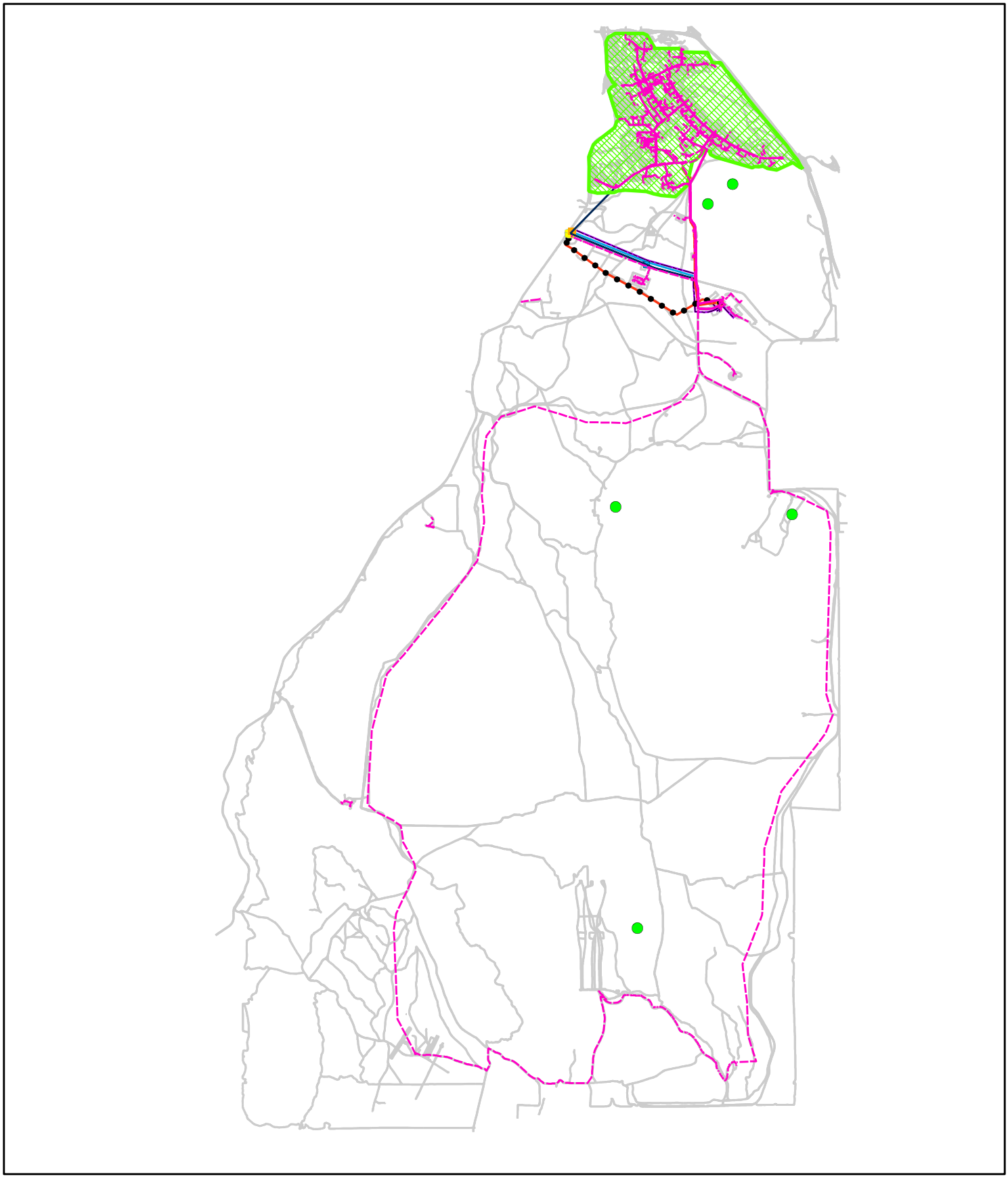


FIGURE 2-5
Location of Proposed Fort Carson Construction Projects

Table 2-3 presents a summary of the estimated disturbance area within the Cantonment, downrange, and airfield areas. Permanent disturbance includes total impervious areas, including buildings, sidewalks, and parking lots. The temporary disturbance includes the area likely to be affected by construction activities, such as staging and trenching. Much of the temporary disturbance shown in Table 2-3 is attributed to installation of new utilities. All utilities would be underground, and disturbed areas would be restored after completion of the projects.

TABLE 2-3
Summary of Proposed Construction Projects, 2006 to 2011
Fort Carson Transformation EIS, Fort Carson, Colorado

Location	Number of Projects in Each Area	Permanent Disturbance (acres)	Temporary Disturbance (acres)
Cantonment	18	58.7	84.6[a]
Downrange	6	9.2	9.7
BAAF	1	0	4.1
Total	**25**	**67.9**	**98.4**

[a] Includes combined utility disturbance for projects in the Cantonment and downrange areas.
Source: DPW, 2006a.
Additional details presented in Appendix B.

2.3.3.1 Cantonment Area Construction

In 2006, Fort Carson completed an Environmental Assessment analyzing the construction of a variety of facilities at the installation Cantonment, including the IBCT complex, HBCT complex, and the 4th ID Headquarters Complex (USACE, 2006b). Also in 2006, Fort Carson completed an Environmental Assessment analyzing the construction of the Installation Information Infrastructure Modernization Program (I3MP), a project to upgrade and modernize communications and information systems at Fort Carson and the PCMS, which includes installation of fiber optic lines in the downrange area (DECAM, 2006d). Construction of several of these projects is underway. The construction projects analyzed in this EIS complement the projects previously analyzed under NEPA and already under construction at Fort Carson and comprise support facilities necessary for Army transformation program implementation at Fort Carson.

The Cantonment projects that will be constructed as part of the Proposed Action include construction or renovation of three training facilities, two vehicle maintenance facilities, four medical or dental facilities, three child development centers, a physical fitness center, and a dining facility. Expansion of the rail yard and expansion/upgrade of utilities is also included in the Cantonment construction. These facilities will be constructed in the main part of the Cantonment, as shown in Figure 2-5. Additional details regarding the scope and project timing of these construction projects are presented in Appendix B.

Specific sites for proposed projects in the Cantonment are not available because the location of facilities is subject to change depending on funding and timing. Siting for facilities would be consistent with FC Regulation 200-1, the Master Planning Strategy Smart Growth principles (summarized in Appendix A) for facility siting and usage, and the practice of

avoiding sensitive environmental resources, such as wetlands, historic sites, or environmentally contaminated areas. Other factors, such as density, are also considered in siting of facilities for sustainable land development. In accordance with Army policy (Army, 2006a) and the Fort Carson sustainability program, all vertical building construction projects starting in the fiscal year 2008 (FY08) military construction program will achieve at least the SILVER level of Leadership in Energy and Environmental Design (LEED) New Construction (NC). LEED is a rating system for sustainable building design, construction, and maintenance developed and maintained by the U.S. Green Building Council. Horizontal construction, such as ranges, roads, and airfields, will continue to incorporate sustainable design and development features to the maximum extent possible. Projects constructed prior to the FY08 program will continue to use the Army's Sustainable Project Rating Tool (SPiRiT) and achieve the GOLD level. Such projects may be scored using LEED NC if the LEED SILVER rating level can be achieved within the program budget established for the project. Some common characteristics of the projects would include:

- Construction would include connection to the energy monitor and control system, installation of an intrusion detection system, and a fire protection/alarm system.
- Appropriate facilities would be built to comply with requirements under the Americans with Disabilities Act.
- Vehicle maintenance facilities would include wash racks.
- An industrial wastewater collection system would be constructed to connect the vehicle maintenance facilities with the existing industrial wastewater treatment plant.
- Project design would include construction and post-construction stormwater controls designed to prevent offsite impacts from stormwater runoff.
- Construction procedures would be implemented to mitigate potential impacts to migratory birds and to preclude access by most species of urban wildlife.
- Required construction permits (such as a Stormwater General Permit) would be acquired before construction begins.
- Anti-terrorism/force protection would be provided by constructing structures to resist progressive collapse, installing special windows and doors, and incorporating site measures (for example, setbacks and landscaping allowing line of sight).
- Heating and air conditioning would be provided by self-contained units.

2.3.3.2 Downrange Area Construction

The range projects involve construction of new ranges, including a sniper certification range, an automated qualification range, two digital multi-purpose training ranges and a digital multi-purpose range complex, and an individual and crew-served weapons course. The need for these new ranges was determined by the Army Training and Support Center's calculations on the number and types of ranges required for Fort Carson based on the assigned units and mobilization load. Utilities would also be extended in the downrange area.

Construction of the ranges involves a minimal amount of permanent ground disturbance because most downrange area upgrades will be made to the existing disturbed areas on the installation (operation of the ranges is analyzed in Section 3.0 as part of the training component of the Proposed Action).

2.3.3.3 Butts Army Airfield Construction

Under the Proposed Action, construction in the BAAF area is limited to extension and expansion of utilities including water, sewer, natural gas, and electric. No other infrastructure is planned at this time. These utility expansions are included as part of the expansion of utilities in the downrange area, of which BAAF is a part. If Fort Carson's flying mission was to increase, other improvements to BAAF would likely be implemented. The Army has developed the *Butts Army Airfield Real Property Master Plan Digest* (DPW, 2004) that presents conceptual findings and recommendations for how the airfield could be developed if changing mission requirements resulted in a need to develop the airfield. At this time, development of BAAF is not planned, and neither construction nor operation of additional facilities at BAAF is included as part of this EIS. If the airfield were to be developed further, the Army would conduct an additional NEPA review separate from this EIS.

2.3.4 Training Requirements Under the Proposed Action

This section presents an overview of the factors that influence how training is implemented, including the types of training activities that could occur and the process for implementing the training mission at Fort Carson.

2.3.4.1 Training Needs

Training under the Proposed Action would primarily include ground-maneuver and live-fire exercises. Ground maneuvers would be supported by the use of UASs, and visiting forces could use aerial equipment. Because the aerial mission is limited under the Proposed Action, this section focuses on the ground-maneuver and live-fire training activities that would occur under the Proposed Action.

Future training requirements at Fort Carson would increase under the Proposed Action for two reasons: 1) BRAC 2005 unit restationings would permanently station a greater number of active duty troops at Fort Carson; and 2) modular BCTs require substantially more live-fire/maneuver training space than pre-modular units (because technological changes in weaponry enable BCTs to operate on vastly expanded battlefields and require larger maneuver training areas). The Army has analyzed its training requirements in relation to training infrastructure and land availability at Fort Carson, and has determined that:

- Fort Carson is capable of supporting a majority of current doctrinal live-fire training requirements for the active duty units to be stationed at Fort Carson under the Proposed Action. These requirements include individual Soldier qualifications with their personal weapons, crew qualifications with their combat vehicles, up through collective platoon-level live-fire qualifications (referred to as Table I-XII qualifications) required to certify units as operationally ready for deployment.

- Fort Carson is capable of supporting a majority of the maneuver requirements up to the platoon level of units stationed at Fort Carson under the Proposed Action. In addition to this training, Fort Carson would be able to accommodate some limited company-level training but would not have the land capacity to meet doctrinal company-level or higher maneuver training requirements.

Although capable of supporting a majority of platoon-level maneuver training requirements, Fort Carson does not have the land required to train to full doctrinal standards. As noted in Table 1-1, the three HBCTs and one IBCT that would be assigned to Fort Carson under the Proposed Action contain 131 maneuver platoons (35 for each HBCT and 26 for the IBCT) plus the platoons of the 10th SFG and 43rd ASG. Each maneuver platoon is required to train for 1 week, five times per year to meet doctrinal training requirements established in TC 25-1, *Training Land*. This requirement establishes a total training load of 655 platoon-level rotations for the 131 maneuver platoons associated with the three HBCTs and one IBCT stationed at Fort Carson. This level of training requires Fort Carson's training lands to be scheduled for 50 weeks to support only the maneuver requirements of the assigned platoons. For several reasons, this high utilization level is not expected to be realized because it does not account for the following variables. First, the Army recognizes that executing training to doctrinal standards to maintain the readiness of its units results in impacts to training lands. To maintain the quality and availability of training lands, some period of land rest and recovery is required. The process for sustainable management of training lands is described below in Section 2.3.4.3 and 2.3.4.5. Second, training time for the 10th SFG or other stationed or visiting forces to train at Fort Carson is not considered. Third, live-fire training requirements are not included in this scenario. Some maneuver land becomes unavailable when units are conducting live-fire qualifications because of safety restrictions in use of ballistics areas (SDZs). Under the live-fire training requirements of the Proposed Action, live-fire areas would be used substantially to support live-fire training requirements.

Because of the land constraints and competing training needs, the Proposed Action is defined in a way that maximizes training (based on land constraints) and the need to sustain the training lands for continued use. The balance of training needs and land sustainability requires trade-offs. As noted in TC 25-1,

> [A] *maneuver area may be limited as a result of its configuration or restrictions on use. There are several ways to adjust the battlefield space requirement. The commander can reduce unit frontages, decrease the distance between maneuver brigades and their support units, or position support units in an area not contiguous to the maneuver brigades.*

Some of the examples of decisions that could be made to address land constraints are reduction in maneuver training areas, reduction in duration of training exercises, use of training simulators, alternating unit readiness by training less than all of the four BCTs, or some combination of these or other options.

2.3.4.2 Description of Training Activities

Training activities under the Proposed Action would be similar to those described for the No Action alternative (Section 2.2.4.2). Under the Proposed Action, the three types of training activities – maneuver, live-fire, and restricted – would be the same as described for

the No Action alternative. The frequency of training would likely increase to meet the increased training demand described in Section 2.3.4.1.

2.3.4.3 Process for Implementing the Training Mission

The process for implementing training under the Proposed Action would be the same as described for the No Action alternative in Section 2.2.4.3. The Garrison Commander is the final decision-maker regarding the use of training lands at Fort Carson. Decisions made by the Garrison Commander are made in compliance with all relevant environmental laws and regulations and in consultation with DPTM-Range Division, DECAM, and other staff.

To maintain operational flexibility on the part of military commanders and land managers, this EIS assumes that training could occur at any location on the installation (in accordance with the appropriate training uses, for example, maneuver areas). The specific scenarios, however, will be known only as the training needs are evaluated in the real-world context of identified needs (based on when troops are realigned to Fort Carson during the implementation period, what troops are present at Fort Carson for home-station training, and other operational considerations) and on assessment of land and environmental conditions.

2.3.4.4 Coordination of Training Development

Coordination in developing training activities would be the same as described for the No Action alternative (Section 2.2.4.4). The Army would continue to use its ITAM program to monitor training activities, institute projects to minimize training damage, and educate units to limit damage to training lands. Environmental plans developed by DECAM staff in coordination with relevant regulatory agencies and approved by the Garrison Commander would continue to be followed to manage environmental resources in a manner that complies with environmental laws and regulations and avoids unnecessary environmental damage. Coordination with internal and external entities would continue, and input from others would be considered in developing specific training exercises.

2.3.4.5 Environmental Considerations and Safety Measures

Under the Proposed Action, environmental and safety considerations would influence the development of training exercises, as described with the No Action alternative (Section 2.2.4.5). Other factors or new environmental mitigation measures that may be considered to mitigate impacts of the more frequent and longer-duration training under the Proposed Action are assessed in the environmental impact analysis (Section 3.0) of this EIS. Any new mitigation determined to be reasonable and necessary to offset environmental impacts of the Proposed Action will be incorporated into the ROD for this EIS, and management plans and regulations will be modified as appropriate.

2.4 Alternatives Considered But Dismissed

In developing the Proposed Action, the Army considered several alternatives to balance training requirements and land availability. It was determined, however, that these alternatives would unreasonably restrict the Army's ability to react to changing conditions. (See Section 1.3 for a discussion of the scope of the EIS analysis and how NEPA actions are addressed under BRAC 2005.) In addition, as discussed in Section 1.3, alternatives that

consider whether troops should be realigned to Fort Carson are eliminated from consideration by the Base Closure and Realignment Act of 1990 and, therefore, are not considered reasonable or feasible for analysis in this EIS. Other alternatives considered but dismissed are discussed below.

2.4.1 Train Troops at Other Locales

Supplementing training at Fort Carson with training at other locations was determined not to be efficient or practical. Fort Carson's primary mission is to meet the live-fire and small-unit maneuver requirements for units up to the company level (and primarily for the platoon-level training). These units have limited numbers of vehicles, minimal logistical support requirements, and a small amount of equipment. No training sites are present in the vicinity of Fort Carson that can be reached by a convoy of tactical vehicles of combat units to meet maneuver requirements. In addition, it is not practical to transport equipment by rail to other, more distant training facilities because of lost training time and inefficient use of training dollars spent on extensive logistics and substantive transportation costs. The training rotation durations for platoon and company maneuvers are approximately 5 to 7 days; adding 2 to 4 or more days of travel to these rotations would add at least 40 percent more time to the training rotation and would prevent units from meeting annual training requirements.

2.4.2 Land Acquisition and Expansion

Acquiring land to eliminate the problems of land constraints is an alternative that would meet the need for training to doctrinal standards. There are, however, no large areas of undeveloped lands adjacent to Fort Carson that could be easily acquired. The area surrounding Fort Carson is populated and developed, and expansion of training activities at Fort Carson would be incompatible with this surrounding development due to safety concerns, community impacts, and encroachment on training values such as night training. The Army does not have the authority, funding, or plans to expand Fort Carson.

2.4.3 Training Scenarios Based on Deployment Conditions

A set of alternatives was considered to be in line with Department of the Army HQ's training requirement land-use projections based on the most frequently occurring deployment scenarios. These scenarios ranged from a low-, medium-, and high-intensity land uses. The low-intensity use assumes that a maximum number of units (two BCTs) would be deployed and, therefore, not in home-station training status. The medium-intensity scenario assumes that one BCT is deployed and three are conducting home-station training. The medium-intensity scenario is considered the most frequent deployment condition. The high-intensity scenario assumes no deployments and that all BCTs are conducting home-station training. These alternatives were considered as a means to provide a baseline for comparison and public disclosure of the range of impacts that could occur from the action alternatives. They did not represent reasonable "alternatives" in the NEPA sense because they were based on conditions that were beyond the Army's control and could not be reasonably "selected" as a Proposed Action. Therefore, the Proposed Action incorporates the high-intensity scenario — that all troops are conducting home-station training.

3.0 Affected Environment and Consequences

3.1 Introduction

This section introduces the resource areas and the approach to the analysis for the EIS. It also describes the affected environment and environmental consequences of implementing the Proposed Action and No Action alternative. On the basis of existing available information obtained from the Army, personal communications with knowledgeable sources, and readily available published literature, the EIS qualitatively and quantitatively evaluates the potential environmental impacts of proposed transformation programs on Fort Carson.

3.1.1 Resources Analyzed

This EIS analyzes and discloses the direct, indirect, and cumulative impacts of implementing the BRAC 2005, IGPBS, and AMF at Fort Carson for the following resource areas:

- Land Use (Section 3.2)
- Air Quality (Section 3.3)
- Noise (Section 3.4)
- Geology and Soils (Section 3.5)
- Water Resources (Section 3.6)
- Biological Resources (Section 3.7)
- Cultural Resources (Section 3.8)
- Socioeconomics, including Environmental Justice (Section 3.9)
- Transportation (Section 3.10)
- Utilities (Section 3.11)
- Hazardous and Toxic Substances (Section 3.12)

Potential effects to the visual and aesthetic resources on and around Fort Carson were considered but not included for detailed analysis. Construction of new facilities and implementation of increased training could introduce new elements to the visual landscape, but these changes either would not be visible from off post or are consistent with the character of a military installation. Therefore, there would be no adverse visual or aesthetic impacts resulting from increased density of buildings or frequency and duration of training activities, and visual and aesthetic impacts are not discussed further in the EIS. The potential for decreased visibility or increased fugitive dust emissions (which has potential for visual and aesthetic impacts) is addressed under the Air Quality analysis (Section 3.3 of the EIS).

3.1.2 Framework for Assessing Impacts

In compliance with NEPA, CEQ guidelines, and 32 CFR 989, et seq., the description of the affected environment focuses on those resources and conditions potentially subject to

impacts. Subsequent to the description of the components of the affected environment, this section presents the analysis of the direct, indirect, and cumulative environmental and socioeconomic effects that would likely occur with the Proposed Action or No Action alternative, and identifies adverse environmental effects that cannot be avoided through project design.

The terms "effect" and "impact" are synonymous as used in this EIS. Effects can be beneficial or adverse and can apply to the range of natural, aesthetic, historic, cultural, and economic resources within the project area and surrounding area. Effects are also expressed in terms of duration. The duration of short-term impacts is considered to be 1 year or less, and long-term impacts are described as lasting beyond 1 year. Long-term impacts can potentially continue in perpetuity. The magnitude of effects of an action must be considered regardless of whether the effects are adverse or beneficial. In instances where potentially significant adverse impacts are identified, measures that could be used to mitigate those impacts are discussed. Where no significant adverse impacts are identified, mitigation measures are not proposed. In addition to direct and indirect impacts, cumulative impacts are discussed in Section 3.13.

3.2 Land Use, Plans, and Policies

This section discusses land use in and around the Fort Carson installation, and management plans that provide guidance on operations at Fort Carson. Section 3.2 also identifies the environmental consequences to land use and compliance with management plans resulting from additional troops, training on the Cantonment and downrange area, and construction and operation on the Cantonment and downrange area.

3.2.1 Affected Environment

3.2.1.1 Geographic Setting and Location

Fort Carson is located in central Colorado at the foot of the Rocky Mountains in El Paso, Fremont, and Pueblo counties. Fort Carson covers approximately 137,000 acres, and extends between 2 and 15 mi east to west and approximately 24 mi north to south. The Cantonment, located in the northern portion of the installation, covers approximately 5,800 acres. Fort Carson is bounded by I-25 and mixed development to the east and SH 115 to the west. Colorado Springs and Denver lie 8 mi and 75 mi, respectively, to the north, while the City of Pueblo is located 35 mi south of the Fort Carson cantonment area.

3.2.1.2 Climate

Fort Carson is located near the border of the Great Plains and the Front Range of the Rocky Mountains. The climate is moderate and semi-arid, with an average July temperature of 71 degrees Fahrenheit (°F) and an average January temperature of 29°F. Mean precipitation is about 17 inches per year. Precipitation ranges from approximately 12 inches (southern Fort Carson) to 15 inches (northern Fort Carson) per year, with about 80 percent falling between early April and late September. Average annual snowfall is approximately 36 inches annually. Snow and sleet usually occur from September to May, with the heaviest snowfall registered in March and trace accumulations recorded as late as June (DECAM, 2002a).

3.2.1.3 Existing Land Use

Fort Carson comprises approximately 137,000 acres of land in El Paso County. In addition, the Army maintains easements and special use permits on private lands adjacent to Fort Carson. These easements and permits allow Fort Carson to maintain water rights, conduct monitoring on buffer lands, and use other federal properties for military purposes. Land on Fort Carson includes military and non-military uses, as described below.

Military Uses

Fort Carson is an active military training facility for both weapons qualification and field training. Land use at Fort Carson falls generally into one of three categories: the Cantonment, which consists of developed land and a high density of urban uses; the downrange area, which consists of open land used for training purposes; and non-military uses, which are allowed in various areas within Fort Carson and are accessible by the public.

Cantonment

The cantonment area comprises approximately 6,000 acres and contains most of the facilities on Fort Carson, such as troop and family housing, administrative, maintenance, community support, recreation, and supply and storage facilities, utilities, and classroom and simulation training facilities. Principal industrial operations have been the repair and maintenance of vehicles and aircraft. For the most part, industrial operations take place at the "banana belt" (so called because it is a banana-shaped arc of brick buildings) on the east side of the cantonment area, the north end of the cantonment area, and at BAAF (part of the downrange area) (DECAM, 2005a).

Downrange Area

The downrange area consists of approximately 96,000 acres of unimproved or open lands that are used for live-fire artillery practice, small-arms practice, tank and Bradley Fighting Vehicle maneuver operations, and bivouac training. Air operation ranges on Fort Carson consist of the Air Burst Range and BAAF. Remaining land is used for recreation and other purposes (DECAM, 2005a). The primary training activities that occur within the downrange area include maneuver training and live-fire training. Other areas within the downrange area are restricted from training. Each of these categories is described below.

- **Maneuver Training.** Maneuver training supports equipment and personnel engaged throughout the area in tactical maneuvers with an opposing force. Equipment and personnel move through the area according to the requirements of training exercises. Maneuver training occurs in areas based on topography and other environmental conditions. Many of the training areas within Fort Carson are limited in size and not appropriate for large maneuver activities. The largest contiguous area appropriate for maneuver training, known as Sullivan Park, is located in the southwestern portion of the downrange area in TAs 30, 31, 39, and 40. Land rest and rehabilitation are required in areas where maneuver training occurs, and these areas are not continuously available to support training activities. Maneuver training activities also can be limited during live-fire exercises, which are incompatible (because of safety) with maneuver training. Some developed areas, such as Camp Red Devil and the Military Operations on Urban Terrain, are used for maneuver training, but mechanized travel is generally restricted to existing roads and trails. Some maneuver training areas are only appropriate for dismounted (non-mechanized) training. Dismounted training includes Soldiers moving

on foot only and conducting activities such as surveying, placing of communication equipment, bivouacking, and rappelling.

- **Live-Fire Training.** Live-fire training is conducted at firing ranges specifically designed for each weapon or weapon system. Live-fire training occurs within the Small Impact Area, Large Impact Area, and ranges throughout Fort Carson. Exclusion areas (SDZs) identified to protect personnel during weapons training are included within live-fire areas. SDZs outside the developed ranges and permanent impact areas generally comprise areas of Fort Carson that would be available for maneuver training when no live-fire activities are occurring.
- **Restricted Areas.** Portions of Fort Carson's downrange area are restricted to varying degrees, from training to protect natural and cultural resources, fragile soils, recreation areas, or other environmental values.

Non-Military Uses

Although Fort Carson's primary land use is for military training, the lands also support recreational activities, wildlife refuge, and the operation of two small clay mines near Stone City. Two permits have been issued by the State of Colorado to mine refractive clay on Fort Carson, near the Stone City site. Fort Carson is required by law to allow mining at existing sites provided that permit conditions continue to be met by permittees (DECAM, 2002a).

Recreational uses on Fort Carson include hunting, angling, dog training, and activities such as picnics and trail rides. Recreational uses occur at the following locations:

- Bird Farm Recreation Area
- Wildlife Demonstration Area
- West Haymes Wildlife Conservation Area
- Turkey Creek Recreation Area
- Turkey Creek Protected Species Area
- Townsend, Northside, Teller, and Womack Reservoirs
- Large and Small Bird Reservoirs
- Camp Falcon

Military training is generally off limits at these sites, and the intensity, level, and type of recreational activities vary by site. Most of the sites that support recreational uses are also waterfowl nesting refuges; some sites also protect other species, including fish. Recreational uses are also allowed on training range lands (with the exception of firing ranges and impact areas) when training areas are not being used for military activities (DECAM, 2002a; DECAM, 2001).

Land-Use Planning

Land-use planning at Fort Carson is the responsibility of the DPW's Master Planning Division. Although a formal land-use plan guiding future land management does not exist for Fort Carson, the Master Planning Division continuously assesses new facilities needs and how these facilities can be sited to complement existing land uses at Fort Carson. As an installation, Fort Carson has developed Master Planning Strategy Smart Growth Principles that provide 10 specific goals for facility siting and usage that guide conservation at Fort Carson. Relevant environmental management plans are referenced in Appendix A.

Surrounding Offsite Land Use

Developed land and land planned for future development surround approximately the northern one-third of Fort Carson. These lands are part of unincorporated El Paso County to the west, the City of Colorado Springs to the north and west, and Security-Widefield and the City of Fountain to the east. Land use surrounding the southern portion of the installation consists primarily of undeveloped agricultural land. The Town of Penrose, however, is located west of the southwest corner of Fort Carson.

El Paso County recognizes Fort Carson as a special land use dedicated for military training. Several areas in El Paso County including Turkey Canyon Ranch, Red Rock Valley Estates, El Rancho, and Midway Ranch are located adjacent to Fort Carson and zoned as a residential land use. These areas are considered noise-sensitive land uses and are described in further detail in the Noise Section (Section 3.4) of this document. El Paso County is responsible for regulating land use in these communities.

The City of Fountain's future land-use plan indicates that business park, industrial, and parks and open-space uses will abut the east boundary of Fort Carson. While several small pockets of residential land use will be maintained near Fort Carson according to this plan, most of the existing land zones for residential use near the installation's eastern boundary will be changed to industrial or open-space uses in the future (City of Fountain, 2005).

The City of Colorado Springs future land-use plan indicates that the City plans to annex land adjacent to the western boundary of Fort Carson near Gate 2. Land uses planned include general residential use to the west and north of Fort Carson, existing park/open space, and community activity centers (City of Colorado Springs, 2005).

Federal, state, and other public lands provide recreational uses near Fort Carson, including Pike National Forest (USDA Forest Service), the Beaver Creek Wilderness Study Area (Bureau of Land Management), Cheyenne Mountain State Park (Colorado Department of Natural Resources) Fountain Creek Regional Park (El Paso County), North Cheyenne Cañon Park (City of Colorado Springs), and Bear Creek Regional Park (El Paso County).

3.2.1.4 Prime Farmland

The Farmland Protection Policy Act (FPPA) of 1981 requires federal agencies to consider the impact of any activity that would convert prime or unique farmlands to non-agricultural uses. The NRCS regulates compliance with the law (7 CFR 658). According to the NRCS (USDA, 1979), prime farmland designations occur within El Paso, Fremont, and Pueblo counties. No farming has ever occurred on Fort Carson. Between 1960 and 1973, Fort Carson leased approximately 35,000 acres of land for grazing but no grazing leases have been issued since 1974 because of potential conflicts with proper land management criteria and the military mission (DECAM, 2002a). Because no areas of Fort Carson have been used for agriculture since 1973, no farmlands would be converted as part of the Proposed Action. No action, therefore, is required under the FPPA, and prime farmland is not carried forward in this EIS for further analysis.

3.2.2 Consequences

3.2.2.1 No Action Alternative

Personnel

Implementing the No Action alternative would result in no increase in personnel at Fort Carson. The Army would continue to implement the land-use planning process described above for any new facilities required to support personnel. There will, therefore, be no impacts to land use on the installation or in surrounding communities because of personnel under the No Action alternative. Cantonment and downrange area uses will continue to be the same as today.

Training

Future training activities will continue to be similar to today. Recreational uses will still be allowed in special site when such uses do not interfere with the military mission. There will be no impacts to land use on the installation or in surrounding communities because of training under the No Action alternative. Training activities will continue to comply with existing regulations and management plans.

Construction and Operation

Construction activities and future operation of Fort Carson under the No Action alternative will have no impacts to land use on the installation or in surrounding communities. Construction and operations will continue to comply with existing regulations and management plans.

3.2.2.2 Proposed Action

Personnel

The additional facilities required to support the new population of troops and dependents at Fort Carson would likely result in minor impacts to land use on the installation. New development would occur within the Cantonment, and such development would be consistent with the existing, developed land uses in the cantonment area. Some Cantonment-type land uses would potentially expand south of the existing cantonment area toward Wilderness Road. Although this expansion would occur in an area that currently is not heavily used for the training mission or for recreational activities, it will be inconsistent with the training land uses in that area.

For those troops and dependents choosing to live off post, additional housing would be needed in the surrounding communities. Developable land in the vicinity of Fort Carson planned for residential land use, and the existing and planned residential housing would be sufficient to accommodate those troops and their dependents who choose to live off post.

Training

The increased training activities on Fort Carson would likely reduce the availability of the downrange area for recreational uses, such as hunting, except for those portions of training areas that are in a limited-use status (as determined by FC Regulation 350-10). Hunting would likely still be allowed in deferred areas, if such use would not interfere with the training mission. Special areas used for recreation and wildlife protection currently off limits to training would likely continue to be off limits to training in the future.

As training increases on the installation, the incompatibility with some offsite land uses will increase as well, especially for noise generated by training activities. Noise impacts attributable to the Proposed Action are discussed in the Noise Section (Section 3.4) of this EIS.

The increased training requirements on the installation would be required to comply with Fort Carson regulations on training activities. In some cases, regulations and plans may need to be updated to reflect new mission activities.

Construction and Operation

Construction activities and future operation of Fort Carson from the Proposed Action would not be expected to have any impacts to land use on the installation or in surrounding communities. Construction of new support facilities and future operation of the installation would still be required to comply with Fort Carson regulations and management plans. In some cases, regulations and plans may need to be updated to reflect new mission activities.

3.3 Air Quality

This section identifies the affected environment and the environmental consequences for air quality at Fort Carson from implementing the Proposed Action and No Action alternative. Appendix C of this EIS contains supporting documents that provide detail on the approach to the air quality analysis in this EIS. Subsequent to the public scoping period for this EIS, interim communication occurred between Fort Carson, the Colorado Department of Public Health and Environment (CDPHE), PPACG, and EPA Region 8. The meetings and correspondence focused on the modeling approach and methodology to be used to evaluate the potential impacts to air quality during the prevention of significant deterioration (PSD) analysis and General Conformity analysis. Comments from both the CDPHE and the EPA were incorporated into the approach used in this EIS. The subsequent sections discuss the affected environment and results of the air quality analyses.

3.3.1 Affected Environment

This section presents the affected environment for air quality at Fort Carson. Applicable air quality laws and regulations designed to protect and improve air quality are discussed first, followed by a description of ambient air quality conditions at Fort Carson. Fort Carson is located in the Colorado Springs area, which is the immediate area that would be affected by actions at Fort Carson.

3.3.1.1 Laws and Regulations

The Clean Air Act (CAA), adopted in 1970, and its amendments in 1977 and 1990, established programs and a permitting process designed to protect and improve air quality. Air quality regulations are published in 40 CFR, Sections 50 through 97 and Sections 1048 through 1068. As mandated by the CAA, EPA has established maximum standards for the following criteria pollutants:

- Carbon monoxide (CO)
- Particulate matter (PM_{10} and $PM_{2.5}$)
- Ozone

- Nitrogen dioxide (NO_2)
- Sulfur dioxide (SO_2)
- Lead

Federal clean air laws require areas with elevated levels of ozone, CO, NO_2, SO_2, and inhalable particulate matter (PM) to develop State Implementation Plans (SIPs) that describe how states would achieve the National Ambient Air Quality Standards (NAAQS). The NAAQS were established to protect human health and can be used to compare modeled net increases plus the ambient background concentrations.

Under the General Conformity provisions of CAA Section 176(c)(1), no federal agency can approve or undertake an action unless the action has been demonstrated to conform to the SIP prior to the action occurring. The conformity determination is a process that demonstrates how an action would conform to the SIP; it is applicable only in areas designated as "nonattainment" or "maintenance" for NAAQS. An action that produces emissions that exceed the General Conformity threshold or are considered regionally significant is required to demonstrate conformity with the SIP through mitigation or other accepted practices. The Colorado Springs area, which is in attainment for all criteria pollutants, achieved attainment status for CO on October 25, 1999. As a part of the redesignation, the Colorado Springs area is under a CO Maintenance Plan until 2015 to demonstrate compliance with the CO NAAQS.

Any net increase of criteria pollutants would subject Fort Carson to the PSD review requirements (40 CFR 52.21). The Colorado Air Quality Control Commission (AQCC) within CDPHE administers the State of Colorado's EPA-approved PSD program (59 *Federal Register* [FR] 42500) by implementing Regulation 3, Part D, which regulates criteria pollutants from new combustion sources.

The AQCC also regulates the emissions of PM, smoke, CO, and sulfur oxides (SO_X) by implementing opacity and emission limits in AQCC's Regulation 1. Opacity limits are set to keep areas free of haze and to ensure that visibility long-term is not adversely affected. Obscurants include smoke and other visibility-reducing products used for military training. Fort Carson would meet these requirements in the following ways:

- Adhering to DoD training manuals and guidance regarding DoD-approved obscurants;
- Ensuring no off-property transport of visible emissions from obscurants (or if any visible emissions have a reasonable probability of crossing the installation property boundary, ensuring that obscurant generation ceases immediately);
- Implementing precautionary measures to include spot meteorological checks for wind speed and direction, posting designated smoke observers with direct communications to range control and training commanders who can intervene should a smoke violation occur; and
- If visible emissions from obscurant use drift across the installation property boundary, the necessary response measure will be taken to minimize the impacts, and the state will be informed as soon as possible but no less than 24 hours or the next business day after the event.

Fort Carson is also subject to its Title V Operating Permit, which limits the use of smoke munitions and the generation of fog oil smoke for training exercises. Fort Carson will not exceed the following permit-limited emission rates (Colorado Air Pollution Control Division [APCD], 2001):

- 1,540 gallons per day or 63,647 pounds per year (lbs/yr) for fog oil
- 14,471 lbs/yr for hexachloroethane (HCE) from smoke pots and white grenades
- 8,053 lbs/yr for colored smoke grenades
- 12,828 lbs/yr for white phosphorous projectiles
- 3,557 lbs/yr for white smoke grenades (excluding HCE)
- 13,078 lbs/yr for smoke pots (excluding HCE)
- 453 lbs/yr for starters

Controlled burns will be used to reduce the risk of large fires by reducing fuel loads and breaking up the continuity of fuels. A Prescribed Burn Planning Document was submitted to meet the requirements of AQCC Regulation No. 9, *Open Burning, Prescribed Fire and Permitting*. This planning effort includes constant monitoring during the prescribed fire to ensure that air quality and safety are not compromised. Implementation of this plan includes obtaining required state and county permits. Prescribed burning would target areas most likely to ignite due to range operations as well as areas with heavy fuel buildups (DECAM, 2003).

Fort Carson also implements FC Regulation 200-1, promulgated in December 1999, which prescribes policies and procedures and assigns responsibilities for the conservation, protection, and enhancement of the environment, including air quality, at Fort Carson and supported facilities. The *Air Quality Management Chapter* of FC Regulation 200-1 was updated in February 2003 to provide enhanced guidance on program responsibilities and smoke and obscurants management. FC Regulation 200-1 parallels AR 200-1 and is specific for Fort Carson.

The *Fugitive Dust Control Plan* (DECAM, 2004a) was established as a part of the state-enforceable best management practice (BMP) at Fort Carson to minimize dust impacts to air quality. It was approved by the CDPHE in August 2005 and will continue to be followed. Additionally, site-specific land disturbance permits and dust suppression regulations and procedures are applicable and implemented at Fort Carson.

3.3.1.2 Ambient Air Quality Conditions

This section presents the ambient air quality conditions at the Fort Carson. Specifically, it discusses compliance with ambient air quality standards in the Colorado Springs area and El Paso County, air pollutant emissions generated at Fort Carson, and the Regional Air Pollutant Emission Summary for El Paso County.

Ambient Air Monitoring Results

This section presents the ambient air quality conditions in the Colorado Springs area and El Paso County for criteria pollutants. Table 3-1 lists the NAAQS and the attainment status for the Colorado Springs area. Table 3-2 lists the maximum pollutant levels from any monitor within El Paso County for ozone, CO, and PM_{10}. There are no NO_2 or SO_2 monitoring stations within the Colorado Springs area. As noted in Table 3-1, El Paso County is in attainment for all pollutants except CO.

TABLE 3-1
National Ambient Air Quality Standards
Fort Carson Transformation EIS, Fort Carson, Colorado

Pollutant	Averaging Time	NAAQS	Attainment Status
Ozone	8 hours	0.08 ppm	Attainment
CO	8 hours 1 hour	9.0 ppm 35.0 ppm	Attainment/Maintenance Area Attainment/Maintenance Area
NO_2	Annual	0.053 ppm	Attainment
SO_2	Annual 24 hours 3 hour	0.03 ppm 0.14 ppm NA	Attainment Attainment NA
PM_{10}	Annual geometric mean 24 hours	50 $\mu g/m^3$ 150 $\mu g/m^3$	Attainment Unclassified
$PM_{2.5}$	Annual arithmetic mean 24 hours	15 $\mu g/m^3$ 65 $\mu g/m^3$	Unclassified Unclassified

Notes:

ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter
NA = not applicable

TABLE 3-2
El Paso County, Colorado Springs Area Monitor Values
Fort Carson Transformation EIS, Fort Carson, Colorado

	CO[a] (ppm)		PM_{10}[b] ($\mu g/m^3$)		Ozone[c] (ppm)
Monitor Year	1 Hour	8 Hours	24 Hours	Annual	8 Hours
2003	9.2	4.2	69	22	0.084
2004	8.4	3.3	82	23	0.072
2005	5.9	3.7	84	24	0.086
Federal Standards	9.0	35.0	150	50	0.12

Notes:

Source: EPA, 2006a.
[a] Maximum values are from the 690 W. Highway 24 monitoring station.
[b] The 3730 Meadowlands monitoring station had the maximum PM_{10} ambient concentration values.
[c] U.S. Air Force Academy monitoring station.

3.3.1.3 Air Pollutant Emissions

Air pollutant emissions are generated at Fort Carson mainly through the combustion of fossil fuels in equipment such as boilers, generators, and motorized vehicles. Combustion products include CO, nitrogen oxide (NO_x), SO_2, PM_{10}, and PM_{25}. Vehicle travel on unpaved roads contributes to fugitive PM. Painting and coating activities, fuel storage, fuel operations, and chemical usage contribute to both volatile organic compounds (VOCs) and hazardous air pollutants (HAPs). To a lesser extent, landfill-related emissions, military training activities, and fire training activities emit VOCs and various HAPs.

Prescribed burning, which supports training, ground maintenance and the health of surrounding forest areas, is a major contributor to CO emissions. Approximately 3,000 to 10,000 acres are affected annually by prescribed burns at Fort Carson (DECAM, 2003).

Facilities with the potential to emit (PTE) greater than 100 tons per year (tpy) of a criteria pollutant are a part of the APCD-administered Title V Operating Permit Program. The Title V Operating Permits include listings of all air pollution regulatory requirements applicable to the source. The PTE represents the maximum emissions a facility could emit given physical, enforceable, and permitting constraints. Fort Carson is considered a Title V major source because of its PTE of more than 100 tpy of the following criteria pollutants:

- CO
- NO_x
- PM
- VOCs

As a major source under the Title V program, Fort Carson is subject to Operating Permit No. 95OPEP110. A renewal application was submitted to the APCD within CDPHE on September 1, 2002, and the renewal permit is anticipated sometime in mid-2007. None of the current air pollutant sources has contributed to an exceedance of the NAAQS (refer to Appendix C, Attachment C.2. The current PTE emissions for Fort Carson are listed in Table 3-3, and detailed emission calculations are available in the *Transformation Air Emissions Inventory for Fort Carson,* (DECAM, 2006c).

TABLE 3-3
Current Stationary Sources PTE
Fort Carson Transformation EIS, Fort Carson, Colorado

Emission Unit	Pollutant (tpy)				
	PM_{10}	NO_x	CO	SO_x	VOC
Boilers and Hot Water Generators[1]	18	191	162	39	11
Exempt Miscellaneous External Combustion Units	3	45	38	0.27	2
Internal Combustion Units[1]	5	102	24	7	5
Paint Booths	1	NA	NA	NA	13
Categorically Exempt Storage Tanks and Associated Operations	NA	NA	NA	NA	7
Military and Fire Training	32	0.11	0.03	NA	32
Abrasive Blasting	0.07	NA	NA	NA	NA
Installation-Wide Total Stationary Source PTE	**61**	**338**	**224**	**46**	**70**

Notes:
NA = not applicable
[1] Includes units that are categorically exempt from permitting requirements under AQCC Regulation 3, Part A. PTE includes permit restrictions, size, and hours-run operational exemptions, and 24 hours x 365 days maximum fuel input operational scenarios.

Separate from the Title V major source classification, Fort Carson is also considered a major source under PSD review requirements (40 CFR 52.21). As shown in Table 3-3, the current installation-wide stationary source PTE for NO_x is greater than 250 tpy, which makes Fort Carson a major source under PSD. The boilers and hot water generators at Fort Carson are also considered to be a major source because they are in one of the 28 individually regulated

PSD categories (i.e., fossil fuel boilers [or combination thereof] totaling more than 250 million British thermal units [MMBTU] per hour heat input). As such, they are a major source because they have a PTE of more than 100 tpy of NO_x or CO [40 CFR 52.21(b)(1)(i)(a)]. For details of the PSD applicability, see Appendix C, Attachment C.1, *PSD Applicability Analysis for Fort Carson*.

3.3.1.4 Regional Air Pollutant Emissions Summary

As a part of the CAA, the EPA is required to set the NAAQS and designate areas as attainment or nonattainment in relation to those standards. To support the determination of the area designation, a National Emission Trend Inventory was developed by the EPA for states and counties throughout the United States. The most recent data available for El Paso County is the 2001 Air Emission Inventory (EPA, 2006a). The EPA 2001 regional air pollutant emission summary for El Paso County includes emissions from industrial-source fuel combustion, petroleum-related industries, other industrial processes, use of solvents, storage and transport services, waste disposal, recycling, highway vehicles, off-highway vehicles, agricultural activities, and miscellaneous fugitive dust sources.

Vehicle exhaust is the major source for VOCs, NO_x, and CO. Fuel combustion from electric utilities is the major source of SO_2, and fugitive dust from unpaved roads and miscellaneous activities are the major sources for PM_{10}. The air pollutant emissions for all of El Paso County as of 2001 are:

- 27,881 tpy of VOC;
- 36,574 tpy of NO_x;
- 116,078 tpy of CO;
- 13,945 tpy of SO_2; and
- 26,789 tpy of PM_{10}.

As shown in Table 3-1, El Paso County is in attainment for all criteria pollutants except CO. El Paso County is classified as a maintenance area for CO.

3.3.2 Consequences

The air quality analyses for Fort Carson addresses the impacts to ambient air quality from implementing the Proposed Action. The No Action alternative is assessed as a baseline for comparing the changes in air quality attributable to the incremental changes of the Proposed Action. For the Proposed Action, air quality impacts could occur during construction and operations. Short-term construction-related impacts could result from fugitive dust and construction equipment exhaust. Long-term operational impacts could result from 1) personnel increases and emission sources related to general population increases (such as the use of heating units and additional mobile sources); and 2) increased land use and training requirements.

Air emissions that could result from implementing the Proposed Action were evaluated in accordance with federal and state air pollution laws and regulations. The air quality analysis evaluates whether the Proposed Action would:

- Have the potential to contribute to a violation of the NAAQS.
- Not comply with the General Conformity rule.

- Be considered a major modification under PSD applicability.

3.3.2.1 No Action Alternative

Personnel

Under the No Action alternative, the number of troops at Fort Carson would not increase from historical levels, and emissions from vehicle travel on Fort Carson would not change from baseline conditions. Consequently, personnel changes under the No Action alternative would not result in air quality impacts.

Training

Under the No Action alternative, training activities at Fort Carson would remain the same as historical levels, as described in Section 2.2.4 of this EIS. Prescribed burn activities are anticipated to increase slightly over the next few years, but will be dependent on many factors such as drought and meteorological conditions. As discussed in Section 3.3.1.1, however, Fort Carson would continue to adhere to the requirements of AQCC Regulation No. 9, *Open Burning, Prescribed Fire and Permitting,* to ensure that conditions are acceptable for prescribed fires and that air quality is not compromised (DECAM, 2003). Consequently, the No Action alternative would not result in air quality impacts from training.

Construction

Under the No Action alternative, construction would not increase over existing conditions; therefore, no additional air emissions would be generated from construction.

3.3.2.2 Proposed Action

Personnel

Increases in military personnel, dependents, civil servants, and contractors resulting from the Proposed Action would lead to increased vehicle travel, which could increase traffic congestion. An increase in traffic congestion typically raises the amount of exhaust emissions from increases in the number of vehicles operating and longer idling times. A detailed traffic study was previously performed in the *Fort Carson Comprehensive Transportation Study* (DPW, 2005), which used a larger increase in population than is included in the Proposed Action. The results of the study indicate that areas with the highest traffic congestion would be below the thresholds that would trigger an air quality analysis. Because the personnel increases for the Proposed Action are less than the increase used in the *Fort Carson Comprehensive Transportation Study*, off-post traffic increases resulting from implementation of the Proposed Action would not exceed regulatory thresholds.

Training

Long-term impacts could result from the increased mobile sources and the increased training exercises that are a part of the Proposed Action. Mobile sources and training activities have the potential to result in impacts to air quality from increased emissions of fugitive dust (PM) and vehicle exhaust. An increase in training exercises would not require an increase in the use of obscurants for training in excess of existing permit limits (Walker, R., 2006). Increases in criteria pollutants have the potential to violate the NAAQS.

To determine the effect that increases in training would have on air quality, this EIS extrapolated the findings of a study conducted for the PCMS. Fort Carson has similar soil types and training activities as the PCMS and, therefore, a direct comparison can be made

with impacts. Under the Proposed Action, off-road activity would increase in the Fort Carson Maneuver Training Areas. The anticipated increase in activity, however, would be much less than the increase at the PCMS. Under the evaluation in the *PCMS Transformation EIS*, emissions from off-road training activities and off-post transportation were analyzed and compared with national threshold levels. The PCMS evaluation indicates that impacts from increases in off-road vehicle emissions at the PCMS would be far below applicable thresholds and would not violate the NAAQS or visibility standards. Therefore, because the off-road activity at Fort Carson is less than the activity at the PCMS and does not include off-post transportation, the impacts from off-road activity from maneuver training at Fort Carson would be much less than NAAQS and visibility standards threshold levels, and would not result in impacts to air quality.

Convoy travel between Fort Carson and the PCMS was also evaluated in the *PCMS Transformation EIS* (USACE, 2006c). It was determined that emissions from increased convoy travel would not result in impacts to air quality.

Construction and Operation

The analysis in this EIS addresses construction and operations emissions for Fort Carson. Construction emissions and their potential to result in impacts to air quality are evaluated under the General Conformity requirements. For operations, this EIS assesses the impacts on both a facility-wide basis and for stationary sources under PSD and General Conformity requirements. For construction of additional support facilities, the Proposed Action could result in impacts to air quality because of wind-blown dust created by construction equipment, exhaust emissions from construction equipment, and the increased number of vehicle trips by construction workers. Wind-blown dust contributes to PM emissions; pollutants associated with construction equipment exhaust include NO_x, PM, CO, and VOCs. Construction-related impacts are expected to be short term and limited to the duration and area of the construction activities. Regional emissions of pollutants (other than CO) are well below NAAQS thresholds. All construction activities are subject to the installation-wide *Fugitive Dust Control Plan* (DECAM, 2004a), and site-specific dust control plans as a part of land development permits are required for all projects greater than 25 acres or disturbed for 6 months or longer (state permit) and an El Paso County permit is required for disturbed land greater than 1 acre. Construction impacts are discussed in the General Conformity Analysis and Determination below.

PSD Analysis

The additional external combustion sources (e.g., boilers and water heaters) and the increased use of paint booths and abrasive blasting that would occur under the Proposed Action would not increase in excess of existing permit limits, but have the potential to result in impacts to air quality. The operation of stationary sources, which includes external combustion sources, paint booths, and abrasive blasting, are evaluated under the PSD requirements below. Other operational impacts are addressed under General Conformity.

As discussed in Section 3.3.1.3, Fort Carson is considered a major source under the PSD program. The CAA requires PSD major stationary sources to undergo PSD review to obtain an air pollution permit prior to beginning construction if major modifications are planned to these major stationary sources. The combined stationary source emission increases from the proposed construction projects between 2006 and 2010 are compared with the major modification PSD thresholds in Table 3-4. The PSD analysis evaluated construction projects

scheduled between 2006 and 2010, rather than the full implementation period through 2011 for this EIS. These years were selected because these projects have been validated (there is a real need), and the funding for these projects is more certain. As shown in the table, emissions from both the proposed boilers (as applicable to the source category) and emissions from the proposed facility-wide stationary sources are less than the PSD major-modification applicability thresholds for all criteria pollutants. Therefore, impacts to air quality from the additional stationary sources would not exceed established thresholds. For details of the PSD applicability, including CDPHE's concurrence with the approach and results, see Appendix C, Attachment C.1, *PSD Applicability Analysis for Fort Carson*.

TABLE 3-4
Facility-Wide Stationary Sources PTE and Boilers PTE Comparison to Major Modification Thresholds Under the Proposed Action[1]
Fort Carson Transformation EIS, Fort Carson, Colorado

Emission Unit	PM_{10} (tpy)	NO_x (tpy)	CO (tpy)	SO_x (tpy)	VOC (tpy)
Boilers and Hot Water Generators [2]	6	32	67	0.5	4.4
Total Stationary Sources [3]	6.2	34	70	0.8	5
PSD Major Modification Thresholds [4]	**15**	**40**	**100**	**40**	**40**

Notes:
1. Emissions are calculated for 30-ppm low-NO_x boilers operating 24 hours per day, 365 days per year.
2. Facilities with boilers and hot water generators with a total heat input rate of over 250 MMBtu/hour are one of 28 PSD-listed source categories subject to a major source threshold of 100 tpy.
3. Includes the separate line item of boilers and hot water generators.
4. PSD thresholds are from 40 CFR 52.21(b)(23)(1) for a major modification to a major source.

Conformity Analysis and Determination

As discussed in Section 3.3.1.1 the General Conformity analysis is a process that compares projected emissions with the regulatory threshold and then, if necessary, demonstrates how an action would conform to the SIP in areas designated as "nonattainment" or "maintenance" for the NAAQS. The analysis is based on the most recent estimates of emissions, which were developed using the current population, employment, travel, and congestion estimates. If the net increase in the Proposed Action's emissions for the peak year exceeds the General Conformity *de minimis* levels or any milestone year for attainment of standards, additional conformity determination is required. The *de minimis* level for a CO maintenance area is 100 tpy for each federal action [40 CFR 51.853 and 93.153(b)(1)]. The results of the General Conformity analysis and determination are summarized below, and details are provided in, Appendix C, Attachment C.2, *Clean Air Act General Conformity Determination, Fort Carson, Colorado*.

A majority of the construction and demolition activities under the Proposed Action would occur in the cantonment area, which is within the Colorado Springs CO Maintenance Area. As cited previously, the following emission sources were included in the General Conformity analysis: construction vehicles, construction activities, temporary power generation, commuter activity at the post, and new boilers/generators. The following emission sources are not included in the General Conformity analysis [40 CFR 93.153(c) and (d)]:

- Actions or portions of actions that are subject to the Transportation Conformity Rule [40 CFR 51.813(a) and 51.858(a)(5)(ii)]; or

- Actions that are exempt from other environmental regulations issued under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) [40 CFR 51.813(d)(5)].

To determine if the Proposed Action would exceed the 100-tpy *de minimis* threshold, the Air Conformity Applicability Model (ACAM), Version 4.2.5 (Air Force Center for Environmental Excellence, 2005) was used in conjunction with emission factors from MOBILE6b (EPA 420-R-03-010, August 2003) and AP-42 (EPA, 1999). As shown in Table 3-5, the peak years for construction, mobile, and stationary sources, estimated CO emissions would exceed the 100-tpy *de minimis* threshold. Therefore, a full General Conformity determination was performed for the Proposed Action.

TABLE 3-5
General Conformity Applicability Analysis CO Sources – Estimated Maximum Year CO Emissions per Source Category
Fort Carson Transformation EIS, Fort Carson, Colorado

Emission Category	Emission Source	2006	2007	2008	2009	2010	2011
Construction	Worker trips	1.14	2.60	6.80	5.67	2.17	2.92
	Dust-generating activities	2.05	0.40	2.65	0.05	0.30	NA
	Mobile equipment	7.82	17.82	34.40	27.25	11.38	12.10
	Stationary equipment	1.16	2.65	5.11	4.05	1.69	1.80
Construction Sources Subtotal (tpy)		**12.17**	**23.46**	**48.96**	**37.02**	**15.54**	**16.82**
Mobile	On-road GOV	-2.12	1.57	4.02	41.39	39.74	40.16
	Post employee commute POV	-5.31	3.94	10.12	106.30	103.21	105.43
Mobile Sources Subtotal (tpy)		**0.0**	**5.51**	**14.14**	**147.69**	**142.95**	**145.59**
Stationary	Boilers/residential; heating/generators	2.72	3.02	6.31	6.32	7.1	7.1
	Miscellaneous point sources	-1.70	1.35	3.47	30.45	30.58	32.56
Stationary Sources Subtotal (tpy)		**1.02**	**4.37**	**9.78**	**36.77**	**37.68**	**39.66**
Total (tpy)		**5.76**	**33.34**	**73**	**221.5**	**196.17**	**202.07**

Notes:
[1] Emission calculations are based on the maximum footprint of buildings.
GOV = government-owned vehicle
POV = privately-owned vehicle

The Proposed Action would conform if the net increase in emissions from facility construction and stationary source operation for the peak year would not exceed the emission budget specified in the SIP inventory [93.158(a)(5)(i)(A)]. The most recent version of the Colorado Springs Area CO Maintenance Plan was adopted by the PPACG in September 2003 and the AQCC in December 2003. This plan extends the maintenance year through 2015 and revises the CO emission budget from 270 to 531 tons per day for the period 2010 and beyond (APCD, 2003). As noted previously, any actions or portions of actions covered under the transportation conformity rule would not be subject to General Conformity [40 CFR 93.158(a)(5)(ii)]. Because commutes by Fort Carson employees via POVs would be accounted for in the PPACG Transportation Improvement Plan (TIP), emissions associated with those sources were not included in the final General Conformity determination. Furthermore, the net increase in emissions associated with facility construction and stationary source operation for the peak year would not exceed the emission limits specified in the SIP inventory based on CDPHE/EPA's concurrence that there is sufficient allowance in the SIP inventory for these CO emissions. Consequently, the

Proposed Action would conform to the applicable SIP for the Colorado Springs CO Maintenance Area. The Army sought formal concurrence from PPACG on this determination, as the Metropolitan Planning Organization and lead air quality planning agency for the Colorado Springs Region. Additional details, including PPACG's concurrence with the General Conformity determination, are provided in Appendix C, Attachment C.2, *Clean Air Act General Conformity Determination, Fort Carson, Colorado*. EPA's determination that the Proposed Action meets the general conformity requirements is noted in Appendix H in the EPA Comment FA7-16.

3.4 Noise

This section identifies the affected environment and the environmental consequences for noise, including potential impacts to noise-sensitive areas.

Noise is generally defined as unwanted sound. It can be any sound that is undesirable because it interferes with communications or other human activities, is intense enough to damage hearing, or is otherwise annoying. Human response to noise varies, depending on the type and characteristics of the noise, distance between the noise source and the receptor, receptor sensitivity, and time of day.

The most widely used metric for noise is the day-night average sound level (DNL), which is the metric recommended by EPA and used by most federal agencies to measure environmental noise. The DNL represents energy-averaged sound levels measured by summing and averaging sound exposure level values during a 24-hour period. A penalty of 10 decibels (dB) is assigned to noise events (including aircraft operations) occurring between 10:00 p.m. and 7:00 a.m. The 10-dB penalty compensates for generally lower background noise levels and increased annoyance associated with events occurring at night. DNL is a useful descriptor for noise in two respects. First, it is an average, and it fits intuitive concepts when dealing with continuous noise, such as that from a busy highway. Second, because it is a summation of sound energy over a 24-hour period, it is a cumulative metric. For intermittent sound, it represents the total sound being received rather than the sound level at any given time. Noise from transportation sources, such as vehicles and aircraft, and from continuous sources, such as generators, is assessed using the A-weighted DNL (ADNL). The ADNL significantly reduces the measured pressure level for low-frequency sounds while slightly increasing the measured pressure level for some high-frequency sounds. Noise from small-arms ranges is assessed using the ADNL. Impulse noise resulting from armor, artillery, and demolition activities is assessed in terms of the C-weighted DNL (CDNL). The CDNL is often used to characterize high-energy blast noise and other low-frequency sound capable of inducing vibrations in buildings or other structures. The C-weighted scale does not substantially reduce the measured pressure level for low-frequency components of a sound.

The Army seeks to minimize the impact or annoyance of unwanted noise produced by military operations on communities surrounding its installations. Under its Environmental Noise Management Program (ENMP) (formerly known as the Installation Compatible Use Zone Program), which is described in AR 200-1, the Army evaluates the impact of noise that may be produced by ongoing and proposed Army actions and activities. To evaluate the potential effects of noise associated with military operations, the Army conducts noise

studies and generates noise contours. The ENMP characterizes noise into three primary zones (Noise Zones 1-3) as shown in Table 3-6. Noise Zone (NZ) 1 is typically suitable for all types of land uses and is located the furthest from the noise source. NZ II and NZ III are generally considered incompatible for noise-sensitive land uses.

TABLE 3-6
Noise Zones
Fort Carson Transformation EIS, Fort Carson, Colorado

		Noise Limit			
Noise Zone	Population Highly Annoyed	Transportation (ADNL)	Large-Caliber Weapons (CDNL)	Small-Caliber Weapons (ADNL)	Small-Caliber Weapons (PK15[met])
LUPZ	9%-15%	60-65	57-62	60-65	NA
Zone I	<15%	<65	<62	<65	<87
Zone II	15%-39%	65-75	62-70	65-75	87-104
Zone III	>39%	>75	>70	>75	>104

NA = not applicable

In addition to the contours discussed above, other metrics used to create noise contours include the Land Use Planning Zone (LUPZ) and the PK15(met) contours. The LUPZ encompasses an area during which periods of increased operations can lead to increased community annoyance levels associated with above average training activities. The PK15(met) contour shows the peak noise level that is expected to be exceeded by only 15 percent of the events and gives personnel a truer indication of the maximum level they are likely to hear during training activities. The PK15(met) thresholds of complaints associated with large-caliber weapons noise are shown in Table 3-7.

TABLE 3-7
PK15(met) Large-Caliber Weapons Noise Contours
Fort Carson Transformation EIS, Fort Carson, Colorado

Complaint Level	Decibel Range for Large-Caliber Weapons
Low Risk	<115
Moderate Risk	115-130
High Risk	>130

3.4.1 Affected Environment

Noise-sensitive areas adjacent to Fort Carson consist of numerous communities and residential developments. To the north, these areas include Cheyenne Mountain State Park and the communities of Colorado Springs, Security, Widefield, and Fountain. Other noise-sensitive areas include Turkey Canyon Ranch and Red Rock Valley Estates along the western boundary, and El Rancho and Midway Ranch along the eastern boundary. Noise-sensitive locations adjacent to the southern boundary of Fort Carson include the communities of Penrose and Pueblo West, which are located to the southwest and southeast, respectively. Noise-sensitive areas within Fort Carson are limited to the cantonment area.

Sources of noise associated with Fort Carson include aircraft and traffic as well as large- and small-caliber weapons. The primary sources of noise are the firing of weapons, specifically large-caliber weapons such as artillery and tank main guns, as well as the operation of military aircraft at BAAF. Secondary sources of noise include motor vehicle traffic, consisting of cars, trucks, and tracked vehicles.

3.4.2 Consequences

To evaluate noise impacts associated with military training activities at Fort Carson, the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) prepared an ENMP noise study. USACHPPM is responsible for conducting noise studies for military operations at installations throughout the United States. The study used computer modeling to develop noise contours to identify noise-impacted areas. Airfield noise contours were developed using the NOISEMAP computer model, noise from large-caliber weapons was modeled using the BNOISE2 program, and SARNAM was used to model noise from small-caliber weapons. Existing records on flight and range operations along with reasonable assumptions of use were used to create inputs for the noise models. Noise contours, which are presented in Appendix D, were generated for both the No Action alternative and Proposed Action (USACHPMM, 2006). It should be noted that noise levels are not projected to be different between the two alternatives, although the contours appear different. Differences in the noise contours are related to anomalies in the input data. Under the No Action alternative, *actual* usage data (from 2001) were used to generate noise contours. Under the Proposed Action, firing data were projected based on *potential* use. In some cases, rounds that would have been projected to be fired in 2001 and in the future (under the Proposed Action) were not actually fired in 2001 and, therefore, were not incorporated into the computer modeling.

Fort Carson operates in accordance with the *Installation Environmental Noise Management Plan*, *Fort Carson, CO* (U.S. Army Environmental Center [USAEC], 2006a) and will continue to do so under the No Action alternative and Proposed Action. The plan outlines the policies and procedures for managing and limiting noise impacts to the surrounding communities. Specific strategies may include the establishment of no-fly zones and the identification of areas most likely to experience noise impacts.

In accordance with the Army Compatible Use Buffer Program, Fort Carson has delineated a 1.5- to 2-mi buffer around the installation boundary. The purpose of the buffer is to limit further development and encroachment in areas adjacent to the installation likely to experience noise impacts. The program provides a natural buffer between military training lands and noise-sensitive residential and commercial land uses, thereby protecting noise-sensitive areas from the negative effects of noise pollution resulting from training activities. El Paso County is responsible for recording noise disclosures and regulating land use on private lands surrounding Fort Carson. This buffer area applies to both the No Action alternative and Proposed Action.

3.4.2.1 No Action Alternative

Aircraft and Traffic Noise

Noise contours generated for BAAF indicate that the NZ III contour (greater than 75 ADNL) does not extend beyond the boundary of Fort Carson or into any noise-sensitive areas

within Fort Carson. Noise contours for NZ II (65-75 ADNL) and the LUPZ (60-65 ADNL) extend beyond the western boundary of Fort Carson.

A supplemental annoyance buffer for the nap of the earth (NOE) flight corridor was also generated. The 0.25-mi-wide buffer on both sides of the NOE flight corridor was determined to be sufficient to account for possible annoyances outside the actual NOE flight corridor. The supplemental annoyance buffer extends into noise-sensitive areas, including El Rancho, Turkey Canyon Ranch, and Red Rock Valley Estates, by as much as 0.25 mi. It should be noted that the buffer does not surround the entire installation because the NOE flight corridor is located at varying distances from the boundary and does not follow the full length of the installation boundary.

There would be no change to the NOE flight corridor under the Proposed Action; therefore, a discussion of noise resulting from the NOE flight corridor is not included in the following analysis. Noise from aerial maneuvers, however, is likely to be less under the Proposed Action because there are no permanently assigned aircraft or helicopters associated with any of the units that will be stationed at Fort Carson after the implementation of the transformation programs. At the time that the noise contours were generated for the Proposed Action, the reduction in air traffic was not known.

3.4.2.2 Large-Caliber Weapons Noise

Noise contours were generated for noise associated with the firing of large-caliber weapons (see Appendix D). Under the No Action alternative, the NZ III (70 CDNL) contour extends beyond the western boundary into Turkey Canyon Ranch. The NZ III contour extends past the eastern boundary into a portion of El Rancho. The NZ II (62 CDNL) and LUPZ (57 CDNL) contours extend beyond the western boundary into Turkey Canyon Ranch and beyond the eastern boundary into Midway Ranch, Fountain, and El Rancho. Specifically, the LUPZ contour nearly encompasses both El Rancho and Midway Ranch.

In addition, the PK15(met) contours for large-caliber weapons noise were generated for Fort Carson and are shown in Appendix D. Under the No Action alternative, both the PK15(met), 130-dB contour and the PK15(met), 115-dB contour extend past the western, northern, and eastern boundaries into Turkey Canyon Ranch, Red Rock Valley Ranch, Midway Ranch, and El Rancho; the PK15(met), 115-dB contour also extends into the community of Fountain.

The PK15 (met) noise levels associated with training activities under the No Action are expected to be the same as the Proposed Action (see Section 3.4.2.4). Although the frequency of training activity would increase as a result of increased training requirements, the types of noise-generating equipment and the noise levels from equipment use would not change (i.e., no new large caliber firing systems would be used). It should be noted that the No Action noise contours are calculated based on actual usage data from Fort Carson in 2001 (see Appendix D).

Although the No Action alternative would not generate increased noise, an existing hand grenade range in the northeastern portion of Fort Carson would continue to operate under the No Action alternative. Noise from the operation of this range was not included in the No Action alternative noise contours because no grenades were issued in 2001 when the No Action alternative noise contours were generated. The new contours generated for the

Proposed Action (discussed in Section 3.4.2.4) account for the noise associated with the downrange area. It is important to note that this range has been in operation and will continue to be operated in the future. Along the same lines, other weapons that have been used in the past and are projected to be used under the Proposed Action (such as 155-mm Howitzers) were not included in the No Action noise contours because they were not actually used in 2001, the year of usage that is the basis for the No Action. Based on the historical operation of the downrange area, noise generation under the No Action alternative is slightly greater than noted in the No Action alternative (2001) contours and may be more accurately reflected in the Proposed Action contours.

3.4.2.3 Small-Caliber Weapons Noise

The noise contours for small-caliber weapons shown in Appendix D currently extend outside the eastern boundary; the Zone II (PK15[met], 87-dB) contour extends less than 2,300 feet (700 meters) into the community of Fountain. The Zone III (PK15[met], 104-dB) contour also extends past the eastern boundary, but barely beyond I-25.

Construction Noise

Noise from construction activities, such as routine maintenance of buildings and roads, will not extend outside the boundaries of Fort Carson. The majority of these activities will be limited to the cantonment area and will result in temporary and short-term impacts to sensitive locations within that area. These impacts will be minor.

No adverse effects to noise-sensitive areas resulting from routine maintenance of buildings and roadways will occur under the No Action alternative.

3.4.2.4 Proposed Action

Aircraft and Traffic Noise

Training activities at BAAF would not change under the Proposed Action. In some instances, training activity could decrease based on stationing of some types of aircraft elsewhere (e.g., Blackhawk helicopters). Noise levels resulting from aircraft activity are expected to be similar to or less than the No Action alternative.

Traffic on local roadways adjacent to Fort Carson is expected to increase by an average of 14 percent as the result of implementing the Proposed Action. As a result, projected increases in traffic at off-post locations as the result of the Proposed Action would not result in a perceivable increase in traffic noise. On-post traffic is expected to approximately double under the Proposed Action at most locations in the Cantonment. Given the low traffic volumes in noise-sensitive areas and low posted speeds, it is unlikely that such an increase in traffic volumes would result in a noise impact.

Large-Caliber Weapons Noise

Noise contours (see Appendix D) for large-caliber weapons were generated based on the proposed changes in activity at the weapon ranges. Table 3-8 provides a summary of changes to NZs II and III resulting from large-caliber weapons.

TABLE 3-8
Large-Caliber Weapons Noise Contours
Fort Carson Transformation EIS, Fort Carson, Colorado

			Distance into Noise-Sensitive Area (meters)			
	Land Use-Planning Zone		NZ II		NZ III	
Noise Sensitive Area	Existing	Proposed	Existing	Proposed	Existing	Proposed
Turkey Canyon Ranch	Completely encompasses	Completely encompasses	750	700	300	400
Fountain	Partially encompasses	Completely encompasses	N/I	1,300	N/I	500
El Rancho	Completely encompasses	Completely encompasses	2,000	4,000	200	400
Midway Ranch	Partially encompasses	Completely encompasses	2,000	4,000	N/I	N/I

Note:
N/I = no impact

As noted previously, the noise contours generated for the Proposed Action were based on projected range usage for large-caliber weapons firing. Some ammunition that could have been fired at the ranges was not fired in 2001. Under the Proposed Action, all ammunition that could be fired is projected to be fired. Actual use of ranges for large-caliber weapons firing is influenced by a number of factors and varies from year to year. Because the full range of weapons and ammunition firing is included in the Proposed Action contours, the noise levels would be conservative and reflect a "worst-case" scenario with regard to noise emissions in the surrounding communities. Actual noise levels could be less. It is also important to note that if projected use data had been used for model inputs under the No Action alternative, the noise contours would be identical because no new types of training or equipment is being proposed under the Proposed Action.

According to the Proposed Action NZ contours, the greatest changes projected between the No Action contours and Proposed Action contours would occur along the eastern boundary near El Rancho, Fountain, and Midway Ranch. The NZ II contour would double in distance into both El Rancho and Midway Ranch, extending an additional 2,000 meters into both communities. NZ III would also increase, extending an additional 200 and 500 meters into El Rancho and Fountain, respectively. Turkey Canyon Ranch would experience a slight increase in noise levels under the Proposed Action because the NZ III contour would extend an additional 100 meters into that community.

In addition to the NZ contours, the Proposed Action 115-dB and 130-dB PK15(met) contours for large-caliber weapons extend farther outside Fort Carson's boundary. Although the Proposed Action does not include use of any new large-caliber firing systems, the Proposed Action contours were created based on the largest caliber weapons that could be fired at each range (see Appendix D). For example, hand grenades have and will continue to be used at a range in the northeastern portion of Fort Carson. Although the circular contours from the Proposed Action contours in the northeast portion of Fort Carson appear new when compared to the No Action contours, the difference is attributable to the fact that no grenades were used at the range in 2001. The Proposed Action contours are based on

potential usage while the No Action contours are based on actual 2001 usage. The Proposed Action contours represent a conservative assessment of noise.

Adverse effects to noise-sensitive areas could occur under the Proposed Action. Noise contours for large-caliber weapon noise would extend farther into adjacent noise-sensitive areas, and slightly increased noise levels in those areas could be expected. Note that this increase is projected for both the Proposed Action and No Action alternative).

The only sensitive on-post receptors are located within the cantonment area located on the north end of the installation outside of any noise contours. Noise levels in this area would continue to be unaffected by the increase in training activities.

Small-Caliber Weapons Noise

There would be no change in small-caliber weapon use under the Proposed Action, and there was little difference in the actual and projected use of small-caliber weapons. Therefore, the noise contours for the Proposed Action and No Action alternative are the same (as reflected in Appendix D).

Construction and Operation

Additional building and roadway maintenance and construction would occur under the Proposed Action, potentially resulting in elevated noise levels at noise-sensitive locations adjacent to the construction sites. Elevated noise levels during construction would not be expected to extend outside the boundaries of Fort Carson and would be temporary and short term in duration.

Adverse effects could occur under the Proposed Action due to elevated noise levels at noise-sensitive locations adjacent to construction sites. Modification of construction activities, such as limiting nighttime construction or use of backup alarms, could be implemented to reduce noise around construction areas.

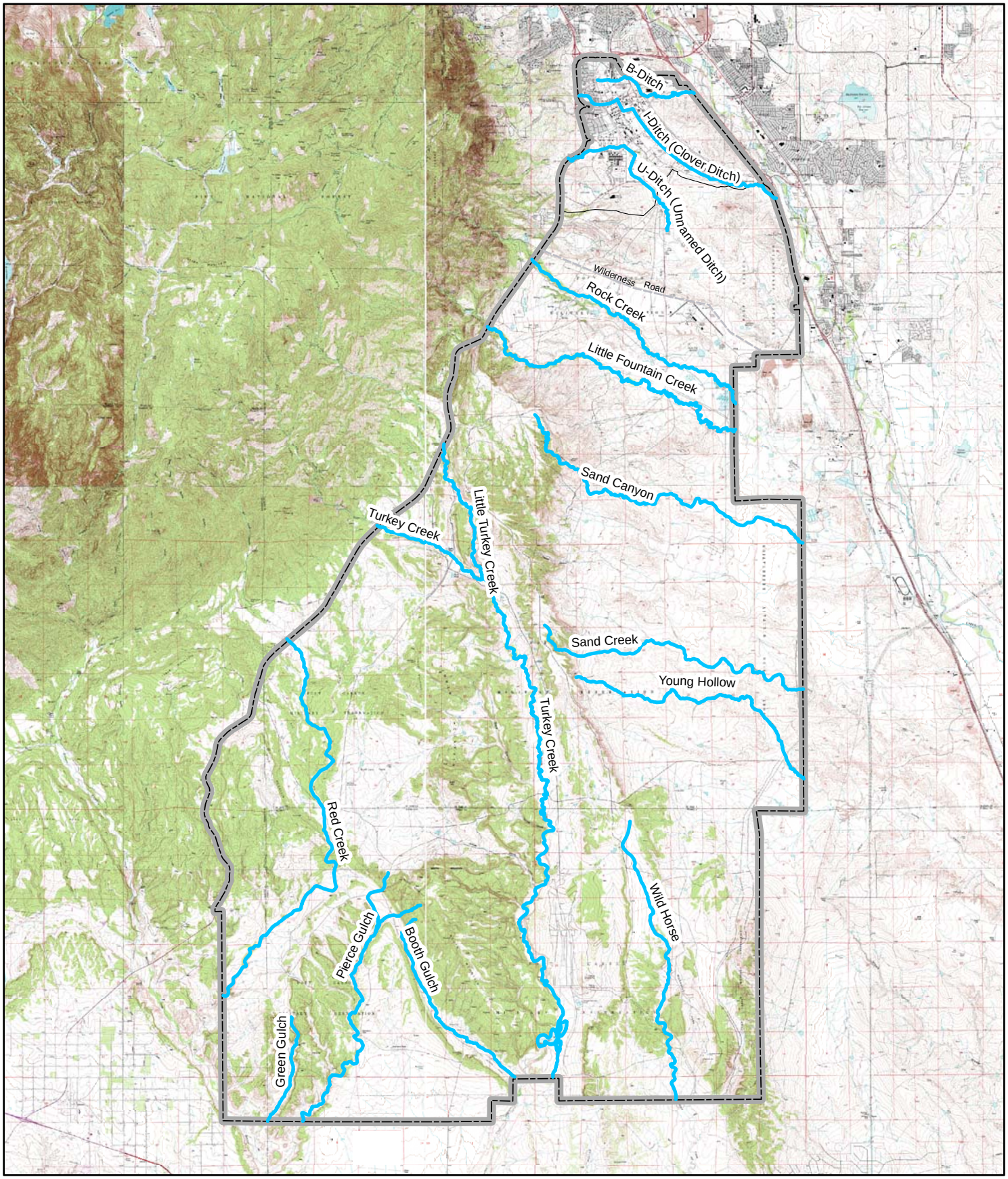
3.5 Geology and Soils

This section identifies the affected environment and environmental consequences for geology and soils, and topographic conditions.

3.5.1 Affected Environment

3.5.1.1 Geologic and Topographic Conditions

The eastern and western portions of Fort Carson are positioned on the Colorado Piedmont section of the Great Plains Physiographic Province and on the foothills of the Rampart Range section of the Southern Rocky Mountains Province, respectively (DECAM, 2002a). The topography gradually slopes to the east with altitudes ranging from 5,500 feet in the west to 2,500 feet in the east (USACE, 2002a). The region is characterized by rolling plains, tablelands, and occasional valleys, canyons, and buttes. Topography of Fort Carson is shown on Figure 3-1.



Legend

- Surface Water
- Installation
- Cantonment Area

N

0 1 2 4 Miles

FIGURE 3-1
Surface Water and Topography at Fort Carson

The geology of the area includes Upper Cretaceous (the Cretaceous age ranges from 146 million years ago (Ma) to 65.5 Ma) sandstone, shale and, in some areas, a loose veneer of Pleistocene (the Pleistocene ranges from 1.8 Ma to 12,000 years before the present) gravel overlaying older shale. According to the Colorado Geological Survey (CGS) (1999), the state has approximately 90 potentially active faults (some of which may be located in the vicinity of Fort Carson). A review of USGS and CGS databases indicates that faults in the area could have a low-to-moderate potential for damaging earthquakes (USGS, 2005; CGS, 1999). It is estimated that several thousand faults within the state have not been extensively mapped or studied; therefore, an accurate estimation of timing or location of potentially dangerous earthquakes is not possible (CGS, 1999).

Three main faults, Ute Pass, Rampart Range, and Oil Creek, exist within the region (DECAM, 2002a), although none crosses into Fort Carson (USGS, 2005; Widmann et al., 2002). Small earthquakes are known to occur in the region with generally undetectable effects (DECAM, 2002a). The Oil Creek fault, located northeast of Fort Carson, is possibly associated with the Divide earthquake that occurred in the vicinity in 1979. The Oil Creek fault may have possible associations with other nearby faults based on its present-day orientation in a northeast-southwest-directed stress regime (CGS, 1997).

The topography of the western portion of Fort Carson is characterized by moderately rolling and strongly dissected plains, interrupted by scattered rocky escarpments. On the eastern portion of the installation, foothills gradually slope to the east to a relatively flat grassland that is characteristic of the western edge of the Great Plains (DECAM, 2005b). The eastern portion of the post is drained by Fountain Creek and its tributaries (DECAM, 2002a).

Landforms on Fort Carson consist of high plains (5,400 to 6,400 feet), low plains (5,400 to 6,200 feet), and steep terrain including Timber Mountain (6,897 feet), Wild Mountain (6,695 feet), and Booth Mountain (6,454 feet) (Topozone, 2006). The lowest point on Fort Carson is Beaver Creek Valley. The high plains region consists primarily of gently rolling uplands, sharp crested hills, and rocky outcrops located in the southeast, west-central, and western portions of Fort Carson. The Cantonment is located within the high plains region of the post, while Fountain Creek and its tributaries are located on the eastern portion of Fort Carson within the low plains region. The maximum relief on the installation is 1,840 feet (DECAM, 2002a).

Geologic units identified at Fort Carson range in age from the Quaternary period (1 Ma before present to recent) to the Pennsylvanian period (200 to 250 Ma before present) (DECAM, 2002a). During the Quaternary period, both consolidated and unconsolidated sediments were deposited in the region. Unconsolidated sediments consist primarily of fluvial and alluvial sands, silts, and gravels as well as wind-deposited silts and sands. Consolidated sediments include shale, limestone, hard sandstone, siltstone, claystone, and conglomerate sandstone and shale (DECAM, 2002a).

Fort Carson is located with Seismic Zone 1, an area of low seismic risk (DECAM, 2002a). Since 1973, most earthquakes within 60 mi of Fort Carson registered at a magnitude of less than 4.0. The largest earthquake in the area was recorded at a magnitude 4.0 at a distance of approximately 75 mi from the center of Fort Carson (USGS, 2005). Although some faults are located within the vicinity of Fort Carson, none crosses through the post.

No landslides are known to have occurred on Fort Carson within the past few years (Goss, 2006), although localized slides resulting in hillwash have occurred sometime in the past given the colluvium nature of soil deposits.

3.5.1.2 Soil

Soil types commonly occurring in the region are aridisol (dry, desert-like soils) and entisol (soils that do not show any profile development and which are largely unaltered from their parent rock) soils (USACE, 2002a). These soil types are characterized by moderate-to-severe erodibility, landslides, and unstable clay formation movement due to variations in moisture content and temperature (USACE, 2002a).

Thirty-four soil categories and 65 soil associations have been recognized on Fort Carson. Predominant soil associations identified are the Penrose-Minnequa Complex, Penrose-Rock Complex, Schamber-Razor Complex, and Razor-Midway Complex (DECAM, 2002a). The Penrose-Minnequa and Penrose-Rock complexes occur in the southern portion of Fort Carson, in Pueblo and Fremont counties.

A brief description of soil coverage at the Cantonment and downrange area is provided below. Additional information on Fort Carson soil types can be found in the *INRMP* (DECAM, 2002a) and information specific to El Paso, Fremont, and Pueblo counties can be obtained from the appropriate county NRCS Soil Surveys.

The Cantonment, located in the northern portion of Fort Carson, is the most highly developed area on the installation and contains post housing, administration, recreational, and other support facilities. Native soils and vegetation occur throughout the Cantonment, primarily in the southern portion, and are broken up by local areas of disturbed soils.

BAAF, located on the eastern side of the post adjacent to and south of Wilderness Road, is semi-developed. The airfield contains a landing strip, paved areas, and support facilities. The land surrounding BAAF contains native soils and vegetation that are broken up by local areas of disturbance. The least-disturbed soils at BAAF occur in the southwestern portion of the airfield.

The downrange area on Fort Carson covers the majority of land on post, is relatively undeveloped, and supports the greatest area of native undisturbed soils. The western portion of the downrange area has a high degree of wind erosion associated with disturbed soils (areas that have been cleared for training operations, including berms).

Soil erosion is a problem at Fort Carson. Soils of greatest concern for erosion are clays, silty clays, and clay loams. In particular, the eastern portion of Fort Carson, located within the Fountain Creek Watershed, contains soils that have been identified as being moderately to highly susceptible to erosion. Specific soil types on Fort Carson of greatest concern for erosion are Wiley-Kim, Penrose-Manvel, and Rizozo-Neville (DECAM, 2002a). Additional discussion regarding existing soil erosion and ongoing prevention and mitigation activities is presented below in Section 3.5.1.3.

Soil chemistry at Fort Carson has constituents that can be problematic. Mercury (Hg) of an undetermined origin exists broadly across the installation. Hg can become problematic if bio-accumulated, particularly in aquatic systems. Selenium (Se) of geologic origin exists broadly across the installation. Se can become problematic if bio-accumulated, particularly

in plant communities and aquatic systems. Fort Carson has studied Se distribution in soil, plants, and aquatic systems. The results of these studies provide prescriptions that land managers use to mitigate the environmental reception and fate of Se at Fort Carson. Wild Horse Creek is listed as impaired for Se on the CWA 303(d) list.

3.5.1.3 Erosion Management on Fort Carson

Soil erosion from water runoff is a recognized existing problem on post (DECAM, 2002a) and evidence of areas prone to erosion exists throughout Fort Carson. Gully erosion of approximately 15 feet in depth and 20 feet in width occurs on the installation on watercourses and minor drainages due to degradation of vegetative cover. Sheet and rill erosion also occur on Fort Carson. These erosive features have increased the flow of stormwater runoff, erosion of unstable soils, and the transport of sediments on Fort Carson (USFWS, 1998). Erosive locations in the downrange area are generally associated with military training operations that presently occur on the installation, including troop, mechanized, and live-fire training events.

Fort Carson currently follows regulations and implements management plans designed to sustain training resources and offset adverse effects to soils on the post associated with military training. BMPs and mitigation measures implemented to reduce effects to soils are included in these regulations and management plans. For example, 349 erosion control dams have been constructed to mitigate erosion and reduce sediment loads on Fort Carson (DECAM, 2002a). In addition, the USGS monitors four erosion control reservoirs on Fort Carson, as funding resources are available (Kuzmiak, 2006). Information on these erosion control reservoirs also is presented in Section 3.6, Water Resources.

The major plans and regulations implemented to reduce the effects of erosion and sediment on Fort Carson are FC Regulations 350-10, 385-63, and 350-19; AR 350-9; the *INRMP* (DECAM, 2002b); the *Fugitive Dust Control Plan* (DECAM, 2004a); and the Section 404 Regional Permit (USACE, 2002b). In addition, the Environmental Assessment (EA) for the Erosion and Sediment Control Program at Fort Carson (USFWS, 1998) identifies mitigation measures that would minimize erosion on the installation. Under the direction of these plans and regulations, which are briefly described in Appendix A, Fort Carson implements erosion control BMPs and mitigation to reduce adverse effects of erosion on post.

In addition to the programs described in Appendix A, erosion control management at Fort Carson includes projects that are carried out by Fort Carson's Watershed Management Team under work plans as erosion control needs are identified (Goss, 2006). Prior to implementing erosion control projects, the work is subject to environmental review, which may include a Categorical Exclusion/Record of Environmental Consideration, EA, EIS, and/or permitting (Goss, 2006). BMPs implemented by DECAM include:

- Grading of existing roads to ensure proper drainage;
- Installation and maintenance of erosion control structures, such as erosion control dams rock check dams, waterbars, and hardened (bed of rock) crossings in existing drainages at intersections with established dirt roads;
- Revegetation of disturbed land;

- Bank sloping to reduce gully erosion and to increase military training opportunities; and
- Installation and maintenance of water diversions.

The main dirt roads in the downrange area are maintained by the DPW through the use of subcontractors (Goss, 2006).

Modeling Studies

USDA's study, *Adding Modern Soil Erosion Prediction and Rangeland Health Assessment to the LCTA (Land Condition Trend Analysis) Program at Fort Carson and Pinon Canyon* (USDA, 2001a), evaluates soil erosion on rangelands and the influences of land use and management practices on rangelands on Fort Carson. The study applied a "Hillslope Erosion Model" to 20 RTLA sites on Fort Carson to assess soil erosion rates and sediment yield along hillslopes. In the study, the USDA recommended using the model in soil protection planning and design evaluation on Fort Carson to evaluate revegetation design on sloped sites, training sites, and rest rotations (USDA, 2001a). The Hillslope Erosion Model has not been used on Fort Carson since the initial studies were conducted by the USDA in 1999 because of the intensive field labor that would be required to collect data (Goss, 2006).

USDA (2001b) discusses sedimentation to streams resulting from non-point source pollution on Fort Carson and the PCMS, evaluates simulation modeling methods and data collected from hydrologic modeling, and presents interpretations of these data for use in future total maximum daily load (TMDL) compliance at Fort Carson. Further information on existing sediment transport issues on Fort Carson is presented in Section 3.6, Water Resources.

3.5.2 Consequences

The following discusses potential impacts to soils and topographic conditions associated with construction and training that could result from the No Action alternative and Proposed Action. Subsurface mineral resources would not be directly affected and are not discussed.

3.5.2.1 No Action Alternative

Personnel

Geologic and Topographic Conditions and Soil

Under the No Action alternative, no new personnel will be added as a result of BRAC 2005, IGPBS, and the AMF. Consequently, no adverse effects to current geologic and topographic conditions and soils will occur because of increased personnel, training, or construction and operation.

Training

Geologic and Topographic Conditions

Under the No Action alternative, training on Fort Carson will not alter geologic and topographic conditions at the installation. Therefore, no adverse effects to geologic and topographic conditions will occur from training implemented under the No Action alternative.

Soil

Under the No Action alternative, training activities, as described in Section 3.2, Land Use, will occur as needed on Fort Carson to support current military training needs on the

installation. Under the No Action alternative, Fort Carson will continue to implement existing programs as described in Section 3.5.1.3 to reduce effects of training on soils. Impacts of training activities under the No Action alternative are summarized below.

Maneuver Training
Topography restricts maneuver training on some areas of Fort Carson. Areas with steep slopes are not open to maneuver training primarily due to their inaccessibility. Other open areas are small and not appropriate for large-scale maneuvers.

Direct impacts to soils that occur from maneuver training include primarily compaction and rutting. The types of activities that cause these impacts include hull defilades (large ramped holes dug to conceal equipment from ground forces), tank traps, neutral pivot steers (the turning of a tank from a stopped position), the turning of tracked vehicles, repeated vehicle passes, and use of land for bivouac sites. These impacts cause soils to be susceptible to erosion by water and wind. Soil compaction also reduces water filtration through the soil profile, increasing water runoff, which can exacerbate soil erosion.

Soils and vegetation at Fort Carson are susceptible to maneuver damage when the soils are wet (DECAM, 2002a). The primary impact of training activities on wet soils is rutting, although compaction may also occur. Training on dry soils can result in soil loss from wind erosion, but it is generally preferable to training on wet soils (Goss, 2006).

Increased wind and water erosion from lost vegetative cover occurs as an indirect impact. Direct adverse impacts due to loss of vegetative cover are discussed in Section 3.7, Biological Resources.

Live-Fire Training
Live-fire impact areas can result in soil disturbance from ordnance impact (DECAM, 2001). Firing areas that are not permanently closed (that is, outside the small and large impact areas) can be used for maneuver training when not in use for firing and would have similar adverse direct and indirect impacts to soils as described above.

Restricted Areas
No adverse effects to soils from training would occur within the restricted areas because these areas are off limits to mechanized and live-fire training.

Construction and Operation

Geologic and Topographic Conditions and Soil
Under the No Action alternative, construction, operation, and maintenance of facilities and ranges would occur as needed to continue current operations on Fort Carson. Therefore, no additional adverse effects would occur on current geologic and topographic conditions and soils.

3.5.2.2 Proposed Action

Personnel

Geologic and Topographic Conditions and Soil
Under the Proposed Action, increased number of Soldiers realigned to Fort Carson would not substantially affect current geologic, topographic, and soil conditions on Fort Carson.

The Cantonment on Fort Carson contains the largest amount of developed land on the post, and under the Proposed Action, the cantonment area would be accessible by increased numbers of personnel. No substantial effects to geology within the Cantonment, however, are expected from the increase in personnel, in large part because of the already-developed nature of the area.

Training

Geologic and Topographic Conditions

Under the Proposed Action, the presence of increased personnel on post as well as an increase in the equipment used during training exercises would not have the potential to alter geologic and topographic conditions on the installation. Therefore, no substantial effect to geologic and topographic conditions would occur as a result of training implemented under the Proposed Action.

Soil

No adverse effects to soil are anticipated within the Cantonment on Fort Carson because no training activities that would affect soil resources are expected to be performed in the cantonment area under the Proposed Action.

Training areas within the downrange area, as described in Section 3.2, Land Use, would support military training operations under the Proposed Action. In addition to the training operations discussed above under the No Action alternative, an increased frequency of training operations would take place due to the increased number of training rotations, personnel, and equipment under the Proposed Action. Impacts of training under the Proposed Action are summarized below.

Fort Carson would continue to implement existing plans, as listed in Section 3.5.1.3, to reduce adverse effects on soils from training. Current programs are sufficient to mitigate adverse impacts to soils due to the increased frequency of training activities under the Proposed Action. Therefore, additional programs would not be required to reduce the effects of increased training activities on soil resources.

Maneuver Training

Direct and indirect impacts that occur from maneuver training on Fort Carson would continue as described under the No Action alternative but could be exacerbated by the increased frequency of training rotations as well as the additional personnel and equipment operating within these locations. Therefore, the direct adverse impacts described above for maneuver training activities under the No Action alternative would increase under the Proposed Action. In addition, indirect adverse impact to soils would increase due to the loss of vegetative cover (see Section 3.7, Biological Resources) associated with increased maneuver training, and potential plant loss from increased training on wet soils. This increase in disturbance would cause greater potential for erosion that would primarily occur in areas that have been previously undisturbed due to current training activities.

Live-Fire Training

Direct and indirect impacts that occur from live-fire training on Fort Carson would continue as described under the No Action alternative but would be exacerbated by the increased frequency of training rotations as well as the additional personnel and equipment operating within these locations.

Restricted Areas
No adverse effects to soils from training would occur within restricted areas because these areas are off limits to training activities.

Construction and Operation

Geologic and Topographic Conditions

There would be no adverse effects resulting from the Proposed Action because the construction and operation of facilities associated with the Proposed Action would not change the underlying geology of the installation. Minor changes in elevation would result from site grading and preparation during construction. Impacts from grading and construction activities would be negligible in relation to the overall size of the facility. No change in the geologic and topographic conditions would occur during facility operation.

Soil

The location of construction projects on Fort Carson that would be implemented under the Proposed Action are identified in Section 2.0 and on Figure 2-5. The majority of proposed construction would occur within the Cantonment, with limited construction projects taking place in the downrange area.

Disturbance to soils would generally occur during construction and demolition. Heavy equipment would be used to demolish facilities, clear and grade sites, move and compact soils, excavate foundations, and remove debris in construction and paving areas. To reduce impacts to soils by water and wind erosion during construction activities, the area of disturbance would be kept to the minimum necessary to complete the work. Additionally, Fort Carson would continue to follow existing programs and implement existing plans to reduce the effects of construction on soils, and no additional mitigation would be required.

Additionally, soils within the areas proposed for construction have shrink-swell potential that can result in adverse effects to building foundations and stability. Facilities would be engineered to address these soil properties in the same manner as all existing facilities on Fort Carson. Proper engineering design would address potential foundation and stability issues, and reduce the effect.

Minor grading and compaction would occur during construction and maintenance activities. The ground-disturbing activities could result in potential offsite transport of sediment and erosion by wind and/or water. Sedimentation and erosion control measures would be implemented, as discussed in Section 3.6, in accordance with NPDES *Storm Water Pollution Prevention Plan* (SWPPP) requirements to minimize erosion of onsite and surrounding soils. Disturbed land would be prepared and seeded in accordance with Fort Carson's post-wide design for landscaping standards (DPW, 2006c). Reseeding standards follow the *General Downrange Seeding Specifications for Fort Carson* (DECAM, 2002a), as discussed in Section 3.7.

3.6 Water Resources

This section identifies the affected environment and environmental consequences for water resources, including surface water, groundwater, and floodplains within the Fort Carson cantonment area, BAAF, and downrange area.

3.6.1 Affected Environment

As outlined in FC Regulation 200-1, it is the policy of Fort Carson to eliminate or minimize the degradation of all water resources on Fort Carson and ensure compliance with all applicable federal, State and local water quality standards. As described in the *INRMP* (DECAM, 2002a), water resources at Fort Carson are managed in coordination with the USGS, NRCS, USFWS, U.S. Department of Justice, USACE, and the Colorado State Division of Water Resources. The Water Resources Management Program (as outlined in FC Regulation 200-1) on Fort Carson includes watershed/sedimentation monitoring and management, and project reviews for erosion and sediment control.

3.6.1.1 Surface Water

Fort Carson is located on the eastern side of the Rocky Mountains adjacent to and south of Colorado Springs. The northern and eastern portions of the installation are located within the Fountain Creek watershed of the Arkansas River Basin and drain eastward into Fountain Creek. The southern and western portions of the installation drain into the Arkansas River to the south (USACE, 2005).

The streams entering and originating in Fort Carson are perennial, intermittent, and ephemeral. Most of the stream flow consists of runoff from precipitation, although groundwater seepage to streams occurs in some areas. No flow occurs in some reaches of the streams for long periods during the year, with most stream flow occurring between April and September (USAEC, 2005a).

The cantonment area is located in the Lime Kiln Valley watershed, a sub-watershed to the Fountain Creek watershed. Stormwater in the cantonment area flows into one of three main ditches: "B" Ditch in the northeast part of the post, "I" Ditch (Clover Ditch) in the central portion of the installation, and the unnamed "U" Ditch in the south. All three ditches are tributaries to Fountain Creek. A map of the surface waters in the study area is shown on Figure 3-1.

Stormwater drainage downrange, as shown on Figure 3-1, is usually via natural drainages with some modifications, particularly near roads and firing ranges. Rock Creek and Little Fountain Creek cross the installation from the northwest to the southeast, converge, and drain into Fountain Creek approximately 10 mi east of Fort Carson (DECAM, 2002a). Intermittent streams, including Sand Canyon, Sand Creek, and Young Hollow, also flow generally from the northwest to the southeast across most of the installation and ultimately drain into Fountain Creek. In the southwestern portion of the installation, Turkey Creek, Red Creek, Wild Horse, and several other intermittent streams flow south into the Arkansas River, which is approximately 10 mi from the southern border of the installation (USAEC, 2005).

The installation implements BMPs and DECAM's Watershed Management Program. Erosion control activities and BMPs implemented or that could be implemented on the installation to control sediment loading in surface water are identified and described in detail in the Section 404 regional permit issued by the USACE (USACE, 2002b), USACE *Low Impact Development Manual* (USACE, 2004), the Storm Sewer System Capacity Report (USAEC, 2005), and the *Programmatic EA for the Erosion and Sediment Control Program*

(USFWS, 1998). The Section 404 regional permit includes standard operating procedures for erosion control methods, including:

- Erosion control and stock watering impoundments
- Bank sloping of erosion courses
- Check dams
- Rock armor
- Hardened crossings
- Culverts and bridges
- Erosion control terraces and water diversions
- Water turnouts

This permit greatly reduces reporting requirements and improves accomplishment of erosion control projects. The regular Section 404 permitting process is used for nonstandard projects (USACE, 2002b). To address potential sedimentation issues and avoid violations of regulatory limits, Fort Carson has installed approximately 349 major sediment control structures.

Fort Carson, as an operator of a small municipal storm sewer system, complies with a general permit for Stormwater Discharges from Federal Facility Small Municipal Separate Storm Sewer Systems (MS4) in Colorado. The permit became effective on June 23, 2003, and expires on June 22, 2008.

Teller Reservoir, the largest downrange water body, is listed as an impaired water body on Colorado's Section 303(d) list. The impairment is the result of a fish consumption advisory that has been imposed because of a biological accumulation of mercury in soil, plants, and fish tissues. Fort Carson has mandated a catch-and-release fishing program in this body of water to reduce the potential for a public health issue. Although the Teller Reservoir has a capacity of approximately 2,600 acre-feet, it frequently contains no water and, in fact, has been dry since 2002.

Fort Carson retains 34 surface water rights as specified by the Colorado Division of Water Resources. Of these surface water rights, 20 are surface diversion ditches and 14 are reservoir storage rights (DECAM, 2002a). The USGS installed 10 surface water-gauging stations on or near Fort Carson streams and reservoirs for continuous monitoring of the water flow, By October 1989, however, surface water gauging was discontinued at five of these stations. Year-round monitoring is conducted at Rock Creek above Fort Carson, Rock Creek near Fort Carson, Turkey Creek near Fountain, Turkey Creek above Teller Reservoir, and Turkey Creek near Stone City (DECAM, 2002a). Wild Horse Creek, on the southern border of the installation has been identified as warranting monitoring and evaluation for nitrite/nitrate as prescribed in the Section 303(d) listing for impaired waters for Colorado. The reaches that are impaired are unknown, and the source of impairment is undetermined.

Although the quality of the surface water on Fort Carson is good, it is not a source of domestic water at Fort Carson (DECAM, 2002a). Water from most streams and surficial aquifers on the western portion of the installation is suitable for irrigation. Surface water that flows eastward across Fort Carson accumulates sediments (i.e., dissolved and suspended solids) that are then concentrated through evaporation. Water from the eastern

portion of Fort Carson, however, is still suitable for irrigation with proper management practices.

3.6.1.2 Hydrogeology and Groundwater

Groundwater at Fort Carson exists in both alluvial and bedrock aquifers. Alluvial aquifers are formed from unconsolidated deposits of stream alluvium and residuum derived from Pierre Shale that are moderately permeable. The alluvial aquifers can provide well yields from 10 to more than 100 gallons per minute (gpm) (Leonard, 1984). In much of the Arkansas River Basin, hydraulic heads are lower in the deep bedrock aquifers than those in the shallow formations, which indicates that deep bedrock aquifers are not in communication with the shallow formations. The primary bedrock aquifer at Fort Carson is the Dakota-Purgatoire aquifer, which can yield 10 gpm, although local fracturing can increase permeability and yield more than 200 gpm. Precipitation and stream flow infiltration recharge the bedrock aquifers (Leonard, 1984).

In general, the quality of groundwater on Fort Carson is good with the exception of localized areas of elevated nitrates, high dissolved solids, and sulfates exceeding secondary drinking water standards. Nitrates have recently been detected in the groundwater at multiple locations greater than the regulatory standard of 10 milligrams per liter (mg/L). Currently, Fort Carson and CDPHE are collaborating to evaluate the possibility that elevated concentrations of nitrates may be naturally occurring as a result of groundwater coming in direct contact with the shale bedrock (DECAM, 2005c).

The Army has 16 subsurface water rights, including nine wells for domestic or military use, at Fort Carson. Seven wells classified as future wells are planned to be installed when determined to be needed (DECAM, 2002a). Water rights directly support the training mission by ensuring adequate water supplies for the support and rehabilitation of natural resources on Fort Carson, and to provide training capabilities and fire suppression.

3.6.1.3 Floodplains

Fort Carson is located on high semi-arid rangeland. Annual precipitation in the Colorado Springs area averages 16 inches (DECAM, 2002b). Approximately 80 percent of precipitation occurs between early April and late September. Short, intense thunderstorms, typically 2 to 6 hours in duration, are the principal source of flooding on post. Snowfall at Fort Carson averages 42.4 inches annually (DECAM, 2002a), and spring snowmelt runoff is occasionally a source of flooding.

A Federal Emergency Management Agency (FEMA)-regulated 100-year floodplain is associated with the three ditches in the cantonment area (“B” Ditch, “I” Ditch, and “U” Ditch) (USACE, 2000) (Figure 3-2). Floodplains in the southern part of the installation (i.e., the downrange area) have not been delineated. Flash floods, however, can occur intermittently during high rainfall-runoff events.

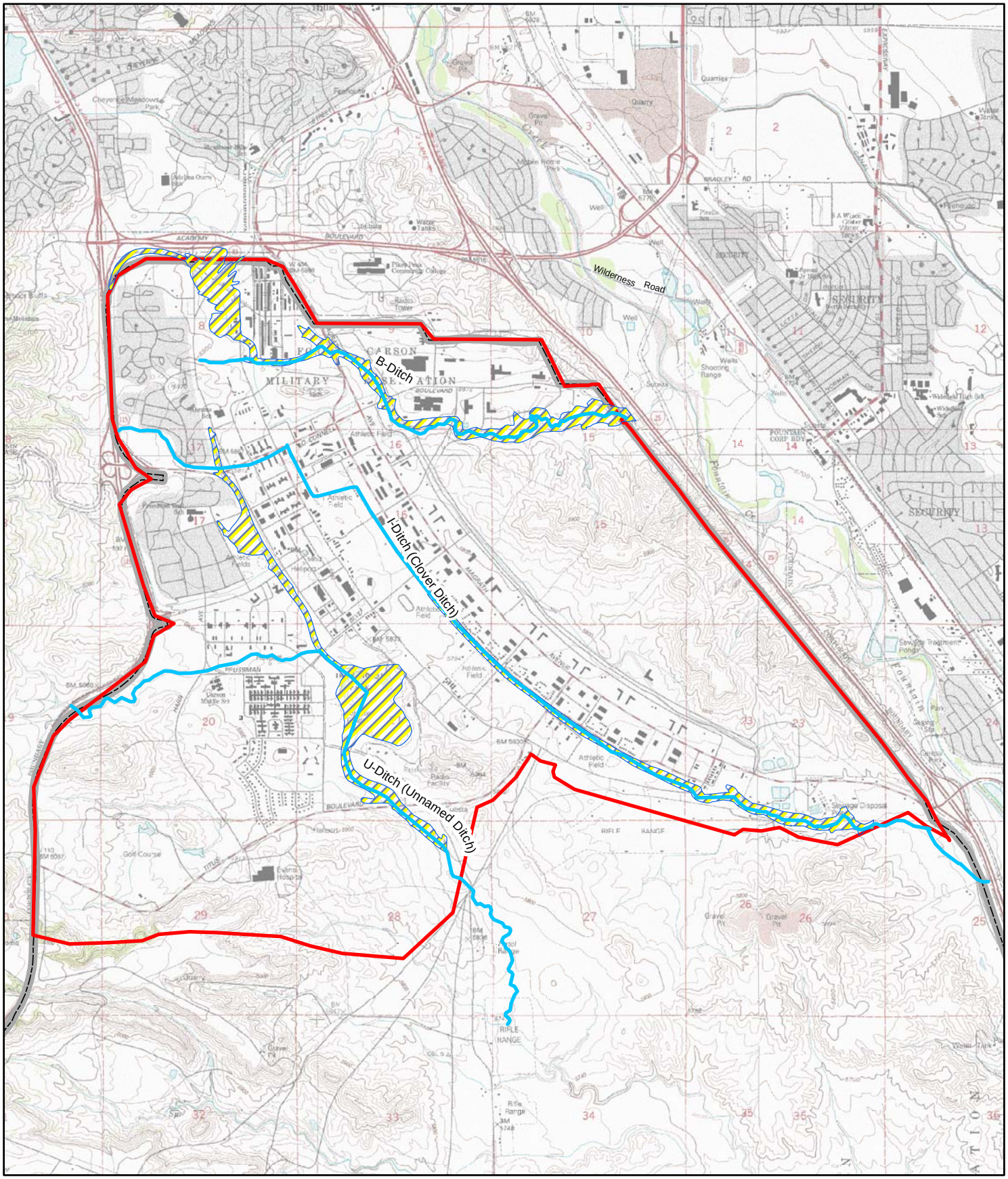


FIGURE 3-2
Mapped Floodplains in the Cantonment Area at Fort Carson

3.6.2 Consequences

3.6.2.1 No Action Alternative

Personnel

No increase of personnel will occur under the No Action alternative. Therefore, water resources will not be affected by increased population. Potable water supply and demand are addressed in Section 3.11, Utilities.

Training

Surface Water and Stormwater

No training activities that could directly affect water resources would occur at Fort Carson under the No Action alternative. Increased training activities associated with the No Action alternative, however, may potentially cause indirect adverse effects to surface water quality.

Increases in training at Fort Carson could occur during wet weather when soils are more susceptible to damage and increased erosion. The Army would, however, continue to use off road condition (green, amber, red) to avoid or reduce training in wet conditions. Increased sediment form erosion could be transported by stormwater or carried by wind to receiving or nearby water bodies, including Fountain Creek. This could result in decreased surface water quality from increased turbidity or sedimentation. The ITAM program is adaptive and is continuously modified to address changing training requirements. Continued implementation of the ITAM program and other land management initiatives will minimize the potential for wind and water erosion of soils and indirect impacts to water quality. Maneuver training has the highest potential to cause increased sedimentation into surface waters.

Increased training will increase the use of fuels, solvents, and other hazardous and toxic substances (see Section 3.12), which might result in indirect impacts to surface water if accidentally released into the environment. Fort Carson will continue to implement all applicable hazards management plans to address leaks or spills of hazardous materials, including the *Spill Prevention Control and Countermeasures Plan (SPCCP)*. Vehicle and equipment fueling and maintenance will be restricted to approved areas unless emergent field maintenance is required. If field maintenance were required, appropriate control and containment measures would be implemented to prevent accidental contamination of surface water.

Potential spills due to increased training activities would be typically small in magnitude. Even a large, uncontained spill, however, would have a low probability of affecting surface water because the streams in Fort Carson's downrange area are intermittent. In addition, Fountain Creek is on the opposite side of a major highway (I-25), making it highly unlikely for any spill to directly or indirectly affect this water body.

Hydrogeology and Groundwater

Groundwater from nine existing wells is used at Fort Carson for natural resource support and rehabilitation, support of training capabilities, and fire suppression. With increased training activities under the Proposed Action, groundwater use may increase. The increase, however, can be accommodated under existing subsurface water rights, including seven wells that are classified as future wells to be installed when required. The Proposed Action

would not release any water that could infiltrate aquifers at Fort Carson. Therefore, the Proposed Action would have no direct adverse effect on groundwater at Fort Carson.

Increased training would increase the use of fuels, solvents, and other hazardous and toxic substances (Section 3.12), which might result in an indirect effect to groundwater if released into the environment in an area where infiltration to groundwater could result. Fort Carson will continue to implement all applicable hazards management plans to address leaks or spills of hazardous materials as described above.

Floodplains

There are no FEMA-mapped floodplains in the downrange area at Fort Carson; therefore, no adverse impact to mapped floodplains will occur due to training. Floodwaters could affect personnel and equipment, however, when training in flood-prone areas, especially during flash flooding. Safety of troops and equipment is a priority during training, and training procedures direct that troops relocate from flood-prone areas when conditions are favorable for sudden storms and flash flooding. These procedures will continue to be implemented.

The increased number of vehicles crossing dry drainages could modify drainage structure through erosion or compaction, and may cause modifications to drainages that result in increased erosion. Such erosion could result in indirect impacts to surface water quality, as discussed above.

Construction

No major capital construction will occur under the No Action alternative. Therefore, water resources would not be affected by construction activities.

3.6.2.2 Proposed Action

Personnel

No direct effects to water resources would occur from increasing the population of Fort Carson. Effects to the water supply are addressed in the Utilities Section (Section 3.11) of this EIS.

Training

Surface Water and Stormwater

The types of impacts associated with increased training activities would be similar to those described under the No Action alternative; however, the increased frequency of training operations may result in a greater magnitude of impacts as compared with the No Action alternative.

Hydrogeology and Groundwater

The types of impacts associated with increased training activities would be similar to those described under the No Action alternative; however, the increased frequency of training operations may result in a greater magnitude of impacts as compared with the No Action alternative.

Floodplains

There are no FEMA-mapped floodplains at the BAAF or the downrange area at Fort Carson. The types of impacts associated with increased training activities would be similar to those described under the No Action alternative; however, the increased frequency of training

operations may result in a greater magnitude of impacts as compared with the No Action alternative.

Construction and Operation

Surface Water and Stormwater

Fort Carson would continue to implement existing BMPs, follow permitting requirements, and adhere to FC Regulation 200-1 during construction of new facilities. Pursuant to provisions in the CWA, contractors performing work at Fort Carson would submit a NOI to obtain coverage under the NPDES General Permit for Storm Water Discharges from Construction Activities for each construction project that disturbs 1 acre or more of land. In addition, contractors would develop and implement a SWPPP and Post Construction Stormwater Management Plan. These plans would specify mitigation strategies to reduce impacts associated with stormwater runoff during and after construction, respectively (EPA, 2006b).

Construction projects in the Cantonment will be sited to avoid dredging or filling activities at "B" Ditch, "I" Ditch, "U" Ditch, or any other jurisdictional waterways if possible. If avoidance is not possible, a Department of the Army permit under Section 404 of the CWA will be obtained as necessary, and any required mitigations from the Section 404 permit would be implemented. All potential impacts requiring 404 permitting would be coordinated with the USACE, Albuquerque District, and mitigations would be implemented as necessary.

Construction in the cantonment area would increase the amount of impervious surfaces, which could increase stormwater runoff and provide a pathway for hazardous materials to enter receiving water bodies.

Permanent treatment of storm runoff (for example, installation of post-construction BMPs), however, is required as part of the installation's MS4 permit in Colorado. Therefore, no increase in untreated stormwater runoff would occur under the Proposed Action. The existing deficiencies of the stormwater conveyance and treatment system, however, would persist if the remaining phases of the USAEC (2005) study were not implemented.

The USACE (2005) study identified several areas and segments of the existing sewer system where the additional generation of runoff from the proposed increases in impervious area from planned development would exceed existing capacity and might cause localized flooding, ditch overflows, and erosion. The study recommended additional evaluation phases and resulting improvements to the capacity of the entire system.

Dewatering may be needed during construction, particularly of the utility trenches. Impacts to surface water would be minimal because dewatering activities would occur in accordance with a construction dewatering permit, which would require such sedimentation treatment and confirmatory sampling. Discharge would be to the land surface through a filtration and energy dissipation structure to minimize the potential for erosion and downstream sedimentation.

Construction and operation of new facilities would increase the use of fuels, solvents, and other hazardous and toxic substances (Section 3.12), which could result in an indirect effect to surface water if accidentally released into the environment. Fort Carson, however, would

require that all handling and storage of hazardous and toxic substances be conducted in accordance with established procedures and policies as described above.

Hydrogeology and Groundwater

Dewatering may be needed during construction, as described above, but impacts associated with dewatering activities would be mitigated through compliance with a construction dewatering permit.

Construction and operation of new facilities would increase the use of fuels, solvents, and other hazardous and toxic substances (Section 3.12), which could result in an indirect effect to groundwater if accidentally released into the environment. Fort Carson, however, would require that all handling and storage of hazardous and toxic substances be performed in accordance with established procedures and policies as described above.

Floodplains

As discussed in Section 3.11, the stormwater conveyance system, utilities, and ditches may be unable to handle the increased loading from additional construction and facilities operation within the Cantonment, even with the upgrade of the "B" Ditch and the Magrath/ O'Connell drainage system. Insufficient capacity in the stormwater conveyance system could result in adverse affects to floodplains in the Cantonment under the Proposed Action. Implementing the remaining phases of the USAEC (2005) study would address shortcomings in the stormwater system.

There are no mapped floodplains at the BAAF or downrange area. There could be adverse impacts to flood-prone areas under the Proposed Action if construction of permanent facilities occurs within flood-prone areas. Any construction activity within the 100-year floodplain in El Paso County requires a Floodplain Development Permit issued by El Paso County. To avoid adverse impacts, new facilities would be located to the extent practicable outside of known flood-prone areas, including areas immediately adjacent to arroyos.

3.7 Biological Resources

This section describes the affected environment and environmental consequences of the Proposed Action and the No Action alternative for biological resources on Fort Carson, including vegetation, wildlife, sensitive species, and wetlands. Information on the occurrence and distribution of natural resources on Fort Carson was obtained from a variety of sources, chiefly the *INRMP* (DECAM, 2002a) and Fort Carson geographic information system (GIS) data.

3.7.1 Affected Environment

Fort Carson is located at the western edge of the Central Shortgrass Prairie Ecoregion, which includes all the plains of Colorado east of the Rocky Mountains as well as an approximately equal area in adjacent Great Plains states and Texas. The Central Shortgrass Prairie is characterized by rolling-to-undulating plains and tablelands of low relief that are moderately traversed by streams and contain canyons, buttes, badlands, and isolated mountains. Shortgrass prairie, mixed-grass prairie, and sandsage prairie community types dominate the Central Shortgrass Prairie Ecoregion (Burget et al., 1998). Thirty-six percent of

Fort Carson's 137,000 acres are dominated by pinyon-juniper woodland and ponderosa pine with some riparian communities.

3.7.1.1 Vegetation

The eastern side of Fort Carson is characterized by flat-to-rolling, open terrain dominated by grasslands and shrublands (see Figure 3-3). Woodlands and a variety of shrub communities occupy higher ground on the western side of the installation, and large grassland areas are also present. The Cantonment on Fort Carson is highly disturbed and developed, and vegetation consists primarily of non-native ornamental landscaping, including bluegrass turf and landscape trees. Only small areas of native vegetation remain within the Cantonment. Native grasslands occur primarily in the eastern and southwestern portions of Fort Carson. Several deciduous shrubland types are found on Fort Carson, and these are often restricted to special edaphic (soil-related) conditions (USACE, 2005; DECAM, 2002a).

Coniferous woodlands dominated by one-seed juniper (*Sabina monosperma*) or a combination of one-seed juniper and pinyon pine (*Pinus edulis*) are the most common woodlands on Fort Carson, occupying the elevated landscapes on the western side of the installation. Pinyon-juniper woodlands are found primarily on mesas and hills with gravelly soils where they out-compete grasses (USACE, 2005; DECAM, 2002a). A number of Colorado state- and county-listed (El Paso, Pueblo, and Fremont counties) noxious weeds have invaded both natural and developed landscapes on Fort Carson. Fort Carson has targeted noxious weeds for priority control by preventing them from populating disturbed areas, controlling infestations to levels compatible with other land management objectives, or eliminating the weed species from the area (DECAM, 2002a). Maintaining healthy native plant communities and revegetating disturbed areas, as necessary, is the most effective methods of preventing weed establishment and encroachment at Fort Carson (DECAM, 2002a).

Existing data on plant species present on Fort Carson are available in greater detail in the *INRMP* (DECAM, 2002a), supplemented by applicable descriptions of plant communities from *Plant Communities, Ecological Checklist, and Species List for the U.S. Army Pinon Canyon Maneuver Site* (Shaw et al., 1989). A plant species list for Fort Carson is provided in Appendix E, Attachment E.1.

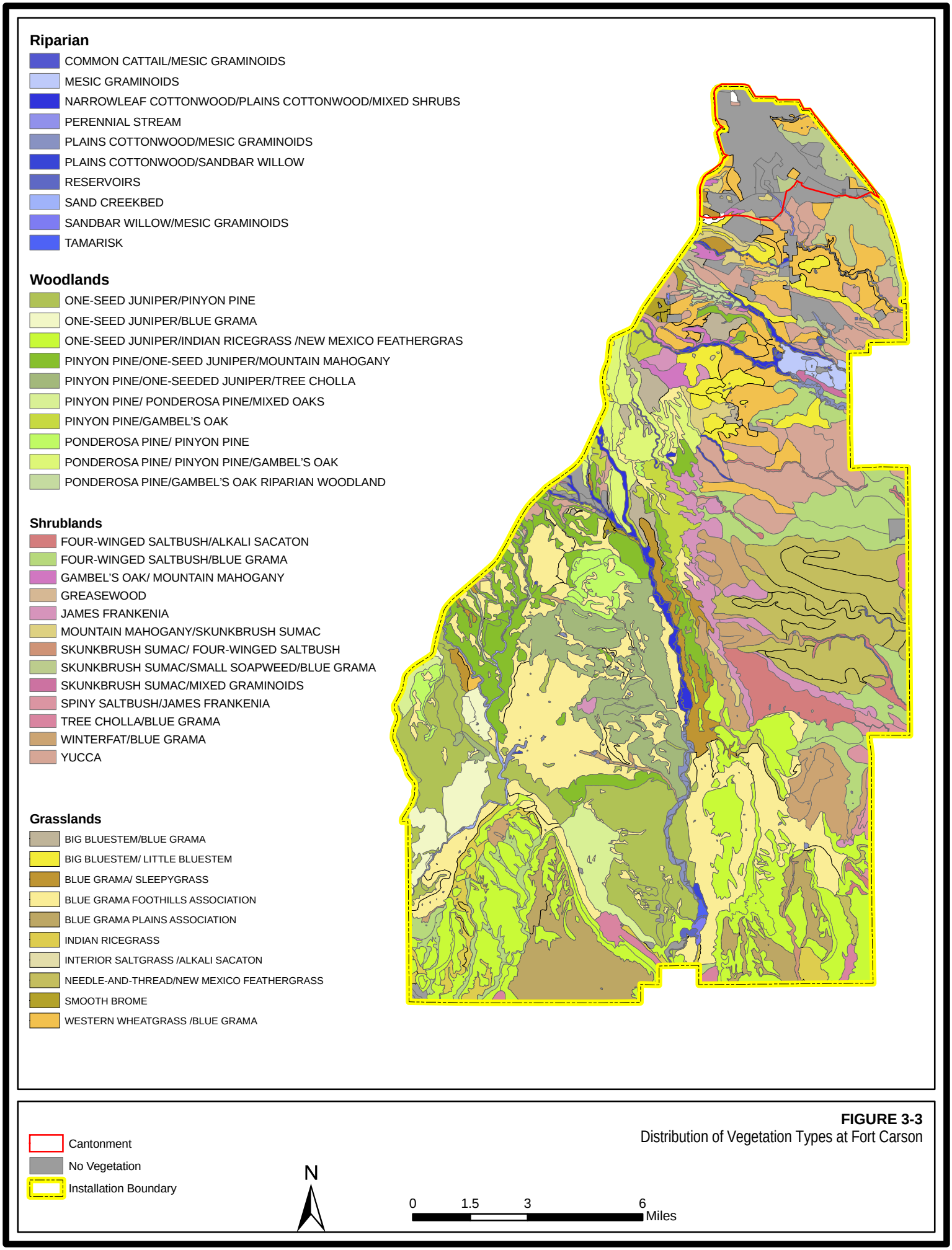


FIGURE 3-3
Distribution of Vegetation Types at Fort Carson

Management of wildland fires protects and enhances natural resources on Fort Carson. Fire is suppressed or controlled where necessary for safety and for protecting high-value resources. Prescribed fires accomplish predefined resource management objectives (DECAM, 2002a), including:

- Reducing the fuel load contributed by excessive understory vegetation, thereby preventing larger and less-easily controlled wildfires;
- Creating buffer zones in and around live-fire training areas to reduce the risk of fire from training activities;
- Manipulating the composition of existing plant communities;
- Enhancing or creating specific wildlife habitats; and
- Controlling noxious weeds.

The Army has cooperative agreements with the Colorado Springs Fire Department and El Paso County to provide mutual aid for the suppression of wildland fires on Fort Carson and surrounding areas (DECAM, 2002a).

3.7.1.2 Wildlife

Typical wildlife habitat types on Fort Carson include shortgrass prairie, pinyon-juniper woodland, and aquatic and riparian communities. The dominant terrestrial habitat types on Fort Carson are grasslands, shrublands, and woodlands. Aquatic habitats on Fort Carson are very limited and consist of wetlands, riparian corridors, and open water. Existing data on wildlife species and descriptions of wildlife habitats present on Fort Carson were obtained from the *INRMP* (DECAM, 2002a).

Mammals

Several species of carnivores, ungulates, and small mammals are known to occur on the Fort Carson. A wildlife species list for Fort Carson is provided in Appendix E, Attachment E.2.

Reptiles and Amphibians

Western rattlesnake (*Crotalus viridis*), triploid checkered whiptail (*Cnemidophorus neotesselatus*), and coachwhip (*Masticophis flagellum*) are typical reptiles found on Fort Carson. Wetlands support several herptofauna species found on Fort Carson, including plains leopard frog (*Rana blairi*), northern leopard frog (*Rana pipiens*), and painted turtle (*Chrysemys picta*). A wildlife species list for Fort Carson is presented in Appendix E, Attachment E.2.

Fish

Native and non-native fish can be found at reservoirs at Fort Carson (USACE, 2005), eight of which are managed for sport fishing (DECAM, 2002a). The closest surface waters to the cantonment area, including Haymes, Townsend, and Northside Reservoirs and Bird Farm Reservoirs, are man-made impoundments primarily used for recreational fishing. Warm-water catch-and-release fisheries are found at Northside, Small Bird, and Large Bird Reservoirs. Womak, Haymes, and Townsend Reservoirs are currently managed as cold-water fisheries (DECAM, 2002a). Streams, especially spring-fed streams, also support native fish species on Fort Carson (USACE, 2005).

Birds

Numerous bird species are known to occur on Fort Carson. A wildlife species list for Fort Carson is presented in Appendix E, Attachment E.1

3.7.1.3 Sensitive Species

Federally listed threatened and endangered plant and animal species are protected under the Endangered Species Act. The Migratory Bird Treaty Act protects migratory birds and implements the U.S. commitment to international conventions for the protection of migratory birds. Bald and golden eagles are protected by the Bald and Golden Eagle Protection Act. Other sensitive wildlife species include those listed by the Colorado Division of Wildlife (CDOW), Colorado Natural Heritage Program (CNHP), USFWS, Partners in Flight (PIF), and the Central Shortgrass Prairie Ecoregional Assessment and Partnership Initiative (CSP). Other sensitive plant species include those identified by the CNHP as Colorado Species of Concern.

Federally Listed Species

Table 3-9 presents the 11 animal and two plant species that are on the USFWS list of federally listed endangered, threatened, and candidate species for the counties in which Fort Carson is located (El Paso, Pueblo, and Fremont counties). No critical habitat for these species has been designated or proposed for designation in these counties (USFWS, 2005; Linner, 2006).

No federally listed threatened or endangered plant species or candidates for federal listing are known to occur on Fort Carson, and no portion of Fort Carson has been designated or proposed for designation as critical habitat for listed plant species identified in Table 3-9 (USACE, 2005; Linner, 2006).

TABLE 3-9
Federally Listed Endangered, Threatened, and Candidate Species of Counties Occupied by Fort Carson
Fort Carson Transformation EIS, Fort Carson, Colorado

Species	Scientific Name	Species Type	Status	Distribution on Fort Carson
Arkansas darter^	*Etheostoma cragini*	Fish	C	Occurs on Fort Carson (introduced population).
Bald eagle^	*Haliaeetus leucocephalus*	Bird	T	Winter (late October through late February) resident and migrant on Fort Carson.
Black-footed ferret	*Mustela nigripes*	Mammal	E	Not known to occur on Fort Carson.
Canada lynx	*Lynx canadensis*	Mammal	T	Not known to occur on Fort Carson.
Greenback cutthroat trout^	*Oncorhynchus clarki stomias*	Fish	T	Occurs on Fort Carson (introduced population).
Interior least tern*	*Sterna antillarum athalassos*	Bird	E	Not known to occur on Fort Carson.
Mexican spotted owl^	*Strix occidentalis*	Bird	T	Winter resident on Fort Carson.
Pallid sturgeon*	*Scaphirhynchus albus*	Fish	E	Not known to occur on Fort Carson.
Piping plover*	*Charadrius melodus*	Bird	T	Not known to occur on Fort Carson.

TABLE 3-9
Federally Listed Endangered, Threatened, and Candidate Species of Counties Occupied by Fort Carson
Fort Carson Transformation EIS, Fort Carson, Colorado

Species	Scientific Name	Species Type	Status	Distribution on Fort Carson
Preble's meadow jumping mouse	*Zapus hudsonius pleblei*	Mammal	T	Not known to occur on Fort Carson; surveys conducted in 1995 and 1996 did not find evidence of this species on Fort Carson.
Whooping crane*	*Grus americana*	Bird	E	Not known to occur on Fort Carson.
Slender moonwort	*Botrychium lineare*	Plant	C	Not known to occur on Fort Carson.
Ute ladies'-tresses	*Spiranthes diluvialis*	Plant	T	Not known to occur on Fort Carson; surveys conducted in 1994, 1995, and 1996 did not find evidence of this species, and there are no historic records of it occurring on Fort Carson.

Notes:
A = Animal; P = Plant; E = Endangered; T = Threatened; C = Candidate
^ = Species occurring on Fort Carson are also state-listed (Arkansas darter is state-listed as threatened).
* = Water depletions in the South Platte River may affect the species and/or critical habitat in downstream reaches in other states. Note that Fort Carson is located in the Arkansas River drainage, not the South Platte River drainage.

The following four federally listed wildlife species are known to use Fort Carson:

Bald Eagle. The bald eagle is a winter (late October through late February) resident and migrant on Fort Carson. Most records are from the northern region of the installation and focus on prairie dog colonies in the cantonment area and small arms range (DECAM, 2002a). The bald eagle does not nest on Fort Carson or in the surrounding area and has never been seen on Fort Carson during the breeding season (DECAM, 2002a; USACE, 2005). Appendix E, Attachment E.3 provides a management plan for wintering bald eagles on Fort Carson.

Mexican Spotted Owl. The Mexican spotted owl is a winter resident on Fort Carson known only from the rugged canyons on Booth and Timber Mountains. This species is most likely to be seen in the southern half of the installation in TAs 38, 39, and 45 (DECAM, 2002a). The *Biological Assessment and Management Plan for the Mexican Spotted Owl on Fort Carson* contains more information on this species (DECAM, 2002c).

Greenback Cutthroat Trout. The greenback cutthroat trout is the only trout endemic to headwaters of the South Platte River and Arkansas River systems (DECAM, 2002a; USACE, 2005). Fort Carson is on the eastern edge of the historical distribution of the species, and greenbacks have been introduced into Lytle, Duck, and Little Turkey Creek ponds as well as a perennial section of Turkey Creek (DECAM, 2002a).

Arkansas Darter. The Arkansas darter was introduced into Lytle Pond in 1980 and has since been stocked in TAs 5, 8, 21, 33, and 38 (DECAM, 2002a). A population is established in a perennial portion of Turkey Creek, most likely as a result of a flood event at Lytle Pond (DECAM, 2002a). The Fort Carson population is actively transplanted to other locations in the Arkansas River drainage by the Colorado Division of Wildlife as part of state recovery efforts for the species (DECAM, 2002a).

State-Listed Species and Species of Concern

Table 3-10 presents the special status wildlife species that occur on Fort Carson. These species are tracked by CDOW, CNHP, USFWS, PIF, and the CSP. Threatened and endangered wildlife species are protected by Colorado state law, but species of concern are identified for planning purposes only. The distribution of sensitive wildlife species habitats on Fort Carson is depicted in Figure 3-4. Figure 3-4 has been revised from the DEIS to reflect survey data that became available since the publication of the DEIS. The new data show increased distribution of habitat. The new data do not change the management procedures or findings of the DEIS.

TABLE 3-10
Special Status Wildlife that Occur on Fort Carson
Fort Carson Transformation EIS, Fort Carson, Colorado

Species	Scientific Name	Species Type	Status	Authority
Southern redbelly dace	*Phoxinus erythrogaster*	Fish	SE	CDOW, CNHP, CSP
Arkansas darter	*Etheostoma cragini*	Fish	ST	CDOW, CNHP, CSP, USFWS
Plains leopard frog	*Rana blairi*	Amphibian	SC	CDOW, CNHP, CSP
Northern leopard frog	*Rana pipiens*	Amphibian	SC	CDOW, CNHP, CSP
Painted turtle	*Chrysemys picta bellii*	Reptile	SC	CNHP
Short-horned lizard	*Phrynosoma douglassi*	Reptile	SC	CNHP, CSP
Triploid checkered whiptail	*Cnemidophorus neotesselatus*	Reptile	SC	CDOW, CNHP, CSP
Black-tailed prairie dog	*Cynomys ludovicianus*	Mammal	SC	CDOW, CNHP, CSP
Bald eagle	*Haliaeetus leucocephalus*	Bird	ST	CDOW, CNHP, PIF, CSP, USFWS
Northern harrier	*Circus cyaneus*	Bird	SC	USFWS, PIF
Swainson's hawk	*Buteo swainsoni*	Bird	SC	USFWS, PIF, CSP
Ferruginous hawk	*Buteo regalis*	Bird	SC	CDOW, USFWS, PIF, CSP
Golden eagle	*Aquila chrysaetos*	Bird	SC	USFWS, PIF
Peregrine falcon	*Falco peregrinus*	Bird	SC	CDOW, USFWS, PIF, CSP
Prairie falcon	*Falco mexicanus*	Bird	SC	USFWS, PIF, CSP
Mountain plover	*Charadrius montanus*	Bird	SC	CDOW, USFWS, PIF
Long-billed curlew	*Numenius americanus*	Bird	SC	CDOW, USFWS, PIF, CSP
Northern pygmy-owl	*Glaucidium gnoma*	Bird	SC	CNHP, PIF
Burrowing owl	*Athene cunicularia*	Bird	ST	CDOW, USFWS, PIF, CSP
Mexican spotted owl	*Strix occidentalis lucida*	Bird	ST	CDOW, PIF, USFWS
Common poorwill	*Phalaenoptilus nuttalii*	Bird	SC	PIF
White-throated swift	*Aeronautes saxatalis*	Bird	SC	PIF
Black-chinned hummingbird	*Archilochus alexandri*	Bird	SC	PIF
Lewis's woodpecker	*Melanerpes lewis*	Bird	SC	USFWS, PIF
Red-headed woodpecker	*Melanerpes erythrocephalus*	Bird	SC	USFWS, PIF
Gray flycatcher	*Empidonax wrightii*	Bird	SC	PIF
Cassin's kingbird	*Tyrannus vociferans*	Bird	SC	PIF
Western kingbird	*Tyrannus verticalis*	Bird	SC	PIF
Loggerhead shrike	*Lanius ludovicianus*	Bird	SC	USFWS, PIF
Pinyon jay	*Gymnorhinus cyanocephalus*	Bird	SC	USFWS, PIF
Juniper titmouse	*Baeolophus ridgwayi*	Bird	SC	PIF
Western bluebird	*Sialia mexicana*	Bird	SC	PIF
Curve-billed thrasher	*Toxostoma curvirostre*	Bird	SC	USFWS, CNHP, PIF

TABLE 3-10
Special Status Wildlife that Occur on Fort Carson
Fort Carson Transformation EIS, Fort Carson, Colorado

Species	Scientific Name	Species Type	Status	Authority
Virginia's warbler	*Vermivora virginiae*	Bird	SC	USFWS, PIF
Black-throated gray warbler	*Dendroica nigrescens*	Bird	SC	USFWS, PIF
Green-tailed towhee	*Pipilo chlorurus*	Bird	SC	PIF
Cassin's sparrow	*Aimophila cassini*	Bird	SC	USFWS, PIF, CSP
Rufous-crowned sparrow	*Aimophila ruficeps*	Bird	SC	CNHP, PIF
Brewer's sparrow	*Spizella breweri*	Bird	SC	USFWS, PIF, CSP
Lark bunting	*Calamospiza melanocorys*	Bird	SC	USFWS, PIF, CSP
Grasshopper sparrow	*Ammodramus savannarum*	Bird	SC	USFWS, PIF
Lazuli bunting	*Passerina amoena*	Bird	SC	PIF

Notes:
SE = Colorado State Endangered
ST = Colorado State Threatened
SC = Species of Special Concern
Sources:
CDOW = Colorado Division of Wildlife
CNHP = Colorado Natural Heritage Program (CNHP)1 Tracked Species
CSP = Central Shortgrass Prairie Ecoregional Assessment and Partnership Initiative, 2006
PIF = Colorado Partners in Flight, 2000. Land Bird Conservation Plan
USFWS = U.S. Fish and Wildlife Service, 2002. Birds of Conservation Concern. Division of Migratory Bird Management, Arlington, Virginia

The State of Colorado does not list threatened or endangered plant species. Table 3-11 lists Colorado Plant Species of Special Concern (as listed by CNHP) that occur on Fort Carson. Surveys conducted in 1995 for other Colorado Species of Special Concern plants potentially occurring on Fort Carson did not find Brandegee wild buckwheat (*Eriogonum brandegei*) or Degener penstemon (*Penstemon degeneri*) (DECAM, 2002a).

TABLE 3-11
Colorado Plant Species of Special Concern that Occur on Fort Carson
Fort Carson Transformation EIS, Fort Carson, Colorado

Species	Scientific Name	Distribution on Fort Carson
Dwarf milkweed	*Asclepias uncialis*	Confirmed in southeastern corner of Fort Carson.
Arkansas River feverfew	*Bolophyta tetraneuris*	Large populations in southeastern and southwestern portions of Fort Carson.
Golden blazing star	*Mentzelia (Nuttallia) chrysantha*	Common in southern and southwestern portions of Fort Carson.
Round-leaf four o'clock	*Oxybaphus rotundifolius*	Large populations in southern portions of Fort Carson.
Pueblo goldenweed	*Oonopsis puebloensis*	Found on Fort Carson
Arkansas Valley evening primrose	*Oenothera harringtonii*	Found on Fort Carson
Birdbill dayflower	*Commelina dianthifolia*	Found on Fort Carson
Twin vine	*Sarcostemma crispum*	Found on Fort Carson

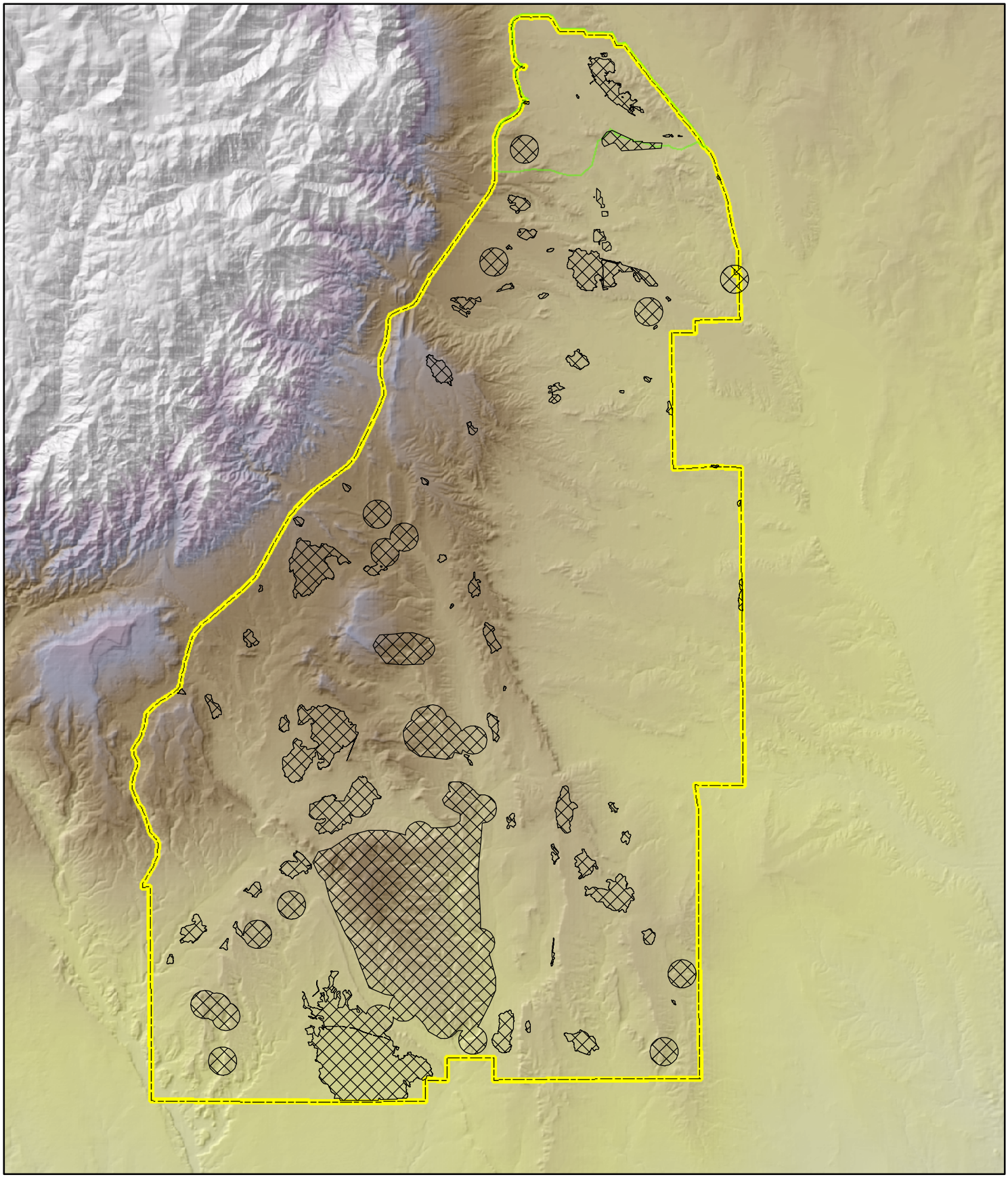


FIGURE 3-4
Distribution of Sensitive Wildlife Habitats on Fort Carson

Chalk-shale barrens on Fort Carson host several of these sensitive plants, including Arkansas Valley feverfew and dwarf milkweed (*Asclepias uncialis*) and Colorado endemics golden blazing star, round-leaf four o'clock, and Pueblo goldenweed (Rifici, 2006). Fort Carson barrens communities are characterized by exposed bedrock formations and generally low plant cover, and they largely are restricted to the southern one-third of the installation. The distribution of these habitats is depicted on Figure 3-5. In accordance with the Army's Species at Risk Program, DECAM has initiated surveys to determine population numbers and the distribution of sensitive plant species (DECAM, 2002a). Target species for sensitive plant species surveys on Fort Carson in 2006 and 2007 include dwarf milkweed, Arkansas River feverfew, Arkansas evening primrose, Pueblo goldenweed, and round-leaf four o'clock (CNHP, 2006). Figure 3-5 has been revised from the DEIS to reflect survey data that became available since the publication of the DEIS. The new data show increased distribution of habitat. The new data do not change the management procedures or findings of the DEIS.

3.7.1.4 Wetlands

The USFWS National Wetland Inventory identified 543 wetland areas totaling approximately 1,050 acres on Fort Carson, of which 383 wetlands totaling approximately 507 acres are man-made (USFWS, 1991). The majority (70 percent) of wetlands on Fort Carson are palustrine emergent wetlands (USFWS, 1991). Most of these are less than 1 acre in area. In the downrange training area of Fort Carson, isolated wetlands can occur where a dam has been built for erosion control or water storage, and most are only 1 to 2 acres in size. The largest downrange wetland area, totaling approximately 100 acres, is on the upper reaches of Teller Reservoir. About six very small springs occur on Fort Carson, and each has a small associated wetland area. Wetland areas are also distributed throughout the cantonment area, typically in natural or stormwater runoff drainages and in an area south of BAAF (site of the old golf course and now a wildlife management area) (DECAM, 2002a).

In 2002, USACE issued a *Regional Permit Under Section 404 of the Clean Water Act (33 USC 1344) for Fort Carson and the Pinon Canyon Maneuver Site Erosion Control Activities* (USACE, 2002b). This regional permit authorizes Fort Carson to conduct erosion control activities on post that may result in minimal individual and cumulative impacts to wetlands from dredge and fill activities. Typical erosion control measures include erosion control and stock watering impoundments, banksloping of erosion courses, check dams, rock armor, hardened crossings, culverts and bridges, erosion control terraces and water diversions, water turnouts, and other erosion control activities approved by USACE.

As described in the INRMP (DECAM, 2002a), the wetland and riparian area buffers are generally protected from vehicular and mechanized training due to the surrounding topography, which makes these areas unsuitable for this type of training. Because of the avoidance and minimization efforts the Army currently implements as part of its INRMP and ITAM procedures, direct effects to wetlands do not occur. Erosion control measures described in Sections 3.5 and 3.6 are protective of surface water, including wetlands and riparian areas.

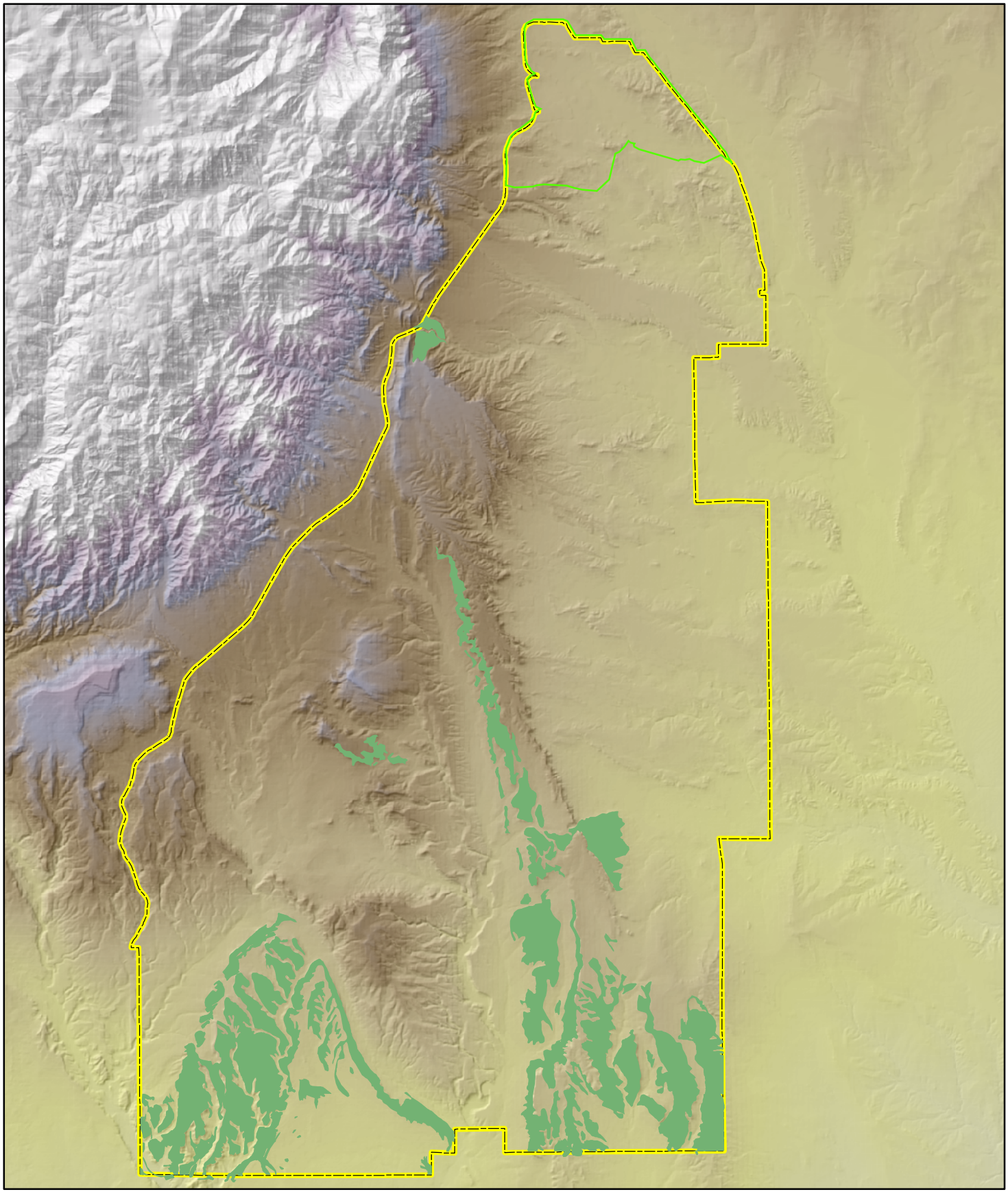


FIGURE 3-5
Distribution of Sensitive Plant Species Habitat on Fort Carson

3.7.2 Consequences

This section presents the impacts to vegetation, wildlife, and sensitive species on Fort Carson from implementing the No Action alternative and Proposed Action. Wetlands on Fort Carson are not discussed in detail in this section because no direct impacts to wetlands are anticipated from proposed construction or training activities. If future training or construction activities have the potential to affect wetlands, the Army would coordinate with the USACE to assess impacts and mitigation for disturbance of wetland areas as is the current practice.

USACE provided comments on the DEIS reinforcing the need to continue to coordinate and obtain permits for wetland impacts (see Appendix H for USACE correspondence). Most direct impacts to wetlands would be avoided, and those that could not be avoided would be mitigated through the Section 404 process (through complying with Fort Carson's regional permit, applying for coverage under a Nationwide Permit, or obtaining a special use permit). Increased training could result in indirect impacts to wetlands from erosion and sedimentation processes in drainages upstream of the numerous (349) man-made erosion control dams on Fort Carson. Sediments could silt in these small wetlands, changing them in nature or converting them to upland habitats if not consistently maintained. The impacts of soil erosion from training are presented in Section 3.5, Geology and Soils.

3.7.2.1 No Action Alternative

No construction will occur under the No Action alternative and, therefore, there will be no impacts from construction activities. The following impacts to vegetation, wildlife, and wetlands from training currently occur at Fort Carson and will continue to occur at greater levels in accordance with the training under the No Action alternative. The discussion focuses on maneuver and live-fire training activities. Restricted areas protect resources on particular sites from training impacts and, as such, no impacts will occur to these areas under the No Action alternative. The impacts described for live-fire training will be less than those associated with maneuver training because maneuver training will not occur during live-fire activities.

Direct impacts associated with maneuver training include tracked vehicles crushing herbaceous and woody vegetation that might not resprout or otherwise recover, and injury to shallow roots that might kill the plants or retard development. Pivoting of tracked vehicles can create high shear stress between the tracks and vegetation, resulting in loss of aboveground plant parts and vegetation uprooting, both of which can create bare ground conditions. Indirect impacts from movement of tracked vehicles can result from vegetation loss, soil disturbance, disaggregation, compaction, and consequently erosion, each of which can change the nature and availability of microsites for seed germination (Shaw and Diersing, 1989; Shaw and Diersing, 1990; Diersing et al., 1988). Disturbance of the soil crust in arid ecosystems can also accelerate erosion, decrease water retention, disrupt plant nutrient cycling at the microbial level, and expose the reservoir of weed seeds in the soil to conditions favorable for germination (USGS, 2002).

Vegetation studies conducted at the PCMS to assess the effects of training maneuvers on vegetation are applicable to assessing the potential impacts of mechanized military training at Fort Carson (Shaw and Diersing, 1989; Shaw and Diersing, 1990). The PCMS studies

indicate that grassland vegetation ground cover decreased and bare ground increased at sites with readily visible imprints of tracks on the soil ("tracking") compared to "untracked" sites (Shaw and Diersing, 1989; Shaw and Diersing, 1990; Diersing et al., 1988). Reseeding efforts by DECAM and ITAM reduce the overall recovery period at Fort Carson by allowing succession to shorten the initial weedy stage.

Fort Carson juniper woodland communities are important for military training because they offer concealment cover for tracked vehicles during maneuvers. The PCMS studies indicate that the density of juniper in tracked areas was reduced by 7 percent over a 2-year training period. An Army study at Fort Carson showed tree decline in specific watersheds attributable to training, and another study showed 17 percent damage to trees (Peyton, 2007). Some of the damage to trees at Fort Carson and the PCMS was the result of porcupine feeding (Peyton, 2007).

In the PCMS studies, understory species in the juniper woodlands were even more seriously impacted than the trees due to tracked vehicles maneuvering between the larger trees. These sections result in root compaction, mechanical damage to woody vegetation, and soil scarification and erosion, which together can result in an immediate reduction in biomass (Peyton 2007). Decreases in density and cover of woody plants are especially significant in juniper woodlands because they typically occur on steep slopes, have low initial cover, and highly erodible soils. Such effects on woodland understory vegetation may be less severe at Fort Carson than was indicated by the PCMS studies because it has many established trails on which tracked vehicles may travel through the woodland areas (Savoy, 2006).

Accidental wildfires could result from mechanized military training. Fires could be caused by hot mufflers and hot exhaust from tracked and wheeled vehicles or by military personnel smoking in the field. Downrange roads and trails can affect vegetation because road and trail systems can disrupt natural drainage patterns and facilitate the spread of weeds. Hardened or paved road surfaces can increase runoff, which could alter plant species composition. Roadside margins are generally permanently disturbed and could provide conduits for invasion by weedy species (Gelbard and Belnap, 2003). Ongoing impacts from travel on roads and trails are expected to remain at similar levels under the No Action alternative.

Pedestrian traffic also can affect vegetation. For grasses and herbaceous cover, level of impact would depend on use factors, such as the concentration of troops occupying a particular area, such as a bivouac site. Direct damage to shrubs and trees from pedestrian movements is expected to be minimal.

Direct impacts to vegetation from live-fire training could include damage by rounds striking or igniting vegetation. Indirect impacts to vegetation (i.e., those arising from soil disturbance) include those previously described for maneuver training. Fire impacts from live-fire training will remain at similar levels under the No Action alternative.

Firing of live-fire tracer rounds could result in accidental wildfires. Prescribed burning to create buffer areas is conducted to provide additional protection from wildfires near live-fire activities.

Wildlife

The following impacts to wildlife from military training on Fort Carson currently occur and will continue to occur under the No Action alternative.

Birds

Factors influencing the impacts of military training maneuvers on bird populations include changes in vegetation structure, composition, and development from military maneuvers; the response of birds to changes in vegetation characteristics at many different scales; training-related behavioral changes that can lead to site abandonment or colonization; the seasonal timing of training activities; total displacement of sensitive or secretive species; and attraction of exotic and disturbance-tolerant species to disturbed areas (Trame, 1997). Studies on changes in the avian community in response to military training for Fort Carson, indicate that overall biomass and abundance of prairie habitats were not substantially decreased compared with control sites. However, the biomass of seed-eating, open-field species was higher on the training site, while the biomass of omnivorous, open-field species was higher on the undisturbed control site (Trame, 1997). Destruction of trees, shrubs, and ground cover in forests generally results in an increase in open-field, edge, or disturbance-adapted species and a decrease in secretive, woodland, and/or ground-feeding species (Trame, 1997). Overall reduction of vegetation can also lead to a decrease in the prey base for raptors and other predators (Trame, 1997).

Migratory Birds. Eggs and nestlings can be destroyed by vehicular traffic, and concentrated training activities can result in abandonment of territories and nests. By mid-fall, most young-of-the-year would be out of nests, although some species will continue to nest into fall (USFWS, 1991). Songbirds are particularly susceptible to noise. Male neotropical migrant birds that breed in short-grass prairie, sagebrush, and riparian communities use songs to establish and defend breeding territories and attract females. The volume and frequency of the noise interferes with this ability (Luckenbach, 1975; Luckenbach, 1978; Memphis State University, 1971; Weinstein, 1978). Waterfowl, especially geese, have been distressed enough by helicopter overflights to flush and, in some cases, normal feeding behavior was substantively disrupted (Trame, 1997). The area of disturbance would vary by species and training activity. Limits on military training during the breeding season could have the effect of minimizing impacts on the bird community. Part of the Army's regular practice is to avoid disturbance of nesting birds.

Managing for the persistence of breeding avifauna communities on Fort Carson, including sensitive grassland bird species such as grasshopper sparrow, Cassin's sparrow, and lark bunting, directly conflicts with military training that tends to create large areas of bare soil and reduced grass and shrub cover. These birds nest in grassland sites, a habitat that also supports most of the maneuver off-road training on the installation. However, surveys conducted on Fort Carson indicate that these species are widespread. BMPs for these birds include the use of prescribed fire to maintain open grasslands with scattered shrubs (8- to 10-year rotation); reseed recovery/rest areas with a mix of short, mid, and tall grass species with shrubs such as cholla or saltbush; prevent breeding season fires from encroaching on breeding habitats by burning adjacent areas in late winter or early spring (DECAM, 2007).

The U.S. Department of the Interior issued a rule on February 28, 2007, exempting the Department of Defense from the Migratory Bird Treaty Act (MBTA) for the incidental take of migratory birds during readiness activities. Although this exemption would apply to Fort

Carson, incidental takes of migratory birds from military readiness under the No Action alternative would not be substantial. A military activity is defined as "… all training and operations of the Armed Forces that relate to combat, and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use."

Raptors. Many raptors are intolerant of high levels of human activity, especially during the breeding season (April through June). When disturbed by humans (on foot and in a vehicle), by a gas-operated engine, or the sound of a rifle, fewer ferruginous hawks had successful nests and fewer young fledged from those nests (Trame, 1997). Some species of raptors can habituate to high levels of human activity. Short-term impacts on raptors from military training include nesting failures, lowered nesting success, displacement, and changes in wintering distribution and behavior (Andersen et al., 1990; Fyfe and Olendorff, 1976). These short-term responses can lead to long-term community changes, such as changes in breeding density and species composition. Resident raptors located in the area where military training occurred shifted the center of their home range and activity areas, made movements outside of the areas where they had previously been confined, and increased the size of the area they used. Birds located in areas not exposed to training did not exhibit these changes to the same extent. In general, birds appeared to increase the size of their home range during periods of military activity.

Surveys and anecdotal data collected on Fort Carson identify large mature deciduous trees in riparian or small isolated stands, cliffs, and the pinyon-juniper/grassland ecotone as the most important large birds of prey nesting habitats. The most frequently used trees are plains cottonwood (*Populus deltoides*) and Siberian elm (*Ulmus pumila*). BMPs could include developing a plan to ensure that replacement trees will be available as existing trees die; close access to nests is available, as warranted, at sites vulnerable to disturbance; and education is provided to Soldiers (DECAM, 2007). DECAM provides G-3 with wildlife information and recommendations for minimizing potential impacts to nesting raptors.

Jet overflights have not been shown to influence nesting success of red-tailed hawks. Over time, these birds habituate to low-level air traffic and the intensity of avoidance behavior decreases. For example, many raptor species that nest along prominent landscape features such as cliffs in open country are easily disturbed during the nesting season, often resulting in nest abandonment (Fyfe and Olendorff, 1976). Golden eagles prefer to nest away from human disturbances, including roads, and experience reduced nesting success in nests located closer to roads than in nests farther from roads (Fernandez, 1993).

Small Mammals

Impacts from military training on small mammals are similar to those on bird communities; species adapted to reduced vegetation, bare ground, or disturbance are favored, while more sensitive woodland species or those requiring intact short-grass prairie ecosystems decline. Studies of small mammal community composition at Fort Carson indicate that, in prairie habitats, small mammal species that prefer sandy soils and eat seeds of weedy plants replaced other species (Trame, 1997).

Pronghorn

Studies indicate that movements or temporary shifts in home ranges caused by military training activities did not have measurable effects on pronghorn productivity or physical

condition (Gerlach and Vaughan, 1990). Pronghorn groups have been alarmed by low jet and helicopter overflights. This could contribute to reduced over-winter survival for individuals, poor condition entering the breeding season, reduced reproductive success and recruitment, and eventual population declines (Trombulak and Frissel, 2000; Wisdom et al., 2000). Pronghorn are especially vulnerable during fawning season (May 1 to June 30) and in severe winters (USFWS, 1991). Restricting training during this period could have the effect of reducing impacts on pronghorn. Revegetating disturbed areas and areas around water with a mix of native shrubs, grasses, and forbs could also have the effect of reducing impacts from military training on pronghorn (Gerlach and Vaughn, 1990).

Mule Deer

Potential impacts to mule deer from mechanized military training maneuvers could occur. One study of mule deer demonstrates that if harassed, mule deer exhibit increased overall activity levels, increased use of cover, increased sensitivity to vehicles, increased flight distance, and decreased reproduction the following spring (Yarmology, Bayer, and Geist, 1988; Trame, 1997). Mule deer may habituate to maneuvers and off-road vehicles if they are not actively pursued (Trame, 1997). In severe winters and during late gestation and lactation periods, helicopter disturbance could adversely affect deer (USFWS, 1991). Training restrictions during severe winters and the fawning season (June 20 to August 20) could minimize impacts to mule deer. Fawns are especially vulnerable at this time to mortality from accidents, abandonment, increased predation, and depletion of energy reserves from excessive movement.

BMPs for reducing military training impacts on mule deer on Fort Carson could include retaining juniper and pinyon-juniper forested patches (2 to 5 acres in size) with greater than 60 percent crown cover for thermal cover; using prescribed burns to rejuvenate foraging areas; reducing recreational use of northern riparian and shrubby areas during the critical fawning season of June through August; limiting resource management activities (e.g., burning and forest thinning during the fawning period); using prescribed fire judiciously in fawning areas (i.e., rotating fires through multiple sites with long-burning interval between fires on each site); using prescribed burns in late winter to protect adjacent fawning areas from wildfire during the fawning season; developing habitat improvement areas on the margins of areas supporting frequent vehicular training; and develop water resources in drier regions of Fort Carson adequate for supporting deer forced to move in response to training maneuvers (DECAM, 2007).

Elk

Many elk found on Fort Carson are part of a resident population, and the elk spend all or most of the year on Fort Carson. Development of water resources and recovering/reseeding grasslands adjacent to known elk wintering areas could have the effect of reducing impacts from military training on elk (DECAM, 2007).

Coyotes

Coyotes are moderately affected by military training. Most changes in coyote movement from military activity are temporary, and coyotes resume their previous activity patterns and occupy similar home ranges after military activity ends (Gese et al., 1989; Kitchen et al., 2000; USFWS, 1991). Restricting military training during denning and other critical times for coyotes, and rehabilitating disturbed habitat could have the effect of maintaining the coyote prey base and escape cover (USFWS, 1991).

Sensitive Species

The following impacts to sensitive species from military training on Fort Carson currently occur and will continue to occur under the No Action alternative. Figure 3-4 depicts sensitive wildlife species habitat on Fort Carson.

Fort Carson regularly coordinates with the USFWS and Colorado Division of Wildlife to determine potential impacts and mitigation for sensitive species. Fort Carson implements measures outlined in several biological assessments to minimize impacts to protected species. An informal consultation with USFWS was conducted for the No Action and Proposed Action alternatives, and USFWS did not identify concerns for the sensitive species.

Black-Tailed Prairie Dog. Destruction of active burrows from large-caliber weapon firing or mine plows is the greatest threat of military training for prairie dogs. Prairie dog burrows usually have multiple entrances and are generally deeper than the surface disruption from mine plows; therefore, mine plow deployment within a colony would have little long-term effect on the colony. Off-road vehicles could damage burrow entrances or kill prairie dogs caught in the open during a maneuver; however, it is unlikely these activities will permanently damage burrows or kill the occupants of a burrow. Trench obstacles dug within prairie dog colonies could damage burrows and kill prairie dogs. Prairie dog burrows could be damaged and individuals killed by weighted pallets in drop zones. Equipment and personnel drops will have a short-term direct adverse effect on prairie dogs and a negligible effect on the long-term viability of a colony. Live small-arms-caliber munitions firing poses minimal to no threat to prairie dogs. However, prairie dog burrowing activities on small-arms ranges with electronic targeting mechanisms have caused problems with buried electrical power wires. In these cases, prairie dogs will be controlled according to practices outlined in the *Biological Assessment and Management Plan for the Black-Tailed Prairie Dog on Fort Carson and the PCMS* (DECAM, 2004d). In 2004, black-tailed prairie dogs were removed from the USFWS Candidate species list, although Fort Carson still follows the recommendations in this management plan, where feasible. Prairie dogs are frequently killed by vehicles on roads through or near colonies.

The number of colonies and total occupied acreage of black-tailed prairie dogs can vary substantially from year to year because of plague. The results of Fort Carson surveys suggest that plague exerts greater control over prairie dog populations than do mechanized and off-road vehicular training. BMPs could include exercising control in areas only to protect health and property; using pesticides in select northern colonies to encourage/retain use by the burrowing owl and to support wintering eagles and ferruginous hawk; and using pesticides to control plague fleas in the TA 54 colony to ensure that prairie dogs are present to maintain mountain plover habitat (DECAM, 2007).

Burrowing Owl. Burrowing owls use active prairie dog colonies and other dens in Fort Carson's downrange area. This species has never been common on Fort Carson and the number of prairie dog colonies annually occupied by this species is low. Much more habitat exists annually than is used by this species. Although the plague does not directly influence nesting burrowing owls, owls generally do not nest in colonies where all the prairie dogs have been killed by plague, but large colonies partially killed by plague are frequently used for nesting by burrowing owls on Fort Carson. Because colony occupation by owls is low (generally fewer than 10 percent of the Fort Carson colonies are used by nesting owls), the most effective BMP for burrowing owls could include controlling fleas with pesticides in

colonies supporting owls to prevent extirpation of the prairie dogs, especially those not generally subjected to off-road and mechanized military training. Maintaining plague-free colonies in areas with less off-road training traffic could be necessary for maintaining this species at current levels on Fort Carson in the future under heaver training loads (DECAM, 2007).

Direct military-training impacts to burrowing owls would be similar to those to prairie dogs. Displacement of burrowing owls as a result of training activities within occupied prairie dog towns could result in losses from the owl population at Fort Carson. Identifying prairie dog towns occupied by burrowing owls annually and establishing a 100- to 300-meter (330- to 990-foot) radius around nest sites could reduce impacts to burrowing owls from military training (Partners in Flight, 2000). These buffers can be accommodated during training exercises, but in some cases, training may require encroachment on this buffer area. DECAM annually provides G-3 with wildlife information and recommendations for minimizing potential impacts to nesting birds.

Mountain Plover. Mountain plovers are rare on Fort Carson, and only a small percent of available habitat is occupied; mountain plovers are known to occupy black-tailed prairie dog colonies on Fort Carson only during the breeding season (DECAM, 2007). Dismounted troops and off-road vehicle traffic are the greatest threats to mountain plovers on Fort Carson. People walking across the prairie or exiting vehicles caused mountain plovers to perform their distraction display, or flush and fly a short distance. Plovers rarely responded to military convoys and other traffic by flushing unless the plovers were near the roadway. Vehicles traveling cross-country, including travel contiguous to roads, could kill juveniles sheltered in tall vegetation adjacent to the road and destroy nests on the open prairie. The effect of military helicopter overflights on nesting mountain plovers is unknown. The mountain plover was proposed for listing as a threatened species in 1999 but the USFWS withdrew the listing in 2003. Because the mountain plover is no longer proposed for listing, the *Biological Assessment and Management Plan for the Mountain Plover on Fort Carson* (DECAM, 2002d), which required a 200-meter-radius (660-foot) buffer zone around each mountain plover nest site during the breeding season, is no longer in force. The Army, however, does maintain these buffers during training exercises, but in some cases, training may require encroachment on this buffer area. The G-3 coordinates with DECAM wildlife biologists to devise training plans that minimize potential impacts to nesting birds. Buffer zones can be cordoned off using engineering tape attached to metal fencing posts, by placing painted automobile tires around the perimeter with off-limits signs attached, or by placing certified weed-free straw bales with appropriate signage around off-limits areas (DECAM, 2002c).

The prairie dog colony in TA 54 is extensive and, in general, the population is annually affected by plague. Ways in which to minimize impacts to mountain plovers include controlling plague fleas in TA 54 to ensure the persistence of prairie dogs; maintaining native rangeland by controlling non-native plants; and, if reseeding is required in TA 54, seeding only with shortgrass species, such as blue grama or buffalo grass. (DECAM, 2007).

Bald and Golden Eagles. The loss of prairie dogs from plague and prolonged activities, such as bivouacking, in prairie dog colonies are sources of secondary impacts to eagles. Eagles are sensitive to human disturbance, including military training. Golden eagles nest on Fort Carson. During breeding season, the golden eagle is sensitive to human disturbance,

particularly dismounted troops, recreationists, approaching vehicles, and many land management activities. Fewer wintering bald eagles have been found in areas with high human activity compared with areas of moderate human activity (Trame, 1997). Appendix E, Attachment E.3 provides a management plan for wintering bald eagles on Fort Carson with recommendations including restricting aboveground poisoning of black-tailed prairie dogs, and measures to prevent bald eagles from being electrocuted on towers, poles, and power lines.

Golden eagle eyrie-occupation surveys are conducted to identify areas used by nesting golden eagles that should be closed during the nesting season. To minimize and avoid impacts to golden eagles from military training, BMPs that could be implemented to minimize effects to golden eagles include temporarily closing training areas supporting active eyries to all non-training activities; advising military trainers of the presence of active eyries in efforts to reduce pedestrian and bivouacking activities in the vicinity of nests; prohibiting prairie dog eradication except to protect health and property; and using flea pesticides to prevent the spread of plague and loss of prairie dogs in select colonies (DECAM, 2007).

Mexican Spotted Owl. Military training effects on Mexican spotted owls roosting and foraging is unknown, but disturbance to Mexican spotted owls from dismounted troop movement, vehicle maneuvering, cross-country movement, bivouac, and aircraft support has been evaluated to be minimal (DECAM, 2002d). All wildfires in Mexican spotted owl management areas are suppressed, and prescribed burns are used as a fire management tool. The *Biological Assessment and Management Plan for the Mexican Spotted Owl on Fort Carson* describes protection measures for Mexican spotted owls.

Arkansas Darter. Arkansas darters are found in areas that are open to the public and are restricted from military training and military training areas. There are currently no impacts from military training to the Arkansas darter.

Greenback Cutthroat Trout. No-military-training zones exist around each of the greenback cutthroat trout ponds, and there is a no-dig zone near the underground pipeline connecting Lytle and Duck ponds. The total land area designated as buffer zones and removed from training is approximately 20 acres, and the duration of military training restrictions at the ponds is indefinite (DECAM, 2002a). Greenback cutthroat trout are also in the golf course pond. There are no impacts from military training to the greenback cutthroat trout.

Southern Redbelly Dace. The Stone City Quarry is restricted from training because of its historical significance, and no military training takes place in this area (DECAM, 2002a). There are no impacts from military training to the southern redbelly dace.

Triploid Checkered Whiptail. Impacts to triploid checkered whiptails from military training would be similar to those described for small mammals and ground-nesting birds. Habitat may be disturbed, and animals may be killed during training maneuvers. Location of suitable habitat and population numbers on Fort Carson are not currently known for the triploid checkered whiptail; therefore, the impacts of military training are difficult to determine at this time. Surveys conducted in 2006 indicate this species is fairly common in wooded barrens habitats supporting rare plant species.

Plants. Impacts to sensitive plant species from military training under the No Action alternative would be similar to the general impacts described above for vegetation in the particular type or types of training areas in which they actually occur. These impacts currently occur on Fort Carson and would continue to occur under the No Action alternative.

3.7.2.2 Proposed Action

Training

To protect long-term land sustainability on Fort Carson, training under the Proposed Action may or may not be conducted 52 weeks per year. To ensure the continued availability of quality training lands, the Proposed Action would continue to use the Army's land and environmental management programs on Fort Carson to provide for sustainable land management (see Section 1.2.5, Installation Sustainability, and Section 2.2.4.5, Environmental Considerations and Safety Measures).

The types of impacts expected to occur to vegetation communities and to wildlife and their habitats in each of Fort Carson training areas under the Proposed Action would be the same as described for the No Action alternative. Because baseline data are not available for quantifying the extent (number of acres used) and magnitude (frequency) of training-related impacts on vegetation and wildlife resources, it is not possible to quantitatively estimate impacts to habitats and wildlife populations from implementation of the Proposed Action or what the magnitude or severity of those impacts would be compared to the No Action alternative.

Vegetation

Increased training levels under the Proposed Action would increase the potential impacts to vegetation described under the No Action alternative. Training activities specific to the different types of training areas would increase and, with the exception of restricted areas, training-related impacts would generally increase in proportion to increases in the areas' primary designated training uses. For example, impacts from maneuver training would be expected to increase from those impacts described under the No Action alternative, in either extent, magnitude, or a combination of both, as previously described and depending on land sustainability considerations. Increased live-fire training under the Proposed Action would decrease the availability of these areas for maneuver training and the impacts associated with that use. The risk of accidental wildfires caused by training in live-fire and maneuver training areas, as described for the No Action alternative, would likely increase under the higher training loads of the Proposed Action. The risk of accidental wildfires caused by mechanized military training, as described for the No Action alternative, would likely increase under the higher training loads of the Proposed Action. The increased risk could be offset by the availability of trained military personnel at the site to suppress fires in their initial stages.

Wildlife

Increased training levels on Fort Carson under the Proposed Action would increase the potential impacts to wildlife, as described for the No Action alternative in Section 3.7.2.1. BMPs for species (also described in Section 3.7.2.1) could be implemented to minimize impacts to wildlife from the Proposed Action. Impacts to wildlife habitat from increased military training would parallel those described for vegetation under the Proposed Action.

In general, species adapted to reduced vegetation, bare ground, or disturbance would be increasingly favored.

Increased military training on Fort Carson might displace maneuvers on the grassland/pinyon-juniper interface farther into current pinyon-juniper habitat. Revegetating disturbed areas with plant species that are valuable to deer for forage and cover as soon as possible after military training would continue to provide suitable mule deer habitat on Fort Carson (USFWS, 1991). Direct disturbance to wildlife species would increase in areas where vehicular activity, fire, and noise increase, which would occur during both maneuver and live-fire training exercises. Increased pedestrian activity in training areas also would increase disturbance of wildlife species sensitive to human presence. Species that are more tolerant of human presence, vehicular activity, and noise would be increasingly favored in areas where military training occurs, while species that are less tolerant of these factors would decline.

Sensitive Species

Impacts to sensitive wildlife species from increased military training under the Proposed Action would be similar to impacts to other wildlife species. The following impacts are species-specific:

- The restrictions on military training in protected Arkansas darter habitat would continue, and unprotected sites would continue to be unprotected. Increased military activities may add erosion to Turkey Creek.
- The buffer zones around greenback cutthroat trout habitat would be maintained, and increased training activities would not affect the greenback cutthroat trout.
- The restriction on training in southern redbelly dace habitat would continue, and increased training activities on Fort Carson would not affect the southern redbelly dace.
- Increased military training activities would likely increase prairie dog burrow damage, and direct mortality could increase from increased maneuver training in prairie dog habitat. Impacts to prairie dogs from increased military training would directly and indirectly affect associated species, including burrowing owl, mountain plover, and bald and golden eagles. Disturbance and destruction of prairie dog habitat would directly affect burrowing owls and mountain plovers if these species were present in the colony, and would reduce suitable habitat in areas not currently occupied by these species. If prairie dog populations decline on Fort Carson, use of the installation for foraging and/or nesting by bald and golden eagles and ferruginous hawks would decline or be eliminated. Black-tailed prairie dogs on Fort Carson would continue to be managed according to the *Biological Assessment and Management Plan for the Black-Tailed Prairie Dog on Fort Carson and the PCMS* (DECAM, 2004d).
- Buffer zones around mountain plover nests on Fort Carson would be accommodated where feasible. If buffers were maintained, mountain plovers would not be affected by increased military training during the breeding season. DECAM annually provides G-3 with wildlife information and recommendations for minimizing potential impacts to nesting birds.

- The *Biological Assessment and Management Plan for the Mexican Spotted Owl on Fort Carson* (DECAM, 2002d) would be maintained. Fire suppression and prescribed burning would be maintained in Mexican spotted owl management areas, as recommended in the management plan (DECAM, 2002d). Mexican spotted owls would not be affected by increased military training on Fort Carson as long as the management plan is followed.

Impacts to sensitive plant species from increased military training on Fort Carson under the Proposed Action would generally be similar to those described above for vegetation within the particular type or types of training areas in which they occur.

Construction and Operation

Most construction in the Fort Carson cantonment area under the Proposed Action would occur in areas that have already been developed for cantonment facilities. Areas disturbed during construction would be landscaped consistent with existing cantonment landscape design. To the extent that sensitive plant and wildlife species occur in the cantonment and training areas, construction and operation would result in impacts similar to the impacts described below for vegetation and wildlife.

Construction activities in the Fort Carson cantonment area could also result in temporary ground disturbance and permanent loss of small areas of native vegetation. Construction of additional training facilities in Fort Carson training areas could result in temporary ground disturbance and permanent loss of native vegetation. Areas disturbed during construction would be reclaimed and revegetated with native or other suitable vegetation, as appropriate. Each of the new training facilities would occupy only a small area, and permanent loss of native vegetation in affected plant communities would be minor. Although construction and operation of facilities in the cantonment area would result in physical disturbance and displacement of wildlife habitat and of wildlife, the cantonment area is currently disturbed, and most of the area is already developed. Wildlife residing on or near the construction sites have adapted to noise and human activity of urban landscapes. Wildlife species associated with urban habitats could disperse from other portions of the cantonment area and occupy landscaped areas after construction is completed. In the cantonment area, the loss of native habitat, if any, would be minimal.

Direct impacts from mortality to ground-nesting birds, small mammals, reptiles, and amphibians could occur during site construction. Disturbance to wildlife in the cantonment area is expected to be minor because most of the area is already developed and wildlife habitat is limited. In training areas, construction and operation would result in physical disturbance and permanent loss of wildlife habitat as well as disturbance and displacement of wildlife. Approximately 65 acres of habitat would be temporarily disturbed and about 9 acres of habitat would be permanently disturbed. Although noise, human presence, and heavy equipment during construction would be likely to displace wildlife at or near the construction sites, the wildlife species would likely return soon after construction is completed. This temporary displacement would be an indirect short-term impact.

3.8 Cultural Resources

3.8.1 Affected Environment

Cultural resources management on Fort Carson encompasses conservation of resources of significance to the history or prehistory of the United States or of traditional, religious, or cultural importance to Native Americans. Appendix F, Attachment F.1 contains a detailed description of the prehistoric and historic cultural sequences as well as sections specifically covering the settlement of the Fort Carson region and the historic development of Camp/ Fort Carson.

3.8.1.1 Description of Resources

Archaeological Resources

Archeological and historical studies have been conducted on the land encompassed by Fort Carson for the past 60 years. The Fort Carson Cultural Resources Management Program employs a multidisciplinary approach to locate, evaluate, and protect significant cultural resources. Although pedestrian surveys and test excavation investigations are ongoing, most work is conducted by Fort Carson archaeological personnel on a project-by-project basis.

To date, 1,693 archeological sites have been recorded on Fort Carson (refer to Table 3-12), of which 131 have been determined to be eligible for the National Register of Historic Places (National Register). Prehistoric sites predominate on Fort Carson, encompassing approximately 82 percent of the total number of sites recorded to date. Prehistoric site types include complex habitation sites, temporary field camps, and lithic as well as food procurement and processing locations. Historic site types include ranching and homestead complexes and small mining operation sites. Both prehistoric and historic rock art is found on Fort Carson, again, with prehistoric elements predominating.

The Turkey Creek Rock Art District, designated as eligible for the National Register in 1976, contains at least 31 archaeological sites, five of which are known to have rock art. Due to an arbitrary designation of the District's boundaries, however, a re-evaluation project is ongoing to properly identify contributing sites and provide clear boundaries for management purposes.

TABLE 3-12
Archaeological Resources Identified to Date
Fort Carson Transformation EIS, Fort Carson, Colorado

	Prehistoric	Historic	Multi-Component
Archaeological Sites	1,374	264	55
National Register-Eligible Sites	95	27	9
National Register-Eligible Districts	1	3	0
Traditional Cultural Properties	0	0	0
Native American Sacred Sites	1	0	0

Paleontological Resources

Paleontological resources (fossil remains) are located on Fort Carson but are not classified as cultural resources. While fossils are important scientific resources, they do not have the same federal mandates for identification and protection as cultural resources at Fort Carson (or at other Army installations). The Army, however, avoids impacting paleontological resources as part of its management of Fort Carson.

Three paleontological studies have been conducted at Fort Carson, and 53 localities of deposits have been documented, 15 of which were determined to be of high paleontological significance based on presence of rare taxa, unique or unusual geologic setting, presence of many different taxa, presence of vertebrate fossils, and presence of a new taxon (Raynolds et al., 1999).

Architectural Properties

Three National Register-eligible Historic Districts are also located on Fort Carson: the Old Hospital Complex, the Wastewater Treatment Plant and Incinerator Complex, and the Turkey Creek Recreation Area. In all, 68 buildings are contributing properties of these Historic Districts.

3.8.1.2 Cultural Resources Laws, Regulations, and Sections 110 and 106 Consultation

The foundation of broad legislation for preservation of cultural resources is the National Historic Preservation Act (NHPA) of 1966 (36 CFR 800). Section 110 of the NHPA requires federal agencies to institute programs to identify and evaluate National Register-eligible historic properties under their care. Historic properties are defined under the NHPA as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register." Section 106 requires federal agencies to consider effects of undertakings on historic properties through a process of consultation. Evaluative studies constitute the mechanism by which inventoried resources are assessed against criteria of the National Register and upon which all subsequent management actions are based. Documentation for each inventoried resource is submitted to the Colorado State Historic Preservation Office (SHPO).

The process for compliance with Section 106 consists of the following steps:

1. ***Identification of historic properties*** within the area of potential effect.
2. ***Historic property evaluation*** is conducted using National Register criteria (36 CFR 63). Properties that meet the criteria are considered *eligible* for listing in the National Register and are subject to further review under Section 106. Properties that do not meet the criteria are considered *not eligible* for inclusion and are generally not subject to further review.
3. ***Determination of effect*** is a step in which one of the following effect findings will be made: *No Historic Properties Affected*, *No Adverse Effect*, or *Adverse Effect*.
4. ***Resolution of Adverse Effects/Mitigation*** occurs when adverse effects are found. Consultation continues between the federal agency and consulting parties to attempt resolution.

The Army has not initiated Section 106 consultation for the transformation action because details of undertakings potentially affecting cultural resources have not been developed. The Army provided the DEIS to the Colorado SHPO for review and has committed to future Section 106 consultation as specific training exercises are proposed. The Colorado SHPO did not provide comments on the DEIS, but did send correspondence stating that Section 106 consultation requirements follow the steps identified above. See Appendix H for SHPO correspondence.

3.8.1.3 Resource Management

Existing documents relevant to the NHPA include the following:

- 1980 Memorandum of Agreement among Fort Carson, the Colorado SHPO, and the Advisory Council on Historic Preservation (see Appendix F, Attachment F.2);
- *ICRM,(2002-2006*) (DECAM, 2002b); and
- AR 200-4, *Cultural Resources Management*.

The Army is in the process of updating the Fort Carson 2006-2010 *ICRMP* and developing a Programmatic Agreement (PA) with the Colorado SHPO, the Advisory Council on Historic Preservation, and four Native American Tribes with a cultural affiliation to Fort Carson-administered lands.

AR 200-4 outlines responsibilities with regard to cultural resources legislation for Army installations, major commands, and supporting organizations.

Surveyed Areas

Much of Fort Carson, including most areas used for mechanized training, has been inventoried for historic properties. To date, 1,693 archeological sites have been recorded on Fort Carson (refer to Table 3-12), of which 131 have been determined to be eligible for the National Register. The Cantonment at Fort Carson has been completely surveyed for historic properties and is devoid of known prehistoric sites. In other areas, however, prehistoric sites predominate on Fort Carson, encompassing approximately 82 percent of the total number of sites recorded to date.

Fort Carson has completed the inventory and evaluation of all World War II-era architectural properties. In total 68 architectural properties have been determined to be contributing elements to three National Register-eligible historic districts. Historic architectural investigations are ongoing for resources associated with the Cold War era.

Unsurveyed Areas

A comparative analysis was developed to complement the analysis in this EIS (Appendix F, Attachment F.3). This analysis establishes projections of the number of archaeological sites/historic properties with potential to be eligible for inclusion in the National Register that may be encountered and/or adversely impacted in unsurveyed areas because of increased military training activities at Fort Carson. The data contained in the analysis assist in the planning and budgeting process for compliance with Section 110 of the NHPA, and are not intended to be used in lieu of archaeological pedestrian inventories. For undertakings such as increased training activities, the Army would continue to comply with

the requirements of Section 106 to identify resources that may be affected, determine effects, and initiate the Section 106 consultation process.

Geographical settings were recorded as part of the comparative analysis. The criteria for designating the settings were based on physiographic differences in the landform types. The analysis results are summarized in Table 3-13 below.

TABLE 3-13
Fort Carson Comparative Analysis Results
Fort Carson Transformation EIS, Fort Carson, Colorado

	Canyon	Hill	Prairie	Talus	Valley
Unsurveyed Acres	0	15,215	19,342	36	0
Anticipated Number of Additional Sites	0	371 sites (1 site/41 acres)	420 sites (1 site/46 acres)	1 site	0
Anticipated Number of Additional National Register-eligible Sites	0	123 sites	60 sites	0	0

Fort Carson has experienced intense military training for many years, and this activity has altered the integrity of numerous landforms. Although the comparative analysis anticipates 792 additional sites would be encountered in the unsurveyed areas, with 183 projected to be eligible for inclusion in the National Register, this number is likely overestimated because of past disturbance.

3.8.1.4 Native American Consultation and Initiatives

Eleven federally recognized Indian tribes have expressed a cultural affiliation with land at Fort Carson. These include the Apache Tribe of Oklahoma, Cheyenne and Arapaho Tribes of Oklahoma, Comanche Nation of Oklahoma, Kiowa Tribe of Oklahoma, Northern Arapaho Tribe, Northern Cheyenne Tribe, Oglala Sioux Tribe of the Pine Ridge Reservation, Shoshone Tribe (Eastern Band), Southern Ute Indian Tribe, Ute Mountain Ute Tribe, and Jicarilla Apache Nation.

Ethnohistoric research to identify Native American Tribes having traditional ties to Fort Carson-administered lands began in the 1980s as part of the cultural resources surveys in support of Army acquisition of the PCMS. Fort Carson has inventoried its collection and completed repatriation of all human remains and culturally identified artifacts in accordance with the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 and associated regulations (43 CFR 10) (USACE, 1997). Native American consultation continues on Fort Carson as additional sites with the potential for significance to culturally affiliated tribes are identified.

In 2002, Fort Carson initiated a project to complete the required Native American consultation in accordance with Section 106, the American Indian Religious Freedom Act of 1996, and the NAGPRA. Nine sessions of field visits occurred at the PCMS and Fort Carson, with 23 tribal representatives from 11 federally recognized tribes participating. In November 2004, a Comprehensive Agreement (CA) was signed by 10 affiliated tribes in a

ceremony held on Fort Carson. A copy of the CA is found in Appendix F, Attachment F.4. The Jicarilla Apache Nation signed a separate but identical CA in May 2005.

Traditional cultural properties and sacred sites were also identified during the consultation process. On Fort Carson, one sacred site was identified, located within the Turkey Creek Rock Art District. Although only one site was identified as having direct religious significance for culturally affiliated tribes, the sacred site associated with this District may be expanded in the future pending consultation with other tribes.

3.8.2 Consequences

The consequences of BRAC 2005 actions, including IGPBS and AMF, will have an impact on nearly all available land within the boundaries of Fort Carson. All forms of military training activities have the potential to adversely affect cultural resources. The level of impact is dependent on two factors: the type of training, and the landform on which the training will take place.

All training activities that could affect properties eligible for inclusion in the National Register must be considered as undertakings in accordance with Section 106. As of May 2006, a total of 34,594 acres remained unsurveyed, and archaeological investigations will be required prior to additional training use. It should be noted that archaeological work on Fort Carson is ongoing and unsurveyed acreage will continue to decrease.

3.8.2.1 No Action Alternative

The No Action alternative includes three components: new facility construction activities; demolition, renovation, and the increase of training activities with greater numbers of rotations; and use of larger geographic areas, and accommodation of increased troop strength.

Construction of Support Facilities

No additional construction activity is proposed under the No Action alternative.

Training Requirements

Under the No Action alternative, increased training could occur in any area not restricted from training. If this were to occur, Fort Carson will initiate Section 106 consultation procedures as described in Section 3.8.1.2.

Changes in Force Structure and Increased Population

There is a slight potential for impacts to cultural resources due to the proposed changes in force structure and increased troop strength as it relates to building demolition and renovation activities. Should an adverse impact on a National Register-eligible historic property be identified, Fort Carson will initiate Section 106 consultation procedures as described in Section 3.8.1.2.

3.8.2.2 Proposed Action

The Proposed Action at Fort Carson includes three components: new facility construction activities; demolition, renovation, and the increase of training activities with greater numbers of rotations; and use of larger geographic areas and accommodation of increased troop strength.

Construction of Support Facilities

Cantonment Construction

The Cantonment at Fort Carson has been completely surveyed for cultural resources and is devoid of known prehistoric sites. The inventory and evaluation of historic properties through the Cold War era is ongoing, and it is not anticipated that construction activities described in the Proposed Action on the Cantonment will have an adverse impact to these cultural resources. In addition, there should be no adverse impact to the two Historic District-eligible locations within the Cantonment. Should future construction projects pose an adverse impact to identified historic properties in the Cantonment, Section 106 consultation procedures will be followed.

In the event cultural materials and/or human remains are uncovered in the course of ground-disturbing activities during construction, Fort Carson's "Inadvertent Discovery of Archaeological Resources or Burials" Standard Operating Procedure (SOP) and the "NAGPRA" SOP will be applied and enforced. Both SOPs are presented in Fort Carson's *ICRMP* (DECAM, 2002b).

Downrange Area Construction

The sniper certification range, automated qualification range, two digital multi-purpose training ranges and a digital multi-purpose range complex, and the individual and crew-served weapons course described in the Proposed Action are all within previously inventoried areas of Fort Carson and will have no impact on known cultural resources. Should future range projects be determined to have the potential for adverse impacts to cultural resources, Section 106 consultation procedures will be followed.

Two National Register-eligible Historic Districts are located within the downrange area of Fort Carson. It is anticipated that the Proposed Action will have no adverse impact to the Turkey Creek Recreation Area. The Turkey Creek Rock Art District has been designated for dismounted training only. Nevertheless, the potential for adverse impacts due to increased training activities in or around this District are significant. Should future training initiatives involve a change in training policy or be determined to have the potential for adverse impacts to the resources within the District, Fort Carson will comply with Section 106 consultation procedures prior to use.

In the event that subsurface cultural materials are uncovered as the result of ground-disturbing activities, the Fort Carson "Inadvertent Discovery of Archaeological Resources or Burials" SOP and the "NAGPRA" SOP will be applied and enforced.

Butts Army Airfield Construction

The construction projects described in the Proposed Action pose no impacts to known cultural resources in the BAAF area. The Fort Carson SOPs described above for the discovery of subsurface resources during construction will apply.

Equipment

The types of equipment proposed for use at Fort Carson will have no direct impact on cultural resources. The use of certain equipment in downrange training activities, however, may have adverse impacts. The potential for this type of impact to cultural resources is addressed in the Downrange Area Construction and Training Requirements sections below.

Training Requirements

Training requirements, as described in the Proposed Action, relate directly to use of all available land on Fort Carson, whether for live-fire or maneuver training activities. As such, the following will apply for all training undertakings in accordance with Section 106 of the NHPA and the stipulations of all agreement and management documents in force for Fort Carson prior to training use, unless a project-specific agreement has been developed through the consultation process:

- Use of areas that have been inventoried for cultural resources and which contain no historic properties eligible for inclusion in the National Register will be unrestricted because there is no potential for adverse impacts to significant resources.
- Use of areas that have been inventoried for cultural resources and which contain known historic properties eligible for inclusion in the National Register will be used for dismounted training only until the proposed use area has been evaluated to determine that cultural resources can be protected against adverse impacts. If impacts cannot be avoided, further consultation with the Colorado SHPO and/or Native American Tribes, if applicable, regarding mitigation would occur prior to ground-disturbing activities.
- Use of areas that have not been inventoried for cultural resources will not be used for activities other than dismounted training until an archaeological investigation has been conducted and cultural resources determined eligible for the National Register have been evaluated against potential adverse impacts. If impacts cannot be avoided, further consultation with the Colorado SHPO and/or Native American Tribes, if applicable, regarding mitigation would occur prior to ground-disturbing activities.

Changes in Force Structure and Increased Population

There is a slight potential for impacts to cultural resources due to the proposed changes in force structure and increased troop strength as it relates to building demolition and renovation activities. Should an adverse impact on a National Register-eligible historic property be identified, Fort Carson will initiate Section 106 consultation procedures as described in Section 3.8.1.2.

3.9 Socioeconomics

This socioeconomic section presents the existing conditions and environmental consequences for the following:

- Economic development
- Demographics
- Housing
- Public finance
- Quality of life
- Environmental justice in minority and low-income populations
- Protection of children from environmental health risks and safety risks

Implementing the Proposed Action could have impacts that are concentrated in a geographical area referred to as the ROI. The definition of the ROI considers local residential, shopping, and commuting patterns. The ROI is intended to encompass the

geographical area within which linkages are strongest between businesses involved in construction activities and the long-term operation of the new facilities.

The ROI for the Proposed Action at Fort Carson comprises four counties: El Paso, Fremont, Pueblo, and Teller. The cantonment area of Fort Carson, where most of the construction activity would be concentrated, is located in southern El Paso County. Virtually the entire Colorado Springs urbanized area is located north of the post and contained within El Paso County. Adjacent portions of surrounding counties are also a part of the Colorado Springs functional economic region, including Fremont County to the southwest, Pueblo County to the south, and Teller County to the west.

3.9.1 Affected Environment

3.9.1.1 Economic Development

Characteristics of economic development include employment and its distribution across industrial sectors, unemployment, earnings and sources of income, and the contribution made to the regional economy by the military installations, their personnel, and retired service members.

Employment

More than 365,000 people were employed in the ROI in 2005, 75 percent of whom worked in El Paso County (see Appendix G, Attachment G.1, Table G.1-1). This is an increase of 20 percent from 1995, which equaled the job growth in the state as a whole. In El Paso County, the largest share of employment is concentrated in the federal government, with 11 percent accounted for by military and civilian jobs. The retail trade sector employed 11 percent and state and local government accounted for a 9 percent share. In Teller County, the accommodation and food services sector is the largest employer (16 percent of jobs), while in Fremont and Pueblo counties, employment in state and local government contributes substantially to both economies.

The largest employers in El Paso County are the major military installations, with the proportion of military employment in the county being much higher than the ROI and the state.

The unemployment rate in all counties of the ROI gradually fell from highs of between 6 and 9 percent in 1992 to lows between 3 and 4 percent in 2000 (see Appendix G, Attachment G.1, Figure G.1-1). In virtually all years, the unemployment rate for each county in the ROI exceeded that of the state.

Earnings and Income

Total non-farm wage and salary earnings in the ROI totaled nearly $18 billion in 2004, approximately 81 percent of which was contributed by El Paso County. The contribution to total earnings by the military sector is highly concentrated in El Paso County, where it reaches 15 percent compared to 2 percent for the state and less than 1 percent for the other ROI counties (see Appendix G, Attachment G.1, Figure G.1-2).

Military Activities

Five major military installations are within the ROI, including Fort Carson, USAFA, Schriever Air Force Base (AFB), Peterson AFB, and the Cheyenne Mountain Air Station.

These installations are important to the health and stability of the regional economy and support businesses and jobs through 1) payroll expenditures by military and civilian personnel; 2) direct procurement of goods and services by the installations for operations and maintenance functions; and 3) government contract awards to private firms located in the region.

Personnel (Active Duty and Civilian)

Between 1999 and 2004, the total number of active duty military personnel assigned to the five installations varied from a low of 25,850 to a high of 28,191, and the number of civilian personnel ranged between 5,250 and 6,240 (see Appendix G, Attachment G.1, Figure G.1-3). Fort Carson accounted for the largest share of active duty military personnel among the five installations. From 1999 through 2004, the number of active duty military personnel assigned to Fort Carson remained relatively constant, between 14,220 and 15,730, and the number of civilian personnel on post ranged from 1,805 to 2,025.

Payroll

Earnings paid to personnel (active duty and civilian) at Fort Carson totaled $668 million in 2004, an increase of 26 percent from 1999. Payroll for the combined installations (excluding Cheyenne Mountain, for which information is not available) totaled $1.3 billion in 2004, an increase of 18 percent from 5 years previously (see Appendix G, Attachment G.1, Figure G.1-4).

Procurements

Expenditures on grants and contracts by the installations vary measurably from year to year. The value of grants and contracts for Fort Carson, as reported by the DoD, ranged between $94 million and $191 million annually for the period 1999-2004. For the installations combined (excluding Cheyenne Mountain), these outlays fluctuated between $448 million and $671 million over the same period.

In 2004, operating expenditures at Fort Carson that had the greatest effect on the local economy (after salaries) were local purchases and contracts ($217 million), utilities ($16 million), and rent and lease payments ($3 million).

Defense Contracts

The large majority (99 percent) of DoD prime contracts awarded to firms in the ROI have been made to companies located in El Paso County, accounting for over 52 percent of all DoD awards statewide. The value of prime contract awards in El Paso County totaled more than $1.9 billion in 2005 (see Appendix G, Attachment G.1, Figure G.1-5).

Retired Military Personnel

More than 34,000 retired military personnel reside in the ROI and most receive retirement benefits from the DoD. Over 50 percent of all retirement benefits received by military retirees living in Colorado are received by residents in the Colorado Springs area (ZIP code areas 808, 809, and 810), where payments exceed $511 million annually.

Multiplier Effects

The injection of funds into a regional economy has what is referred to as a direct effect. This spending creates a demand for goods and services that, in turn, increases output and employment in numerous support industries. This is referred to as the induced effect, and the link between the two is the multiplier effect.

3.9.1.2 Demographics

On Post

During 2005, slightly more than 15,000 persons lived at Fort Carson. This number was comprised of 7,400 active duty military personnel (of which 4,600 were unaccompanied personnel residing in barracks and 2,800 who were living in military family housing) and just over 7,770 family members (also residing in the family housing) (DECAM, 2005b).

Off Post

The population of the ROI totaled 773,881 in 2004, an increase of more than 209,000 since 1980 (see Appendix G, Attachment G.1, Table G.1-2). Two large communities are located in the ROI: the City of Colorado Springs, located north of Fort Carson, with a population of just over 380,000 in 2004; and the City of Pueblo, located southeast of Fort Carson, with a population in 2004 of more than 104,000 residents.

More than 4,800 civilian workers are employed at Fort Carson (appropriated, non-appropriated, contractor, and others). Assuming each is a head of household, this would represent a population of over 12,500 persons (applying an average household size of 2.61 as reported in the 2000 Census). The 20,145 active duty military personnel are accompanied by nearly 41,300 dependents, which results in a total connected population of 74,000 persons, or nearly 10 percent of the entire 2004 population of the ROI.

Many of the active duty military personnel (and their dependents) who reside off post are located in areas closest to the installation. Nearly 70 percent of off-post personnel reside within the five ZIP code areas in El Paso County nearest to Fort Carson.

Discussion of minority and low-income populations is provided in Section 3.9.1.6, Environmental Justice.

3.9.1.3 Housing

On Post

Fort Carson has on-post housing units for both unaccompanied and accompanied personnel. There are currently 2,664 family housing units of various types contained in numerous clusters or "villages."

According to a recent Housing Market Analysis (Niehaus, 2005), there is already a validated on-post housing requirement for 3,423 family housing units. The analysis anticipated that another 234 units would be needed by 2010 (based on a projected increase of 10,479 troops assigned to Fort Carson, about 2,000 higher than is now anticipated). With a current inventory of 2,664 family housing units, a serious housing deficiency exists on post that will continue to grow over the next 5 years.

The Fort Carson Family Housing Limited Liability Corporation, the post's public/private housing provider, plans to construct 400 to 500 additional family housing units. That project was the subject of an EA prepared in early 2006 (DECAM, 2006a). Upon completion, Fort Carson will still have a serious remaining shortfall in family housing (DECAM, 2006a).

Unaccompanied personnel are accommodated in barracks that collectively provide 3,817 spaces, with an additional 24 bachelor officer quarters (USACE, 2006b). There are 185

additional transient quarters used as temporary accommodations by accompanied personnel newly arrived at the installation.

Because of the severe shortfall in barracks spaces, a number of projects are planned or underway to provide more billeting for unaccompanied Soldiers. By 2011, an additional 2,618 barracks spaces should be available (Davis, 2006).

Off Post

As of 2000, nearly 289,000 housing units were located in the ROI. The proportion of owner-occupied housing units was 67 percent, with the lowest concentration in El Paso County (65 percent) and the highest in Teller County (80 percent). Overall, the quality of housing in the ROI is considered good. The proportion of units lacking complete plumbing and kitchen facilities (a surrogate measure for quality) is low for all counties of the ROI (see Appendix G, Attachment G.1, Table G.1-3).

Vacancy rates for rental units fell in all areas between 1998 and 2001, from about 5 percent to 3 percent, after which they climbed to 10 percent or more by 2006. Vacancy rates and rents in all areas within the Colorado Springs metropolitan area are highly cyclical (see Appendix G, Attachment G.1, Figure G.1-6).

Residential construction activity is also cyclical and highly responsive to economic conditions (see Appendix G, Attachment G.1, Figure G.1-7). Building activity fell sharply between 1985 and 1989, and the level of building at the start of the period was not repeated until 10 years later. Construction activity peaked in 2001 and has declined slightly since then. The region has seen the construction of more than 6,000 units annually during 13 of the 21 years for which data are presented. The large majority of housing units constructed are single-family dwellings, which have comprised more than 50 percent of the units constructed during 8 of the 21 years for which data are presented. Although construction of multi-family units occurs in all years, construction levels of these units comprise a high (over 25 percent) share in only 6 of the years studied.

3.9.1.4 Public Finance

The primary sources of revenue for the four counties of the ROI are 1) sales taxes, 2) property taxes, 3) transfers from the state government, and 4) transfers from the federal government (see Appendix G, Attachment G.1, Table G.1-4). In El Paso and Fremont counties, property taxes contribute a relatively small share of total revenues (under 16 percent) in comparison to Pueblo and Teller counties (26 to 30 percent). Sales tax revenues are especially important for El Paso County and are attributable to its role as the major commercial hub of the ROI. Revenues derived from state and federal government transfers are important to all counties in the ROI, and particularly in Fremont and Teller counties, where these revenues approach nearly 50 percent.

The major operating expenditure categories for the counties are 1) social services, 2) public safety, 3) general government, and 4) public works. The provision of social services consumes 30 percent of operating expenditures in Pueblo and Fremont counties but is much lower in El Paso and Teller counties (18 and 12 percent, respectively). Expenditures on public safety comprise 20 percent or more of the operating expenditures for each county (see Appendix G, Attachment G.1, Table G.1-5).

3.9.1.5 Quality of Life

On Post

Numerous facilities and services located on Fort Carson contribute to the quality of life of on-post residents and military personnel and their dependents residing off post.

Child Care

The childcare programs at Fort Carson are available for children 6 weeks to 5 years of age. These services are provided at three on-post centers: the East Center, which offers full-day care for 303 children; the West Center, offering full-day and hourly care for 303 children (including 74 spaces for hourly care); and the Annex, which offers Kindergarten care, full-day care, and a part-day pre-school. Three additional childcare facilities are planned for construction over the next several years.

Health Care

Evans Army Community Hospital is located on post and has a 78-bed capacity as well as 400 examination and treatment rooms. Additional beds will be supplemented through an addition to the hospital. The hospital provides service to Soldiers, retirees, and their dependents. Care is supplemented by Larsen Dental Clinic. Two new clinics are planned, including a Troop Medical Clinic and a Consolidated Family Care, Troop Medical, and Dental Clinic.

Public Schools

Three elementary schools and one middle school located on Fort Carson are part of the Fountain-Fort Carson School District 8. Most of the enrollment in the on-post schools comes from on-post and off-post military dependents, with a small percentage of non-military children (Walker, C., 2006). High school students residing on post are bused to the nearby Fountain-Fort Carson High School.

Other Facilities

There are also a number of additional on-post facilities, including a commissary, post exchange, recreation facilities, and hobby centers.

Off Post

The communities that surround Fort Carson provide numerous recreational, medical, retail, food, and other community services and facilities. Of the wide array of off-post services and facilities, public schools are highly important.

Community Public Schools

There are 22 school districts in the ROI with a total combined student membership in 2005 of nearly 139,300 (Colorado Department of Education, 2006).

Personnel assigned to Fort Carson reside throughout the ROI and their children make up sizeable portions of the student membership in some school districts (National Association of Federally Impacted Schools, 2006). There can be substantial fiscal implications for school districts that have a high proportion of their student members residing on military installations. The major installations in the region, and reflected in the number of "federally connected" students, include Fort Carson, Peterson AFB, and Schriever AFB.

School districts rely on a number of funding sources, especially local property tax assessments, funds from the state, and federal funds. Military installations are exempt from

local taxes and, thus, local school districts are eligible for federal impact aid funds. These payments are designed to offset the potential loss of property tax payments to affected school districts. The impact aid received is highly weighted in proportion to the students who reside on the military installations, not in the communities.

The number of federally connected students, primarily the children of military and appropriated fund civilian personnel in this area, is highly concentrated in Fountain-Fort Carson School District 8, adjacent to Fort Carson, which also operates the four on-post schools. For this school district, more than half of the average daily attendance (ADA) consists of federally connected students and they account for 30 percent of the budget directly, through impact aid.

Smaller, yet noticeable, concentrations are evident in the Academy School District (24 percent of ADA and 5 percent of budget), Widefield School District 3 (18 percent of ADA and 2 percent of budget), and Falcon School District (14 percent of ADA and 3 percent of budget).

Although the share of ADA that federally connected students comprise is high, the impact aid contribution to the budget in these three school districts is smaller. This is explained by the fact that the great majority of the students do not reside on the military installation and, thus, less impact aid is directed to these school districts. Their contribution to the school district budgets is through property tax payments associated with their places of residence in the community.

3.9.1.6 Environmental Justice

EO 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires each federal agency to identify and address any disproportionately high and adverse environmental or economic effects that its programs and policies might have on minority or low-income populations.

Environmental Justice Guidance Under the National Environmental Policy Act (CEQ, 1997) defines minorities as members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander, Black or African American, or Hispanic. According to the guidance, a minority population should be identified where the minority population of the affected area either exceeds 50 percent or is meaningfully greater than the minority population percentage in the general population.

Low-income populations are identified using the Census Bureau's statistical poverty threshold, which varies by household size and number of children. For example, the poverty threshold for a family of four with two children was $17,463 in 2000 and rose to $18,660 by 2003. Nationwide, the proportion of people in poverty was 11.3 percent in 2000 and 12.5 percent in 2003 (U.S. Census Bureau, 2006a). The Census Bureau defines a "poverty area" as a census tract or block numbering area where 20 percent or more of the residents have incomes below the poverty threshold. An "extreme poverty area" is defined as one where 40 percent or more of the residents are living below the poverty level (U.S. Census Bureau and Department of Commerce, 1995).

To provide the baseline against which potential environmental justice impacts can be identified and analyzed, Table 3-14 presents demographic information on race, ethnicity,

and poverty status for census tracts surrounding and including Fort Carson. the boundaries of the census tracts included in the analysis are shown in Appendix G, Attachment G.1, Figure G.1-8. Statistics for El Paso County and the ROI are presented for context.

Because the impacts of construction are more likely to adversely affect nearby populations than other aspects of the Proposed Action, it is necessary to examine an area smaller than the ROI. Census blocks and block groups, which are subsets of census tracts, were not used in this analysis because the exact locations of the construction projects are unknown at this time. Therefore, census tracts were deemed the appropriate geographical reporting area for analyzing potential environmental justice impacts associated with the proposed construction activity on Fort Carson.

The population of the census tracts including and immediately adjacent to Fort Carson has a higher percentage of minority population than El Paso County and the ROI (see Appendix G, Attachment G.1, Figure G.1-8). The proportion of minority population, however, was less than the 50 percent threshold. Fort Carson's residential population, as with other military populations, contributes to that higher minority percentage in the immediate area of the post. Of the total U.S. military, 36 percent of active duty members identify themselves as minorities (Army, 2005).

TABLE 3-14
Race, Ethnicity, and Poverty Status in the Area Surrounding Fort Carson
Fort Carson Transformation EIS, Fort Carson, Colorado

	Fort Carson Area[a]	El Paso	ROI	Colorado
Total population	193,076	516,929	725,101	4,301,261
Hispanic or Latino[b]	16.6%	11.3%	16.2%	17.1%
Not Hispanic or Latino	83.4%	88.7%	83.8%	82.9%
White[c]	71.5%	81.3%	81.8%	82.7%
Not Hispanic or Latino	64.8%	76.2%	73.3%	74%
Hispanic or Latino	6.7%	5.1%	8.5%	8%
Black or African American	11.0%	6.2%	5.1%	3.7%
American Indian and Alaska Native	1.2%	0.9%	1.1%	1.0%
Asian	2.9%	2.5%	2.0%	2.2%
Native Hawaiian and Other Pacific Islander	0.4%	0.2%	0.2%	0.1%
Some other race	7.5%	4.6%	5.9%	7.2%
Two or more races	5.6%	4.2%	4.0%	3.1%
Total minority[d] population	35.2%	23.8%	26.7%	25.6%
Poverty rate	11.3%	8.0%	9.5%	9.3%

Notes:
Source: U.S. Census Bureau (2006b)
[a] Includes those census tracts that are adjacent to Fort Carson's boundary or that include all or part of nearby residential communities (see Appendix G, Attachment G.1, Figure G.1-8: El Paso County census tracts 15, 21.01, 21.02, 22, 23, 24, 25.01, 25.02, 27, 28, 29, 30, 31, 33.01, 33.03, 33.04, 40.08, 40.09, 41, 42, 43, 44, 45.01, 45.02, 45.03, 45.06, 45.07, 45.08, 45.09, 52.01, 52.02, 53, 54, 61, 62, 63, 64, 65.01, and 65.02; Fremont County census tract 9781; and Pueblo County census tract 29.05).
[b] Hispanics or Latinos are those people who classified themselves in one of the specific Spanish, Hispanic, or Latino categories listed on the Census 2000 questionnaire (for example "Mexican, Mexican Am., Chicano," "Puerto Rican," or "Cuban") as well as those who indicate that they are "other Spanish/Hispanic/Latino." People who identify their origin as Hispanic or Latino may be of any race.
[c] All percentages are of the total population in each area.
[d] Minority population includes all people identifying themselves either as a racial minority group member (including two or more races) or as White and Hispanic or Latino origin.

Fort Carson and other surrounding areas have poverty levels below 20 percent. Although the poverty rate in the Fort Carson area was slightly higher than the rate for El Paso County, the ROI, and Colorado, it did not meet the 20 percent definition of a poverty area. Approximately 8 percent of El Paso County's population lived below the poverty line as of the 2000 Census. Small geographical areas where more than 20 percent of the population lives below the poverty level are scattered throughout the Colorado Springs metropolitan area (DECAM, 2002a).

3.9.1.7 Protection of Children

EO 13045 "Protection of Children from Environmental Health Risks and Safety Risks," seeks to protect children from disproportionately incurring environmental health or safety risks that might arise from government policies, programs, activities, and standards.

Children are present on Fort Carson in a number of settings, including family housing neighborhoods, three elementary schools, one middle school, day care centers, and recreational areas. As of 2000, there were nearly 2,400 children (18 years and younger) living on Fort Carson, including 1,300 who were under the age of 5 years (U.S. Census Bureau, 2000).

3.9.2 Consequences

3.9.2.1 No Action Alternative

No new construction activity is anticipated under the No Action alternative.

No changes related to ongoing operations at Fort Carson are anticipated under the No Action alternative. Normal upgrading and replacement of recreational facilities, schools, and other quality-of-life resources will be necessary over time.

3.9.2.2 Proposed Action

Economic Measures of Project Effects

A number of measures are used to assess the economic effects that the project could have on the regional economy. Attention is focused on the project-induced effects on population, employment, income, and sales volume.

Region of Influence

The ROI for Fort Carson comprises El Paso, Fremont, Pueblo, and Teller counties.

Impact Methodology

The initial step in estimating socioeconomic effects is to characterize aspects of the construction and operational phases of the Proposed Action. With the aid of economic impact modeling techniques (described below), the economic effects of each aspect of the Proposed Action are translated into measures such as jobs and income.

The primary catalyst for changes to socioeconomic resources is a change in economic activity, i.e., industrial output (value of goods and services), employment, and income. Changes in employment have the potential to affect population, housing, and associated community services and infrastructure.

A distinction is made between direct effects and secondary effects, the latter comprising both indirect and induced effects:

- Direct effects are defined as changes in expenditures on goods and services directly related to construction and operation. For example, an increase of $25 million in the final demand for construction inputs such as concrete block and brick will cause that manufacturing sector to increase output by $25 million worth of concrete block and brick.
- Indirect effects are defined as backward linkages through expenditures on intermediate goods or services required by the direct industry in order to increase output. These include construction or operation labor and other inputs. For example, $25 million worth of additional concrete block and brick would require increased output by the cement-producing industry (to produce an additional $2.5 million worth of cement) and aggregate industry (to produce $0.5 million worth of sand/gravel).
- Induced effects are defined as forward linkages derived from employees (both direct and indirect) spending wages within a region. For example, if additional employees were hired to work in the industries supporting and providing inputs to the construction sector, their personal consumption expenditures will induce employment.

The differentiation among direct, indirect, and induced effects contributes to the concept of the "economic multiplier." The larger and more highly urbanized the area, the more complex and integrated the economy is likely to be. Thus, more of the additional economic activity will likely occur within the area and increase the size of the multiplier.

The U.S. Army's Economic Impact Forecast System (EIFS) model is used to assess the economic effects of BRAC 2005 recommendations. (In this case, the model was used to assess economic effects of all transformational activities, to include BRAC 2005, IGPBS, and AMF, and also includes estimates for projects previously analyzed under NEPA that will be constructed during the transformation implementation period.) Results are compared to rational threshold values (RTVs) to evaluate the significance of these effects in relation to the regional economy. RTVs are positive and negative percent changes in population, employment, sales volume, and income that represent an acceptable range around the maximum historic fluctuations within the ROI over approximately the last 20 years. RTVs represent the degree of economic change that the ROI has absorbed in the past. The EIFS model, its inputs, outputs, and significance measures are discussed in more detail in Appendix G, Attachment G.2.

Economic Impacts of Construction

Implementation of the Proposed Action at Fort Carson requires completion of a number of construction projects at the Cantonment, BAAF, and Range. In all, 25 construction projects are planned at Fort Carson, including 18 projects in the cantonment area. The total estimated cost of these projects is approximately $300 million. Projects that would serve the post population include a physical fitness center, three child development centers, hospital addition/alteration, medical clinic and dental clinics, and a dining facility. There are also a number of construction projects already underway at Fort Carson, including large troop complexes that have been previously analyzed under NEPA and which will be used by units and organizations that are part of the transformation programs being studied in this

EIS. The combined total cost of construction is approximately $1.2 billion. Although the actual schedules of all the proposed construction projects are still subject to change, available information indicates that the year when the greatest construction expenditures at the Fort Carson would occur is 2009. Therefore, economic modeling used construction cost estimates for all of the projects that are currently anticipated to be at the construction midpoint in 2009. This approach provides the largest annual inputs and resulting economic effects. Actual annual effects may be somewhat less than those shown. It is anticipated that the large majority of economic effects associated with the proposed construction projects would be experienced in the ROI.

Economic Development

Minor short-term beneficial effects would be expected. In the short term, the expenditures and employment associated with construction projects would increase the sales volume, employment, and income in the ROI, as estimated by the EIFS model results. Table 3-15 shows the projected change in direct and total economic growth (which includes induced growth) during the peak year 2009.

TABLE 3-15
EIFS Model Output for the Proposed Construction Projects at Fort Carson
Fort Carson Transformation EIS, Fort Carson, Colorado

Indicator	Projected Change	Percentage Change	RTV Range
Direct Sales Volume	$353,418,500		
Total Sales Volume	$1,212,225,000	4.63%	-8.23% to 7.5%
Direct Income	$179,286,000		
Total Income	$361,051,900	2.32%	-7.75% to 8.05%
Direct Employment	4,308		
Total Employment	8,736	2.16%	-4.25% to 3.67%
Local Population	0		-1.58 to 3.16 %

Notes:
EIFS model results are based on estimated expenditure during the peak construction year (2009), when the majority of construction projects would be at their midpoint.
See Appendix G, Attachment G.2 for detailed EIFS model report and explanation of RTVs.

These economic benefits would be temporary, lasting only for the duration of construction. The changes in specific economic parameters would fall well within historical fluctuations, as represented by the RTVs shown in Table 3-15, and would be considered minor.

Demographics

No population changes are anticipated. The construction projects at Fort Carson are not expected to trigger a temporary movement of workers from outside the ROI to fill the supply of construction job opportunities.

Economic Impacts of Operations

The long-term economic effects associated with ongoing operations are derived by using the EIFS model and rely on input describing the net changes (Proposed Action versus No Action alternative conditions).

Economic Development

Implementation of the Proposed Action would result in an increase in active duty military employment of approximately 8,500 personnel between 2006 and 2011. In addition to the increase in active duty personnel, the Proposed Action is expected to result in the addition of approximately 800 civilian jobs on Fort Carson. Moreover, the increase in both the personnel and residential population on Fort Carson would require increased operational expenditures for purchases of goods, contracting of services, utilities, and rent and lease payments. Increases in on-post contractors are accounted for under operational expenditures, rather than as employment.

These direct changes would be expected to result in secondary economic impacts within the ROI. Table 3-16 shows the results of the EIFS model associated with the increase in personnel (active duty military and civilian) and operational expenditures on Fort Carson.

TABLE 3-16
EIFS Model Output for Long-Term Operations Under the Proposed Action at Fort Carson
Fort Carson Transformation EIS, Fort Carson, Colorado

Indicator	Projected Change	Percentage Change	RTV Range
Direct Sales Volume	$270,821,400		
Total Sales Volume	$928,917,600	3.55%	-8.23% to 7.5%
Direct Income	$379,052,600		
Total Income	$518,338,200	3.33%	-7.75% to 8.05%
Direct Employment	10,385		
Total Employment	13,778	3.41%	-4.25% to 3.67%
Local Population	21,635		
Local Off-Post Population	15,711	3.16%	-1.58 to 3.16 %

Notes:
See Appendix G, Attachment G.2 for detailed EIFS model report.

The economic benefits resulting from increased employment and operational expenditures are long term. The changes in specific economic parameters would fall well within historical fluctuations, as represented by the RTVs shown in Table 3-16, and would be considered minor. One exception is that the projected change in off-post population slightly exceeds historical changes in population within the ROI.

Demographics

Table 3-17 shows the total population directly associated with Fort Carson before (2005) and after (2011) the Proposed Action (BRAC 2005, IGPBS, and AMF).

TABLE 3-17
Fort Carson Projected Population Increase
Fort Carson Transformation EIS, Fort Carson, Colorado

	No Action (2005)	After Implementation of Proposed Action (2011)	Net change
Trainees	33	32	-1
Military Personnel	14,500	23,000	8,500
Civilian Personnel[a]	2,700	3,500	800
Contractor Personnel[b]	1,600	2,200	600
Military Dependents	19,500	31,000	11,400
Total	**38,300**	**59,700**	**21,300**

Notes:
Totals are rounded to the nearest hundred.
Source: Office of the Chief of Staff for Installation Management, 2006.
[a] Includes estimated non-appropriated fund civilians, not included in the *Army Stationing and Installation Plan* (ASIP).
[b] Estimated on-post support contractors, not included in the ASIP.

In 2005, the on-post population residing at Fort Carson in family housing, bachelor quarters, and barracks was approximately 15,000 persons (see Table 3-18). After implementing the Proposed Action, the on-post residential population would total approximately 18,300. The on-post workforce population (all military, civilian, and on-post contractor personnel) would result in population increases of approximately 9,700 persons to 28,700.

TABLE 3-18
Fort Carson Estimated Population Change On Post and Off Post
Fort Carson Transformation EIS, Fort Carson, Colorado

	Increase	2011 Total
On-Post Residential Population[a]	3,100	18,300
On-Post Workforce Population[b]	9,700	28,700
Off-Post Residential Population	16,800	63,200

Notes:
[a] Military personnel and family members living in family or bachelor housing.
[b] Military personnel, civilian personnel, and contractors.

Because there would be an increase in on-post and off-post population, an increase in demand for private and public services would result from implementing the Proposed Action, as discussed below.

Housing

On Post

Fort Carson is responsible for housing the troops and supporting the needs of the Soldiers and their dependents. Overall, approximately 28 percent of the additional military personnel to be assigned to Fort Carson would be able to obtain on-post housing, primarily those who are unaccompanied by family members.

In preparation for the additional troops, as well as to address existing deficiencies, Fort Carson has already begun building additional barracks. By 2011, approximately 2,600 additional billets should be available, which would accommodate all or most of the unaccompanied Soldiers requiring on-post housing. The estimate of on-post population in Table 3-18 includes personnel living in those new barracks.

Construction of 400 to 500 new family housing units is planned and anticipated to be underway soon at Fort Carson. With the addition of approximately 6,600 new military families, however, a serious shortfall in military family housing would remain. As a result, demand for off-post housing in the local housing market area would increase.

Property taxes are not applicable to on-post housing at Fort Carson. Property tax revenues, however, could increase in local jurisdictions, with an increase in the construction of housing units to meet the higher demand for off-post housing.

Off Post

Because approximately 72 percent (or about 6,100) of the new military personnel are expected to live off post, there would be an increased demand for off-post housing. Based on the vacancy rate and number of housing units reported in the 2000 Census for the ROI, there would be approximately 10,000 housing units available for sale or rent to the military personnel seeking off-post housing (as well as other households requiring housing). Assuming that all of the off-post military personnel elected to live in El Paso County, there would be a total of 6,750 housing units needed to sell or rent to the military personnel (and others) seeking housing within the county.

The number of housing units in the ROI and within El Paso County has increased since 2000. Over the 5-year period from 2001 through 2005, more than 41,300 housing units were authorized for construction in the ROI, 32,000 of which were in El Paso County. Assuming that future vacancy rates remain in the 10-15 percent range as they have in the recent past (see Appendix G, Attachment G.1, Figure G.1-6), and that construction of new housing units follows the historical pattern, there would be adequate off-post housing units to accommodate military personnel and their families as well as population growth from other sources.

Quality of Life

The Proposed Action would result in an increase in both the on-post and off-post population, with a resulting proportionate increase in demand for schools and childcare facilities, public safety, medical, and other services as discussed below.

Schools

School enrollment would increase as a result of the increase in regional population. Some of the additional school-age children whose families move to Fort Carson can be expected to attend the on-post elementary and middle schools. Those whose families settle outside these attendance areas would attend off-post schools.

Based on existing attendance patterns and the limited availability of on-post family housing, population increases at Fort Carson are expected to result in approximately 600 additional students at the three on-post elementary schools (400 living on post and 200 living off post) and approximately 130 additional students at the on-post middle school, mostly living on post.

Table 3-19 presents growth projections for student enrollment prepared recently for advanced planning purposes by Fountain-Fort Carson District 8. These projections were based on a net military personnel increase of 12,500 – higher than the current increase of approximately 8,500 personnel – that was assumed to occur by the 2009-2010 school year.

In addition to the anticipated enrollment changes in Fountain-Fort Carson District 8, Table 3-19 shows the estimated enrollment changes expected to occur in the other school districts that serve Fort Carson and surrounding areas. These school districts receive federal impact aid as an offset for the costs of providing public education to dependents of military personnel.

Table 3-19 also shows the anticipated breakdown of the total military students by grade.

TABLE 3-19
Annual Increase in Military-Connected Student Enrollment
Fort Carson Transformation EIS, Fort Carson, Colorado

	Aug 2005	Aug 2007	Aug 2008	Aug 2009	Total Plan Increase
Pupil Growth[a]					
Fountain-Fort Carson District 8	326	991	186	186	1,689
Colorado Springs District 11	286	299	164	164	913
Harrison District 2	314	328	180	180	1,002
Widefield District 3	334	349	191	191	1,065
Academy District 20	262	274	150	150	836
Cheyenne Mountain District 12	92	96	52	52	292
Falcon District 49	79	82	45	45	251
Total	**1,693**	**2,419**	**968**	**968**	**6,048**
Grade Distribution (of increase)	**K-5**	**6-8**	**9-12**	**Total**	
Number	3,710	1,244	1,094	6,048	
Percent	61%	21%	18%	100%	

Notes:
[a.] Projections include only military dependents.
Source: Walker, C., 2006.

The projections shown in Table 3-19 extend only to 2009, and are consistent with current information. It is anticipated, however, that the actual growth in student population associated with growth at Fort Carson would be less than the numbers shown in the table because the net increase in military personnel by 2011 (approximately 8,500) would only be approximately 70 percent of the growth on which these projections are based (12,500).

In addition, not all students would attend public schools; some may attend private school or be home-schooled. According to the estimates from the 2000 Census, approximately 70 percent of the total school-age children living on Fort Carson were enrolled in school.

Four of the seven school districts listed in Table 3-19 have new or expanded facilities planned for the 2007-2010 school years:

- Fountain-Fort Carson School District 8
  - Elementary School
  - Middle School addition
- Widefield School District 3
  - Elementary School
- Academy School District 20
  - K-8 School
- Falcon School District 49
  - Elementary School (one-half)

The other schools districts (Colorado Springs District 11, Harrison District 2, and Cheyenne Mountain School District 12) have sufficient capacity to accommodate the anticipated growth.

Child Care Services

On Post

The expected increase in population associated with Fort Carson could result in an increased demand for childcare services. The 28 percent of military personnel that are projected to live on post, as well as many who live off post, would increase the demand for childcare services. This increased demand would likely be met by the three child development center projects that are included in the Proposed Action:

- Child Development Center (Project Number 62832): Capacity for 303 children ages 0-5; includes an outdoor playground.
- Child Development Center (Project Number 65330): Capacity for 244 children ages 0-5 and for 195 children ages 6-10; includes computer lab, activity rooms, kitchen, storage, etc.
- Child Development Center (Project Number 65335): Capacity for 244 children ages 0-5 and for 195 children ages 6-10; includes computer lab, activity rooms, kitchen storage, etc.

Off Post

Demand for off-post child care services is also expected to rise, although many of the military personnel commuting to work at Fort Carson likely would first look on post (near their place of employment) for preschool child care services, rather than off post. As with any population increase, the services provided through the private sector can be expected to respond to the increased demand by increasing supply. Thus, the number of childcare centers and providers in the region can be expected to increase.

Family Support and Retirement Services

Services would continue to be provided to residents and retirees by the Army Community Support Center, the Family Connection, Family Readiness Groups, and the Retirement Services Office.

No immediate increase in the retiree population is anticipated. Although some of the older active duty personnel may possibly choose to retire or settle in this area after discharge or retirement, most of the new troops are typically younger and many will likely serve at other posts before discharge or retirement, or return to their place of origin. It is unlikely that the Proposed Action would have an impact on the retiree population.

Shops and Services
The additional on-post and off-post population would increase demand for on-post retail, food, and related services such as Fort Carson's commissary and retail outlets in the Exchange Mall. Off post, the services provided through the private sector can be expected to respond to the increased demand by increasing supply. Opportunities for new or expanded businesses may occur, especially for convenience retail businesses located near Fort Carson.

Recreation
Demand for recreational facilities would increase with the additional population residing on post and off post.

The Proposed Action would provide additional on-post community and recreational facilities. A Physical Fitness Center is included in the Proposed Action, which will include a gym, swimming pool, exercise and weight rooms, indoor track, and climbing wall/indoor ropes course. The center will also include administrative offices, locker rooms, sauna/steam room, etc.

The increase in off-post population would also increase the demand for off-post recreational facilities. The demand for some facilities, such as gyms and pools, may be moderated by the use of the new on-post facilities. Nevertheless, as with any population increase, the services provided through the private sector can be expected to respond to the increased demand by increasing supply. Thus, recreation centers and other facilities that offer recreational opportunities can be expected to increase in number to meet any additional demands.

Environmental Justice
Construction impacts are temporary in nature, but they can range from annoying to detrimental for those living near a construction site. Because most of the construction activity would be carried out in the core of the installation, few adverse impacts to low-income and minority communities are expected. Because exact locations for the construction projects have not yet been identified, this analysis is based on evaluating construction impacts over the area adjacent to Fort Carson, including Fort Carson itself.

As shown previously in Table 3-14, the proportion of minority population in the Fort Carson area does not meet the 50 percent threshold, and it is not substantially greater than the minority population percentage in El Paso County, the ROI, or Colorado. Similarly, the poverty rate in the Fort Carson area is not greater than 20 percent or substantially greater than the poverty rate in El Paso County, the ROI, or the state.

As discussed in Sections 3.4, 3.5, and 3.10, the noise, dust, and traffic generated by construction would be minimized by careful construction planning. Fugitive dust emissions will be minimized throughout the construction period by use of conventional dust suppression, BMPs, and mitigation techniques, such as soil erosion and sedimentation control, restrictions on where vehicles can travel on site, speed controls for construction vehicles and equipment, and watering of exposed soil and demolition debris to control dust.

Noise from construction equipment will be controlled by use of appropriate sound mitigation techniques and BMPs. Construction traffic during peak hours will be reduced by promoting carpooling and the use of using centralized construction staging areas.

Therefore, no disproportionately high and adverse effects on minority and low-income populations are anticipated.

Protection of Children

There is a potential for minor short-term adverse impacts to children.

Because construction sites can be appealing to children, construction activity could be an increased safety risk. Nonetheless, because the exact locations of proposed construction projects have not yet been identified specific construction projects with greater potential risk because of their proximity to family housing, schools, and other locations where children are concentrated cannot be identified. Therefore, this analysis evaluates the potential impacts to the children in general terms.

Barriers and "no trespassing" signs will be placed around construction sites to deter children from playing in these areas, as well as to keep out other trespassers. All construction vehicles, equipment, and materials will be stored in fenced areas and secured when not in use. During construction, safety measures stated in 29 CFR 1926, "Safety and Health Regulations for Construction," and other applicable regulations and guidance will be followed to protect the health and safety of all residents on Fort Carson, as well as construction workers.

3.10 Transportation

This section describes the affected environment and the environmental consequences of the Proposed Action on transportation resources on and surrounding Fort Carson.

3.10.1 Affected Environment

3.10.1.1 Regional Transportation

Roadway Network

Fort Carson is located on the southern edge of the City of Colorado Springs and is bounded by I-25 to the east, SH 115 to the west, and Academy Boulevard to the north. I-25 is a north-south highway that bisects the Colorado Springs metropolitan area and is a major north-south highway along Colorado's Front Range.

In addition to I-25, the primary north-south routes in Colorado Springs are along Academy Boulevard and Powers Boulevard. The Colorado Springs roadway network offers few continuous east-west routes, with this movement primarily accommodated by Fountain Boulevard, Platte Boulevard, Austin Bluffs Parkway, and Woodmen Road. The only access from Colorado Springs to the west is on U.S. 24, while the primary access to the east of Colorado Springs is provided along U.S. 24 and SH 94.

Traffic

Existing traffic data for select Colorado Springs area roadways were collected from the Colorado Department of Transportation (CDOT). The existing (2005) average daily traffic

(ADT) volumes and corresponding daily levels of service (LOS) are summarized in Table 3-20 below, along with roadway classification, number of through lanes, posted speed limit on roadways surrounding Fort Carson, and daily volume to capacity (v/c) ratios.

TABLE 3-20
2005 Traffic Volumes for Select Colorado Springs Area Roadways
Fort Carson Transformation EIS, Fort Carson, Colorado

Roadway Classification	Roadway	Number of Through Lanes	Posted Speed (mph)	ADT[1]	v/c[1]	LOS[2]
Interstate	I-25 (south of SH 16)	4	75	44,300	0.61	C
	I-25 (between Academy Boulevard and SH 16)	4	75	57,300	0.66	C
	I-25 (between Nevada Avenue and Academy Boulevard)	4 to 6	65	61,700	0.80	D
	I-25 (between Nevada Avenue and Cimarron Street)	4	55	88,200	0.74	D
	I-25 (north of Bijou Street)	4	55	106,500	0.81	D
Expressway	U.S. 24 (west of I-25)	4	35	54,600	1.06	F
	U.S. 24 (east of Powers Boulevard)	4	55	32,200	0.67	C
Primary Arterial	Academy Boulevard (west of I-25)	4	45	36,400	0.55	C
	Academy Boulevard (east of I-25)	4	50	44,100	0.66	C
	U.S. 24 Bypass/Fountain Boulevard (east of I-25)	4	45	27,300	0.30	A
	SH 115 (south of Gate 1)	2	60	12,900	0.64	C
	SH 115 (between Gate 1 and Star Ranch Road)	4	55	25,300	0.82	D
	SH 115 (between Star Ranch Road and Cheyenne Mountain Boulevard)	4	40	32,700	0.67	C
	SH 16 (east of I-25)	2	35	17,800	0.61	C
	SH 85/87 (south of Academy Boulevard)	2 to 4	45 to 50	19,300	0.65	C
	Academy Boulevard (north of Constitution Avenue)	6	35	53,100	0.79	D
Minor Arterial	SH 94 (east of Marksheffel Road)	2	60	9,100	0.53	C

Source: [1]CDOT, 2006; [2]PPACG, 2007.
ADT = average daily traffic
LOS = level of service
v/c = volume to capacity

CDOT is currently preparing an Environmental Assessment to analyze potential transportation improvements for the SH 16 and I-25 interchange. The study is evaluating solutions, including capacity improvements on SH 16 and the reconstruction of the SH 16 and I-25 interchange, to alleviate the substantial congestion that occurs along SH 16 near Gate 20 during the morning peak period (DPW, 2005). Although the existing ADT on SH 16 listed in Table 3-20 results in an acceptable daily LOS, the second highest morning peak

hour traffic demand at Fort Carson's access points occurs at Gate 20, resulting in an unacceptable peak hour LOS.

The PPACG Regional Travel Demand Model is used to forecast traffic volumes on roadways in the Colorado Springs area for the current planning horizon, the year 2030, to assist with future infrastructure analysis and planning. The PPACG base-year model (year 2000) indicates that Fort Carson contributes approximately 62,000 trips to the regional roadway network on a daily basis (PPACG, 2006a). According to a 2005 travel survey (PPACG, 2006b), nearly half of Soldiers reside in the four ZIP codes near the post. Three of the ZIP codes border Fort Carson immediately to the west, north, and east (80906, 80817, and 80911) and the fourth (80916) is slightly to the northeast. The combination of these four ZIP codes accounts for 46 percent of the troops who reside off post and, therefore, much of the traffic generated by Fort Carson is concentrated on roadways to and from these areas, including SH 115, SH 16, and Academy Boulevard. The Fountain ZIP code (80817), meanwhile, accounts for the second largest population of Soldiers residing off post.

3.10.1.2 Installation Transportation

Roadway Network

The roadway network at Fort Carson consists of 696 mi of roads, 266 mi of which are paved. Access to Fort Carson is provided through the following six active entry control points: Gates 1, 2, and 5 on SH 115; Gates 3 and 4 on Academy Boulevard; and Gate 20 on I-25 (DPW, 2005).

Cantonment area roadways generally form a grid pattern that is laid out in a crescent shape from northwest to southeast. Primary east-west access within the cantonment area to SH 115 is provided by O'Connell Boulevard and Titus Boulevard, while primary north-south access within the Cantonment is provided by one-way roads (Magrath Avenue and Barkeley Avenue). Butts Road, meanwhile, provides access from the Cantonment to the downrange area (DPW, 2005). A map of the cantonment area roadways is shown on Figure 3-6.

The cantonment area roadway system can be classified in one of the following three categories: arterials, collector roadways, and local roadways (DPW, 2005). Butts Road, Magrath Avenue, and Barkeley Avenue are classified as arterials. Collector roadways within Fort Carson include O'Connell Boulevard, Ellis Street, Nelson Boulevard, Prussman Boulevard, Titus Boulevard, Specker Avenue, Chiles Avenue, and Wilderness Road. Local roadways throughout Fort Carson serve as the direct connections to parking lots and adjacent properties.

The road network in the Cantonment is generally well maintained and adequate for supporting assigned mission activities. Nearly all major roads within the Cantonment have bituminous surfaces and are capable of accommodating all types of wheeled vehicles. The main roads in the downrange area are unpaved and reasonably well maintained, while secondary roads in the downrange area are maintained to varying degrees (DECAM, 2002a).

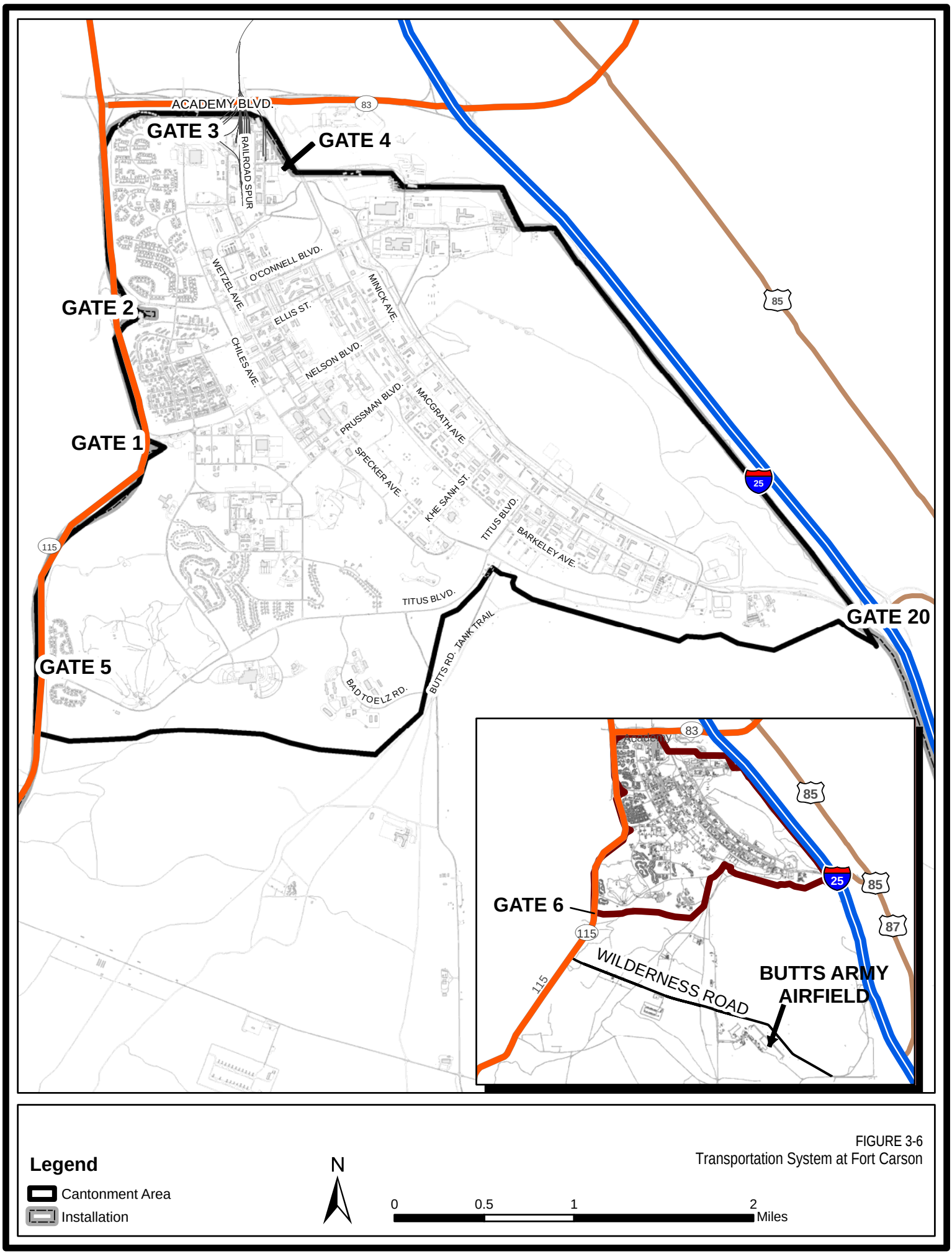


FIGURE 3-6
Transportation System at Fort Carson

Traffic

With the exception of Magrath Avenue and Barkeley Avenue, all installation roadways have one lane for each direction of travel. Magrath Avenue and Barkeley Avenue have two one-way lanes. The posted speed limit throughout the cantonment area is generally 30 mph, although some Cantonment and downrange area roadways have posted speed limits of 40 mph (DPW, 2005).

Existing traffic data indicate that congestion exists on select installation roadways during peak periods, and that all signalized intersections operate at acceptable levels of service according to 2005 traffic volumes (DPW, 2005). Traffic volumes on select cantonment area roadway segments are summarized in Table 3-21.

Traffic-volume data were collected when approximately 55 to 60 percent of the active duty military personnel stationed at Fort Carson were deployed. As such, existing traffic-volume counts on the installation were found to be noticeably less when compared to a normal pre-deployment condition (DPW, 2005). The existing volumes in Table 3-21 reflect an adjusted ADT count to represent normal pre-deployment volumes.

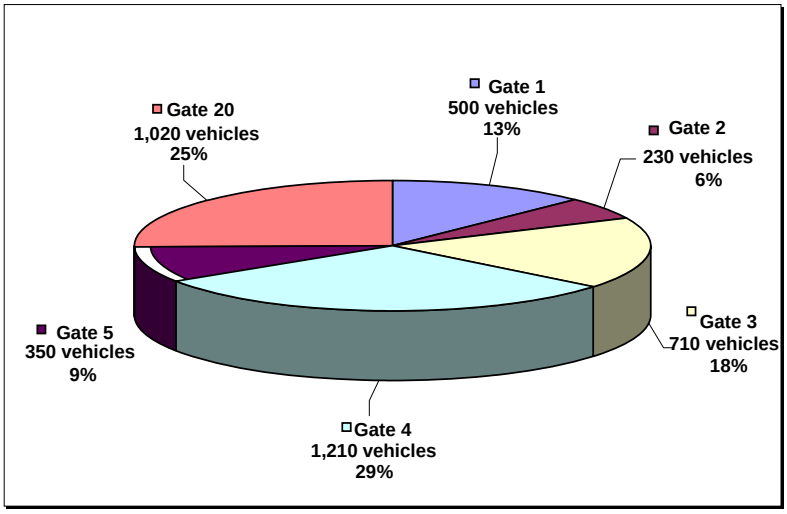
TABLE 3-21
2005 Traffic Growth on Select Cantonment Area Roadways Under the Proposed Action
Fort Carson Transformation EIS, Fort Carson, Colorado

Roadway Classification	Roadway	Average Daily Traffic
Arterials	Magrath Avenue (between Prussman Boulevard and Yano)	2,450
	Barkeley Avenue (between Hogan Street and Khe Sanh Street)	2,970
	Butts Road (near Mates Facility Access)	2,040
Collector Roadway	Ellis Street (between Wallace Street and Pershing Drive)	2,270
	Nelson Boulevard (between Barkeley Avenue and Pershing Drive)	2,110
	Prussman Boulevard (between Iron Fighter Drive and Specker Avenue)	5,610
	Titus Boulevard (at Sheridan Avenue)	6,800
	Specker Avenue (between Ellis Street and Evans Street)	7,570
	Chiles Avenue (between Ellis Street and O'Connell Boulevard)	8,520
	Wilderness Road (west of Butts Road)	620

Source: DPW, 2005.

The amount of use of downrange area roadways fluctuates due to the nature of the maneuver training and variations of training mission requirements. Therefore, it is not possible to determine the volume of traffic on any given section of downrange area roads with accuracy.

Traffic volumes at the six active entry control points were collected in 2005 and are representative of the morning peak hour. The pie chart below shows the 2005 distribution of traffic to each active entry control point. The distribution indicates that the morning peak-traffic demand on Gate 4 is the highest, followed by Gate 20. Peak commuting periods on Army installations differ from traditional morning, afternoon, and evening peaks on off-post roadway systems. At Fort Carson, inbound peaks occur prior to morning physical training (usually before 6:00 a.m.), during morning off-post commuter times for the on-post civilian workforce, mid-morning as the Soldiers return to the installation for the day, and prior to the lunch hour. Outbound peaks generally occur in the morning after physical training, around the lunch hour, and again at the end of the day prior to evening off-post commuter peak periods.



Traffic Distribution at Fort Carson's Active Entry Control Points, 2005.

3.10.1.3 Other Transportation

Descriptions of the rail, aviation, and transit systems that serve Fort Carson are presented below.

Rail

Fort Carson is served by a freight rail line, located between Gates 3 and 4, in the northern portion of the cantonment area. The access railroad is 2.1 mi in length and connects Fort Carson to the main line of the Denver and Rio Grande Western Railroad at Kelker Junction in Colorado Springs, with cross connection facilities to the Atchison, Topeka, and Santa Fe Railroad at the same location. Fort Carson is responsible for 7.1 mi of rail track and has a total loading footage availability of 2.8 mi of track. The railhead area has sufficient capacity to move 270 rail cars per day (DECAM, 2002a).

Aviation

Aviation facilities at Fort Carson are located at BAAF, approximately 4 mi south of the cantonment area and immediately south of the small-arms impact area along Butts Road. First established in 1949, BAAF houses operations and administrative functions for several units, contractor maintenance and support personnel, and rotary-wing aircraft. The existing permanent aircraft population is 68, none of which is fixed-wing aircraft (DPW, 2004). Nearly all fixed-wing aircraft that land at Fort Carson are C-130s, C-12s, or USAFA training aircraft, and the landing strip is not sufficient in length to accommodate larger types of aircraft (DECAM, 2002a).

Transit

Public transit on Fort Carson is provided by Mountain Metropolitan Transit, which also serves the Colorado Springs metropolitan area. Routes 30 and 33 provide service within the

cantonment area and connect to the regional bus system at the Pikes Peak Community College Transfer Station, immediately north of Fort Carson. Bus service is offered Monday through Friday from 8:15 a.m. to 6:15 p.m., and Saturday from 7:05 a.m. to 6:15 p.m. Transit service operates on 50-minute intervals (Mountain Metropolitan Transit, 2006).

3.10.2 Consequences

3.10.2.1 No Action Alternative

Construction Traffic

Under the No Action alternative, the facilities included in the Proposed Action will not be constructed. Therefore, there will be no traffic impacts from construction under the No Action alternative.

Regional Traffic

Under the No Action alternative, traffic volumes for the 2030 regional planning horizon on the regional roadway systems will increase by at least one-third in the vicinity of Fort Carson. According to the PPACG regional travel demand model (year 2030), I-25 volumes north of Academy Boulevard will grow by 53 percent. SH 115 traffic will grow by 50 percent north of Gate 1 and 67 percent south of the gate, while U.S. 24 traffic will grow by 26 percent west of I-25. Academy Boulevard traffic in the vicinity of Fort Carson will grow by 26 percent and 36 percent further north near its intersection with Airport Boulevard/west Peterson AFB entrance. Powers Boulevard traffic will grow by 64 percent near Drennan Road/Colorado Springs Airport, and by 47 percent further north near Airport Boulevard (PPACG, 2006a).

The roadways in the southeast Colorado Springs area experience greater daily volume growth between existing conditions and year 2030 under the No Action alternative. The east side of Colorado Springs is currently the least densely developed portion and is the primary growth area for the Colorado Springs metropolitan area. I-25 traffic will grow by 80 percent south of Academy Boulevard and then by 86 percent south of SH 16/Gate 20. South of the SH 85/87 Fountain interchange, the percent-volume traffic increase is nearly 200 percent. Likewise, Powers Boulevard and Marksheffel Road south of Bradley Road experience a 350 percent traffic growth. On the eastern edge of Colorado Springs, U.S. 24 traffic will grow by 460 percent and SH 94 traffic will increase by 285 percent. SH 16 traffic will grow by 94 percent east of its interchange with I-25 and then by 680 percent closer to its junction with Powers Boulevard. South of SH 16, the daily traffic-volume will increase by 225 percent on SH 85/87 and by 420 percent on Link Road. Furthermore, most of the roadways in the Fountain area experience significant daily traffic-volume growth (PPACG, 2006a).

The general area in which traffic attributable to Fort Carson results in a noticeable increase (1 percent or more) over the No Action alternative is defined as the traffic "area of influence." The traffic area of influence for the Proposed Action at Fort Carson extends north to Constitution Avenue/Fontanero Street and south to the southern boundary of Fort Carson. It extends east to Marksheffel Road/Link Road and west to a line extended north and south of 7th Street. Table 3-22 summarizes the No Action and Proposed Action LOS and v/c ratios and specific daily traffic volume percent change under the Proposed Action as compared to 2030 conditions under the No Action alternative.

TABLE 3-22
Projected 2030 Traffic Conditions for Select Colorado Springs Area Roadways
Fort Carson Transformation EIS, Fort Carson, Colorado

Location	Roadway	Change in ADT Growth between the No Action and Proposed Action Alternatives (%)	No Action Alternative		Proposed Action Alternative	
			v/c	LOS	v/c	LOS
North of Fort Carson	I-25 (between Academy Boulevard and Circle Drive)	9	0.38	B	0.40	B
	I-25 (between Circle Drive and Nevada Avenue)	6	0.37	B	0.37	B
	I-25 (north of Nevada Avenue)	1	0.58	C	0.61	C
	Nevada Avenue (between I-25 and Uintah Street)	33	0.04	A	0.13	A
	Nevada Avenue (north of Uintah Street)	1	0.29	A	0.30	A
South of Fort Carson	SH 115 (between Gate 1 and Fort Carson southern boundary)	7	0.10	A	0.10	A
	I-25 (between Academy Boulevard and SH 16)	4	0.39	B	0.41	B
	I-25 (south of SH 85/87 interchange)	7	0.09	A	0.10	A
East of Fort Carson	Academy Boulevard (between interchange with I-25 and Airport Road)	8	0.25	A	0.27	A
	Powers Boulevard/Mesa Ridge Parkway (south of Fontaine Boulevard)	40	0.02	A	0.03	A
	Powers Boulevard (between Fontaine Boulevard and Grinnell Boulevard)	7	0.20	A	0.20	A
	Powers Boulevard (between Grinnell Boulevard and Airport Road)	3	0.40	B	0.41	B
	Powers Boulevard (south of Airport Road)	1	0.72	D	0.78	D
	SH 16 (between I-25 and Fountain Mesa Road)	16	0.42	B	0.51	C
	SH 16/Mesa Ridge Parkway (between Fountain Mesa Road and Powers Boulevard)	12	0.20	A	0.22	A
	Fontaine Boulevard (east of Powers Boulevard)	20	0.22	A	0.22	A
	Grinnell Boulevard (north of SH 16)	4	0.22	A	0.23	A
	Bradley Road (east of Marksheffel Road)	3	0.24	A	0.24	A
	Old Pueblo Road (north of Link Road)	29	0.19	A	0.22	A
	Old Pueblo Road (south of Link Road)	100	0.01	A	0.03	A
	SH 85/87 (south of SH 16)	12	0.48	B	0.53	C
West of Fort Carson	SH 115 (between Gate 1 and Gate 2)	3	0.29	A	0.30	A
	SH 115 (between Gate 2 and Academy Boulevard)	23	0.45	B	0.57	C
	SH 115 (between Academy Boulevard and Lake Avenue)	11	0.56	C	0.63	C
	SH 115 (between Lake Avenue and I-25)	4	0.63	C	0.69	C
	U.S. 24 (west of I-25)	1	0.34	B	0.34	B

Source: PPACG, 2006a.

Installation Traffic

Under the No Action alternative, there will be no increase in installation traffic due to the realignment of troops and their dependents. Roadways at Fort Carson will experience a slight increase in traffic, less than 0.5 percent per year. Therefore, there would be no traffic impacts from the No Action alternative.

Other Transportation

Under the No Action alternative, there will be no impacts to the rail, aviation, or transit systems.

3.10.2.2 Proposed Action

Construction Traffic

During construction, traffic on roads on Fort Carson and surrounding the post would increase temporarily. Construction traffic would consist of construction vehicles and equipment, including bulldozers, graders, backhoes, excavators, dump trucks, cement trucks, and hoe-ram excavators. Transport vehicles would move the construction equipment to and from work sites.

Construction traffic would be routed through Gate 3, Fort Carson's primary commercial traffic gate, and continue south on Chiles Avenue. This is similar to current construction traffic patterns. Construction traffic would pass by a school at Chiles Avenue and Burris Street. Crossing guards are currently used and speed zones are enforced to ensure safety of school children in the area. Chiles Avenue is presently the primary route for commercial and construction traffic, and the introduction of minimal amounts of additional traffic for temporary construction purposes would not negatively affect school children. If needed, construction traffic can be rerouted onto Specker Avenue to avoid sensitive resources.

On-post roadways may need to be temporarily closed during construction activities. Use of traffic control procedures, including flaggers and posted detours, would minimize impacts to traffic flow. Other BMPs to address potential traffic impacts include minimizing construction vehicle movement during peak rush hours on the installation and placing construction staging areas in locations that would minimize construction vehicle traffic within administrative, housing, and school areas.

Regional Traffic

Under the Proposed Action, traffic volumes on the regional roadways network would increase because of the realignment of troops and their dependants. Results from the PPACG Regional Travel Demand Model (year 2030) estimate traffic growth caused by an additional 10,000 Soldiers and their dependents relocating to Fort Carson and residing in Colorado Springs (PPACG, 2006a). PPACG's analysis, which was performed independent of this EIS, used an increase of 10,000 Soldiers plus dependents in its Regional Travel Demand Model to estimate the increase in trips resulting from additional troops at Fort Carson. The impacts stated below reflect PPACG's 10,000 Soldier scenario and result in higher traffic volumes than what would be expected under the Proposed Action (that is, an approximately 8,500 Soldier increase).

The area in which traffic attributable to Fort Carson results in a noticeable increase over the No Action alternative is defined as the traffic "area of influence." The traffic area of influence for the Proposed Action at Fort Carson extends to Constitution Avenue (east of I-25) to the north, the southern boundary of Fort Carson to the south, Marksheffel Road (south of Airport Road) to the east, and approximately 1 mi west of SH 115 (between Academy Boulevard and I-25) to the west. Table 3-22 summarizes the No Action and Proposed Action LOS and v/c ratios and specific daily traffic volume percent change under the Proposed Action as compared to 2030 conditions under the No Action alternative.

In general, the patterns of traffic increase on the major roadways show larger increases closer to Fort Carson and then smaller increases further away from the installation as people filter to minor arterials and collectors to enter their neighborhoods. Because access to Fort Carson is provided off I-25, Academy Boulevard, SH 16, or SH 115, these roadways experience the largest daily traffic-volume increases on their segments adjacent to the installation. These roadway segments, however, do not necessarily have the largest percent daily traffic-volume increases. The daily traffic-volume increases on the higher-volume roadways result in smaller percentage increases. Likewise, lower-volume roads experience a higher percent increase in daily volume due to the additional troops even though the actual volume increase is not as great as on the major roadways. The greatest change in v/c ratio occurs on SH 16 and SH 115.

The v/c trend is further explained by comparing the daily LOS between the No Action and Proposed Action alternatives. The three roadway segments that experience a drop in daily LOS due to higher v/c ratios are SH 115, SH 85/87, and SH 16 all of which are immediately adjacent to Fort Carson access points. The daily LOS along these three segments would drop to an LOS C, which remains acceptable. All of the roadway segments in the No Action and Proposed Action alternatives are projected to operate on a daily basis above the acceptable LOS threshold of D.

The roadway network in the southeast area in and around Fountain experiences the highest percent traffic-volume increase. This is to be expected because the 2005 travel survey indicates that the Fountain area houses the second highest number of troops and it contains areas that are currently undeveloped and which can accommodate growth. Several of the areas north and west of Fort Carson (highest percentage of current Soldiers) cannot accommodate additional development or additional troops.

Traffic impacts resulting from the Proposed Action could be lessened by encouraging ridesharing and transit use. Improvements to the regional roadway network programmed in 2005-2010 Transportation Improvement Plan or currently underway would also help in accommodating the traffic growth resulting from the Proposed Action. Fort Carson should continue to coordinate with state and local agencies to plan for future transportation improvements to ensure that these projects take into account growth anticipated at Fort Carson.

Installation Traffic

Under the Proposed Action, traffic volumes on Fort Carson's roadway system would increase because of the realignment of troops and their dependants. Additionally, the facilities that would be constructed to accommodate the new troops would change travel patterns on the installation.

Traffic growth is expected to be the greatest on roadways that run through the less densely developed areas of Fort Carson. A sharp increase is expected on Wilderness Road, which currently has low existing traffic volumes. The increase in traffic on Wilderness Road would require additional entry control point access onto Fort Carson. Gates 6 and 19 would be opened to accommodate the additional traffic demand. Traffic at the active entry control points is expected to increase from 27 percent at Gate 2 to 66 percent at Gate 5. The change in travel patterns to and on Fort Carson would make traffic volumes at Gate 20 the highest

(DPW, 2005). Table 3-23 below summarizes the traffic growth on select installation roadways.

Traffic volumes at signalized intersections on post would increase under the Proposed Action. All signalized intersections, however, would have sufficient capacity to accommodate the increased demand.

TABLE 3-23
Future Traffic Volumes for Select Cantonment Area Roadways Under the Proposed Action
Fort Carson Transformation EIS, Fort Carson, Colorado

Roadway Classification	Roadway	Average Daily Traffic Growth (%)
Arterials	Magrath Avenue (between Prussman Boulevard and Yano)	215
	Barkeley Avenue (between Hogan Street and Khe Sanh Street)	120
	Butts Road (near Mates Facility Access)	210
Collector Roadway	Ellis Street (between Wallace Street and Pershing Drive)	85
	Nelson Boulevard (between Barkeley Avenue and Pershing Drive)	30
	Prussman Boulevard (between Iron Fighter Drive and Specker Avenue)	130
	Titus Boulevard (at Sheridan Avenue)	155
	Specker Avenue (between Ellis Street and Evans Street)	70
	Chiles Avenue (between Ellis Street and O'Connell Boulevard)	130
	Wilderness Road (west of Butts Road)	1,100

Source: DPW, 2005.

Impacts caused by an increase in traffic volumes on Fort Carson could be mitigated by implementing the suggested roadway improvements outlined in the *Fort Carson Comprehensive Transportation Study* (DPW, 2005). Increased traffic volumes at Fort Carson's active entry control points would be minimized by opening Gate 6 and Gate 19 to reduce traffic at the other entry control points.

Other Transportation

Under the Proposed Action, use of the rail system would increase to accommodate increased troop training at the PCMS. A typical BCT would require four train shipments to the PCMS (one per day for 4 days) consisting of 225 cars total. All vehicles shipped by train are shipped back to Fort Carson at the conclusion of the training rotation. Rail shipments to and from the PCMS and Fort Carson would not exceed one shipment per day for a total of 40 days per year for BCT training rotations. Shipments of vehicles for battalion units occur over the course of 1 to 2 days. These shipments would not exceed one shipment per day for a total of 60 days per year for battalion training rotations. It is assumed that all company operations would take place in conjunction with BCT or battalion training deployments.

All rail shipments to the PCMS would be scheduled through the Installation Transportation Officer at least 60 days in advance of the training rotation in order to file a movement request. This allows the Installation Transportation Officer to complete adequate coordination with the rail lines prior to any convoy movement. With proper coordination, the increased use of rail would not burden the rail system.

Under the Proposed Action, there would be no additional aircraft assigned to Fort Carson and no increase in the number of aviation training missions. Therefore, there would be no impacts to aviation under the Proposed Action.

The Proposed Action would not affect transit services at Fort Carson, although the realignment of troops to Fort Carson may minimally increase transit ridership on post and regionwide. The current transit system is not compatible with some aspects of Solders' schedules, such as morning physical training. Therefore, it is unlikely that future transit demand will exceed available system capacity.

Ongoing coordination with Mountain Metropolitan Transit to assess Fort Carson's transit needs as additional troops arrive would minimize impacts that increased bus ridership may create. Additional bus routes and more frequent bus service may be implemented if demand is sufficient.

3.11 Utilities

This section identifies the existing utilities at Fort Carson associated with potable water, wastewater, stormwater, energy sources, communications, and solid waste, and describes the environmental consequences for these utilities from additional personnel, increased training, and the construction and operation of new facilities. The environmental consequences for utilities include assessing the need for upgrades and any secondary impacts associated with those upgrades.

3.11.1 Affected Environment

Utilities at Fort Carson are operated in accordance with an energy conservation program that is detailed in the *Energy Management Plan* (DECAM and DPW, 2005). The *Energy Management Plan* complies with the Energy Policy Act of 1992 and EO 12902 energy efficiency mandates, which require the active involvement of all commands, activities, and individuals to reduce costs, while not impairing the training, readiness, or health and safety of personnel.

Solid waste management at Fort Carson is conducted in compliance with all applicable regulations. Regulations that apply to solid waste management include:

- Resource Conservation and Recovery Act (RCRA);
- EPA's non-hazardous solid waste regulations codified in 40 CFR 240-258;
- The Pollution Prevention Act of 1990;
- EO 13101, "Greening the Government through Waste Prevention, Recycling, and Federal Acquisition";
- 10 USC 2577, "Disposal of Recyclable Materials";
- DoD Instruction 4715.4, "Pollution Prevention";
- AR 200-1, "Environmental Protection and Enhancement";
- AR 420-49, "Utility Services"; and

- 6 Colorado Code of Regulations 1007-2, Part 1, "Regulations Pertaining to Solid Waste Sites and Facilities."

3.11.1.1 Potable Water Supply

Potable water is purchased by Fort Carson from Colorado Springs Utilities for domestic, industrial, and irrigation use in the Cantonment. A portion of the water purchased by Fort Carson is also supplied to the Cheyenne Mountain Air Force Station.

Potable water is delivered to Fort Carson through two 20-inch-diameter lines that enter the installation from the north and split to the eastern and western sides of the Cantonment. The 50-year-old water lines within the Cantonment are deteriorated and in need of replacement. A 6-inch plastic line from the Cantonment services BAAF, and a 20-mi, 6-inch water line extension from BAAF follows near Route 1 to the multi-purpose range complex at the southern end of Fort Carson.

The maximum historical daily water demand on Fort Carson is 5.5 million gallons per day (mgd), and the total capacity of the two supply lines is 14 mgd (Guthrie, 2005). The potable water storage system at Fort Carson consists of four water storage tanks that provide capacity during emergency conditions. Fort Carson's Teller Reservoir, which has been dry since 2002, has a potential water capacity of 31.8 million gallons.

Tributaries for which Fort Carson retains water rights are Little Fountain Creek, Little Turkey Creek, Red Creek, Rock Creek, Sand Canyon Creek, Turkey Creek, and Wild Horse Creek (see Figure 3-1). Fort Carson has 16 subsurface water rights for the nine installed wells. Decreed use categories include irrigation, recreation, fish maintenance, fire fighting, military, livestock, domestic, and industrial.

Potable water for consumption during training activities in the downrange area is trucked from the Cantonment, while at the multi-purpose range complex, potable water is piped from the Cantonment (Benford, 2006).

3.11.1.2 Wastewater System

Fort Carson operates and maintains a sewage treatment plant that services the Cantonment, the family housing area, and BAAF. Effluent discharges from the sewage treatment plant are regulated under EPA NPDES Permit Number CO-00211181, effective October 1, 2005. CDPHE allows Fort Carson to discharge only 3.2 mgd into Clover Ditch(Guthrie, 2005). The Fort Carson golf course is irrigated, in part, by the effluent (USACE, 2006b)

The sanitary sewage treatment plant, which was re-constructed in 1998, has a 4.02-mgd design capacity with a maximum peak historical flow to the sanitary sewage treatment plant of 2.6 mgd (Guthrie, 2005).

The Colorado Water Quality Control Commission (WQCC) has adopted new EPA ammonia discharge standards (EPA-823-F-99-024); it is anticipated that the new standards will be in effect by October 2007. Fort Carson, which discharges into Fountain Creek, is in the process of determining how to achieve compliance with these standards (Cloonan, 2006).Based on a review of the current permit limits for Fort Carson, it has been concluded that the facility is in compliance with the current ammonia effluent limits. The annual average total ammonia concentration in the effluent is 0.50 mg/L. Under the proposed regulations, if future

ammonia standards require facility upgrade, Fort Carson will have until calendar year 2012 to accomplish implementation.

The original sanitary system, constructed in 1942, comprises numerous areas of old, deteriorated lines that have been identified and programmed for replacement.

The Training Support Complex, at the far west end of Wilderness Road, is not currently supported by a sanitary sewer system and must utilize "open soaking pits" for discharge of shower, laundry, and mess hall wastewater. Such pits are not allowed by Army, federal, state, and local health regulations, and the El Paso County Department of Health and Environment has requested Fort Carson to construct more permanent support facilities (Project Number 30630).

Portable toilets, dry vault, and self-composting latrines, are used in the downrange area when septic tanks/leach fields are not available (e.g., during training activities on the downrange area) (Benford, 2006).

An industrial wastewater treatment plant (IWTP) is located directly north of the sanitary sewage plant, near Gate 20. The IWTP was designed and constructed to treat petroleum-contaminated water from the motor pools in the Cantonment. The IWTP collection sewer extends down Minick Avenue behind the motor pools and delivers industrial wastewater to the IWTP. Wastewater is conveyed using both lift stations and gravity flow. IWTP effluent is combined with the sanitary sewage water entering the sewage plant. No IWTP effluent is discharged directly into "B" Ditch, "I" Ditch (Clover Ditch), or "U" Ditch (Unnamed Ditch), Fort Carson's three main ditches (see Figure 3-2) (USAEC, 2005).

BAAF, the Colorado Army National Guard Centennial Training Site, and the 10th SFG Complex (all south of the Cantonment) are not connected to the IWTP.

3.11.1.3 Stormwater System

Fort Carson watersheds drain to Fountain Creek to the east and southeast and to the Arkansas River to the south. The northern and eastern parts of the installation are drained by Little Fountain Creek, Sand Creek, and other smaller tributaries of Fountain Creek. The Cantonment is located in the Lime Kiln Valley watershed, a sub-watershed to the Fountain Creek watershed. Once these tributaries enter Fort Carson, they flow into one of three main ditches that drain the northern portion of the installation and the Cantonment: "B" Ditch, "I" Ditch (Clover), and "U" Ditch (Unnamed Ditch), all of which are tributaries to Fountain Creek. Figure 3-2 presents a map showing the drainage areas of the three ditches. As illustrated in Figure 3-1, stormwater drainage in the downrange area is generally via natural drainages with some modifications, particularly near roads and downrange area facilities. The intermittent streams of Rock Creek and Little Fountain Creek cross the downrange area, converge, and drain into Fountain Creek approximately 10 mi east of Fort Carson (DECAM, 2002a). Turkey Creek flows through/adjacent to the installation and enters the Arkansas River to the south. The southwestern part of the installation, is drained by Red Creek and the south-central portion of Fort Carson is drained by Little Turkey Creek and Turkey Creek. Fountain and Turkey Creeks are all tributaries of the Arkansas River (USAEC, 2005).

Fort Carson is authorized to discharge stormwater runoff from construction sites under NPDES Construction General Permit COR1000F. The permit became effective on July 1,

2003, and expires on July 1, 2008. To obtain coverage under the general permit, contractors performing work at Fort Carson must submit a NOI for each construction project that disturbs 1 acre or more of land. In addition, contractors must develop and implement a SWPPP for each project (EPA, 2006a) and comply with the additional BMPs set forth in Fort Carson's *Stormwater Management Plan*.

In December 2005, the Army completed an evaluation of Fort Carson's storm sewer capacity (USAEC, 2005). The study concluded that the existing Fort Carson storm sewer system is at or near capacity. Increased development of Fort Carson's Cantonment would result in increased stormwater runoff. The increased runoff could contribute to flooding, high peak flows that cause erosion, and degradation of water quality. The study recommended that Fort Carson implement additional BMPs for new and existing development to control and properly treat stormwater flows.

3.11.1.4 Energy Sources

Fort Carson purchases natural gas and electricity from Colorado Springs Utilities. Electrical services are provided through two aerial 34.5-kilovolt, 3-phase, supply lines, which terminate at two power substations in the Cantonment. The peak historical electrical demand at Fort Carson is 24,000 kilowatts (kW), while the total capacity of transmission lines available to the installation is 48,800 kW and the total capacity of transformers is 32,200 kW (Guthrie, 2005).

The training facilities within the downrange area are also supplied power from Colorado Springs Utilities. Electrical supply lines to BAAF were upgraded in 1986 (Project Number 36429). During maneuvers, targets are locally powered by battery or generator.

Fort Carson receives natural gas from Colorado Springs Utilities via two feeds at the north end of the installation, near Gate 4. The natural gas is metered and piped through a series of gas mains and distribution lines to Fort Carson's four central heating plants, BAAF, and the Family Housing Area. The existing gas line servicing BAAF does not have the capacity to accommodate additional gas service to the downrange area or Training Support Complex, located at the far west end of Wilderness Road. Colorado Springs Utilities is in the planning stages for a gas feed to Gate 1 area, in support of the new Cheyenne Mountain State Park west of this gate (DECAM, 2005d). The peak historical daily consumption of natural gas at Fort Carson is 8,600 million cubic feet (mcf)/day, and the peak historical monthly consumption is 186,000 mcf. Colorado Springs Utilities' maximum delivery capacity to the installation is 10,650 mcf/day (Guthrie, 2005).

3.11.1.5 Communications

The primary communication infrastructure at Fort Carson is the telephone lines that run throughout the Cantonment, seven ranges, and BAAF. Currently, administrative analog telephone and low-speed data are available in a few downrange area locations using copper and leased fiber. The separately studied I3MP project currently under construction will provide upgraded communications and information capability, including fiber optic cabling.

3.11.1.6 Solid Waste

The *Integrated Solid Waste Management Plan (ISWMP)* (DECAM, 2004e) contains details of the Solid Waste Management Program at Fort Carson. The *ISWMP* complies with AR 200-1 and is consistent with AR 420-49 and other applicable guidance on solid waste management. Fort Carson intends to achieve a 50 percent annual reduction/diversion rate of solid waste by 2010 through recycling, reuse, and reduction (based on a 1992 baseline generation rate), while ensuring that integrated non-hazardous solid waste management programs provide an economic benefit when compared with disposal using landfills and incineration alone. DPW manages refuse and construction-related solid waste, and DECAM manages recyclable materials (DECAM, 2004e).

Fort Carson's current waste disposal contractor for both refuse and construction and demolition waste is Mark Dunning Industries, Inc. (MDI), although refuse waste from the housing units is handled under a separate contract (DECAM, 2004e).

Until 1998, Fort Carson operated a 50-acre sanitary landfill, located south of the Cantonment, for the disposal of municipal solid waste. Construction and demolition waste was placed in an adjacent 20-acre landfill that was closed in 2002. Since that time, waste has been shipped off site for disposal in local landfills. Currently, all solid waste from Fort Carson, including waste from the housing units, is shipped 15 mi to approved offsite landfills, including the Midway Landfill in Fountain, Colorado, for disposal. Midway Landfill and other landfills are permitted Subtitle D landfills.

3.11.2 Consequences

3.11.2.1 No Action Alternative

Personnel, Training, Construction, and Operation

Potable Water Supply

The existing potable water supply and distribution system within the Cantonment meets the capacity needs of current personnel and training activities. The aging water line system in the Cantonment, however, is in need of replacement. A potable water line extends from the Cantonment to the multi-purpose range complex near the southern boundary of the installation. This potable water supply along with water trucked from the Cantonment adequately provides water for existing personnel and training activities in the downrange area. The existing line supplying potable water to BAAF is adequately meeting the needs of current personnel and training activities. Under the No Action alternative, the installation will continue to use the existing potable water supply system within the Cantonment, downrange area, and BAAF, and no change will be implemented. Therefore, no adverse effect to the potable water supply will result from implementation of the No Action alternative.

Wastewater System

The existing IWTP and the sanitary sewage treatment plant are sufficient to support current personnel and training activities within the Cantonment. The existing sanitary sewer system at BAAF adequately supports existing personnel and training activities. Therefore, no adverse effect to the wastewater system within the Cantonment and BAAF will result from implementation of the No Action alternative.

As previously discussed, the Training Support Complex is not currently supported by a sanitary sewer system. Under the No Action alternative, the current sanitary wastewater system in the downrange area will continue to be in non-compliance with health regulations.

It is anticipated, based on the low levels of ammonia in the effluent, that the wastewater treatment plant can reasonably be expected to meet new ammonia effluent limitations under the No Action alternative. Any required facility upgrades required to meet the new standard would need to be completed by 2012, as noted previously.

Stormwater System

The installation will continue to use the existing stormwater system under the No Action alternative. BMPs recommended in the storm sewer study (USAEC, 2005) are being evaluated and may be implemented under the No Action alternative in response to existing inadequacies of the stormwater system. Implementation of planned and under-construction projects may result in stormwater runoff that exceeds the capacity of the stormwater system.

Energy Sources

Electricity and natural gas demand in the Cantonment and BAAF will continue to be met because the systems are adequate to support demand from existing personnel and training activities at Fort Carson. Therefore, no adverse effect to energy sources within the Cantonment and BAAF will result from implementation of the No Action alternative.

As described above, the existing gas line servicing BAAF does not have the capacity to accommodate gas service to the downrange area or Training Support Complex. Under the No Action alternative, the current natural gas system in the downrange area is inadequate to meet the current needs of the area.

Communications

The existing communication system is currently being upgraded under the separately studied I3MP project and, therefore, under the No Action alternative will be adequate upon completion of that project.

Existing communications at BAAF adequately support the current personnel and training activities; therefore, no adverse effect will occur to communications at the airfield from implementation of the No Action alternative.

Solid Waste

The installation will continue to use the existing solid waste processes under the No Action alternative and no change will be implemented. Therefore, no adverse effect will occur to solid waste within the Cantonment and downrange area from implementation of the No Action alternative.

3.11.2.2 Proposed Action

Personnel

Potable Water Supply

The existing water lines, which are deteriorated and require replacement, cannot support the additional personnel within the Cantonment. According to Fort Carson utility planning, the estimated maximum daily flow for 2007 is 6.6 mgd, which is a 20 percent increase over current maximum historical flow (Guthrie, 2005). Implementation of the planned upgrade of

the water lines as part of the Proposed Action would improve the ability of the Cantonment's potable water system to handle the increased demand from the additional personnel at the installation under the Proposed Action.

Installation of new service lines, increased line capacity, and an elevated 500,000-gallon water storage tank as included in the Proposed Action would support delivery to the proposed elevated sites and development along Wilderness Road (Project Number 30630). Installation of a new water pump and water lines at the Ammunition Supply Point (ASP) would ensure the potable water system's ability to handle increased demand from additional personnel along Wilderness Road (Project Number 30630). Installation of a larger-capacity water supply line from the Cantonment to BAAF will support increased potable water demand along Fort Carson's eastern boundary range complexes, including the multi-purpose range complex and at BAAF. Under the Proposed Action, no adverse effect to the potable water system at the Cantonment and downrange area would occur.

Wastewater System

The proposed upgrade of the capacity of the sewer treatment plant would improve the existing sanitary wastewater system's ability to handle the increased load of additional personnel under the Proposed Action. Installation of new sanitary sewer lines would ensure that the sanitary sewer system could support increased demand in these areas. Installation of sanitary sewer lines to the Training Support Complex, ASP, and along Wilderness Road (Project Number 30630) would provide the downrange area with a wastewater system to handle the increased personnel under the Proposed Action. These sanitary sewer lines would convey sanitary wastewater from these locations to the sanitary sewage treatment plant.

The existing IWTP and industrial sewer collection system are adequate to support additional personnel under the Proposed Action. Facilities that would be constructed under the Proposed Action could affect the IWTP, as discussed later in this section.

It is anticipated, based on the low levels of ammonia in the effluent, that the wastewater treatment plant can reasonably be expected to meet new ammonia effluent limitations even with the increase in wastewater that will be generated under the Proposed Action. As noted under the No Action, any required facility upgrades required to meet the new standard, would need to be completed by 2012.

Stormwater System

The presence of additional personnel would not have the potential to alter current stormwater systems within the Cantonment, downrange area, and BAAF. Therefore, no adverse effects to stormwater systems would occur from increased personnel (except as associated with construction of facilities addressed later in this section).

Energy Sources

Increased personnel would result in increased electricity demand on the Cantonment. According to Fort Carson utility planning, estimated peak demand for 2007 is 31,200 kW, which is a 30 percent increase over current historical demand (Guthrie, 2005). Installation of a third substation, transformer upgrades, and coordination with Colorado Springs Utilities to provide additional capacity would provide the power and capacity to support additional Cantonment personnel under the Proposed Action (Project Number 66696).

Installation of new electrical circuits and a substation at BAAF would meet electrical demand generated by additional troops along Wilderness Road, the downrange area, and BAAF (Project Number 30630). Therefore, no adverse effect to electricity within the Cantonment, downrange area, or BAAF would result from implementation of the No Action alternative.

Increased personnel would result in increased natural gas demand on the Cantonment. According to Fort Carson utility planning, estimated peak demand for 2007 is 10,750 mcf/day, which is a 25 percent increase over current historical data (Guthrie, 2005). Under the Proposed Action, Colorado Springs Utilities is in the planning stages of providing an additional gas feed to the Gate 1 area in support of the new Cheyenne Mountain State Park west of the gate. Coordination with Colorado Springs Utilities is in progress to size this gas line to support the additional personnel. Upgrade of Fort Carson's natural gas distribution system, specifically raising pressure-regulation pits, would meet U.S. Department of Transportation regulatory requirements (DECAM, 2005d). Therefore, no adverse effect to the natural gas system within the Cantonment would result from implementation of the No Action alternative.

Additional numbers of personnel in the downrange area would result in increased natural gas demand. The current natural gas system is inadequate to meet the current and future personnel needs in the downrange area. Therefore, an adverse effect to the natural gas system would occur due to implementation of the Proposed Action. Remedies addressing this inadequate natural gas system are discussed under the Construction and Operations Section below.

Communications

No changes to communications are included in the Proposed Action. The separately studied I3MP project currently under construction will provide upgraded communications and information capability for the additional personnel, including fiber optic cabling.

Solid Waste

Solid waste generation at the Cantonment and downrange area would increase with increased personnel. Solid waste is managed in accordance with the *ISWMP*. Solid wastes are collected and transported to appropriately permitted disposal facilities off Post. Solid waste generated from implementation of the Proposed Action would be managed in accordance with the existing *ISWMP*. Therefore, no adverse effect to solid waste would occur due to implementation of the Proposed Action.

Training

Potable Water Supply

Increased training activities in the downrange area would result in an increase potable water demand. Upgrades to the potable water system for the downrange area as discussed above in the Personnel Section would also support the additional demand that increased training would have on the downrange area (Project Number 30630). Therefore, no adverse effect to the potable water system would occur in the downrange area from increased training under the Proposed Action.

Wastewater System

Increased training activities within the downrange area would result in additional load to the wastewater systems at Fort Carson. Upgrades to the downrange area wastewater systems discussed in the above Personnel Section would support the additional demand that increased training would have on the downrange area facilities including the Training Support Complex, ASP, and along Wilderness Road (Project Number 30630).

Increased numbers of personnel training in the downrange area at an increased frequency could result in the generation of wastewater that exceeds the capacity of existing septic tanks, portable toilets, dry vault, and self-composting latrines. The installation should provide for additional servicing of wastewater disposal facilities and/or provide additional portable toilets to accommodate the additional wastewater generated by more frequent training activities.

Stormwater System

Increased training in the downrange area is not anticipated to increase the quantity of stormwater generation or alter the current stormwater drainage patterns. Therefore, no effect to the stormwater system would occur due to implementation of the Proposed Action.

Energy Sources

Increased frequency of training would result in increased electricity demand on the installation. New construction and upgrades to the electrical systems on Fort Carson as discussed above in the Personnel Section would also support the additional demand that increased training would have on the downrange area. Therefore, no effect to the electrical system would occur from training under the Proposed Action.

Increased training in the downrange area would result in increased natural gas demand. As discussed above in the Personnel Section, the current natural gas system is inadequate to meet the needs of the downrange area. The inadequacy of the natural gas system would be exacerbated by the increased demand under the Proposed Action. Remedies addressing this inadequate natural gas system are discussed under the Construction and Operations Section below.

Communications

The existing communication system is currently being upgraded under the separately studied I3MP project to provide operations support for voice, LAN, and real-time video and simulations to current and future ranges, satisfying communications needs for training under the Proposed Action.

Solid Waste

Solid waste generation in the downrange area would increase with increased training. Solid waste is managed in accordance with the *ISWMP*. Solid wastes are collected transported to appropriately permitted disposal facilities off post. Solid waste generated due to implementation of the Proposed Action would be managed in accordance with the existing *ISWMP*. Therefore, no adverse effect to solid waste would occur due to implementation of the Proposed Action.

Construction and Operation

Potable Water Supply

As discussed above in the Personnel Section, the water distribution system would be upgraded to support the construction and operations of new facilities throughout the installation. Therefore, no adverse impacts to the potable water system at the Cantonment and downrange area would occur due to implementation of the Proposed Action.

Wastewater System

Construction and facilities operations would increase wastewater flow through the wastewater system. As described above in the Personnel Section, with the capacity upgrade, the sewer treatment plant can treat the increased flow generated by the construction and facilities operations within the Cantonment, downrange area, and BAAF. The sanitary sewer lines would be upgraded to support the increase flow in the Cantonment. Therefore, no impact to the wastewater system would occur due to implementation of the Proposed Action.

Construction and operation of the new facilities would increase the amount of wastewater generated along Wilderness Road. As previously discussed, installation of sanitary sewer lines to the Training Support Complex, ASP, and along Wilderness Road (Project Number 30630) would provide the downrange area with a wastewater system to handle the construction and facilities operations under the Proposed Action. These sanitary sewer lines would convey sanitary wastewater from these locations to the sanitary sewage treatment plant.

Construction and operations of new remote motor pools at the downrange area would require a dedicated industrial collection system and lift stations near BAAF to support the increased industrial wastewater (DECAM, 2005d). The construction of this facility would minimize the impacts of the construction and operation of new motor pools on the wastewater system at Fort Carson. The Proposed Action does not provide for expansion or upgrade to the IWTP. The construction and facilities operations of additional motor pools would generate increased load at the IWTP for which the facility might not have the capacity to treat. The IWTP should be studied to determine the capacity of the system, identify necessary modifications or repairs, consider enlargement of the facility, and identify potential changes to the process.

Stormwater System

Construction and operation of new facilities in the Cantonment, downrange area, and BAAF would generate increased stormwater runoff. Although standard stormwater management practices would be used to manage the quantity and quality of stormwater runoff in the Cantonment and downrange area during construction and facilities operations, new construction within the Cantonment would affect the existing stormwater system and Fountain Creek drainage system (USAEC, 2005). To correct this stormwater issue, the installation would upgrade both "B" Ditch and the Magrath/O'Connell system (DECAM, 2005d). Implementing other BMPs identified in the USAEC (2005) study would reduce impacts of increased runoff such as flooding, erosion, and water quality degradation.

Energy Sources

The electrical and natural gas system upgrades previously described above in the Personnel Section are sufficient to handle the increased electrical demand generated from construction

and facilities operation within the Cantonment and downrange area, as well as the natural gas demand within the Cantonment.

Construction of and upgrades to natural gas lines within the downrange area would support the additional demand due to construction and facilities operations in the downrange area, including Wilderness Road and BAAF (Project Number 30630).

Therefore, no effect would occur to energy sources due to implementation of the Proposed Action.

Communications

The existing communication system is currently being upgraded under the separately studied I3MP project. These upgrades will satisfy communications needs for facilities to be constructed under the Proposed Action.

Solid Waste

Solid waste generation at the Cantonment and downrange area would increase with construction and operation of new facilities. Solid waste is managed in accordance with the *ISWMP*. Solid wastes are collected transported to appropriately permitted disposal facilities. Solid waste generated due to implementation of the Proposed Action would be managed in accordance with the existing *ISWMP*. Therefore, no adverse effect to solid waste would occur due to implementation of the Proposed Action.

3.12 Hazardous and Toxic Substances

This section identifies the affected environment and environmental consequences for hazardous and toxic substances including uses of hazardous materials, storage and handling areas, hazardous waste disposal, site contamination and cleanup, and special hazards within the Cantonment, BAAF, and downrange area.

3.12.1 Affected Environment

In accordance with the RCRA, Colorado law, implementing regulations, and its Part B permit, Fort Carson has a comprehensive program to address management, use, and storage of hazardous waste and toxic substances, as well as a systematic program to investigate and remediate, if necessary, known or suspected contaminated sites across the installation.

Hazardous and toxic materials used at Fort Carson include gasoline, batteries, paint, diesel fuel, oil and lubricants, chemical agents, explosives, JP-8 jet fuel, pyrotechnic devices used in military training operations, radiological materials at medical facilities, radioactive materials, pesticides, and toxic or hazardous chemicals used in industrial operations (USACE, 2006b). Some of these materials end up as wastes, either through certain processes, or they are off-spec or become contaminated and unusable. Table 3-1 of the Part B Permit (Attachment 3, *Waste Analysis Plan*, September 2006) (February 2006) displays the estimated quantity of hazardous waste generated annually at Fort Carson.

To minimize hazardous waste disposal, Fort Carson maximizes recovery of waste for reuse and recycles applicable materials according to the *Recycling Plan* (DECAM, 2004f), *Pollution Prevention (P2) Plan* (DECAM, 2004g), and the *ISWMP* (DECAM, 2004e). A description of the

applicable management programs and plans implemented at Fort Carson is included in Appendix A.

3.12.1.1 Uses of Hazardous Materials

Cantonment Area

The principal industrial operations involving the use of hazardous materials and petroleum-based products at Fort Carson are the painting, repair, and maintenance of vehicles and aircraft at the Consolidated Maintenance Facility housed in Building 8000 and maintenance facilities.

As required by DoD policies, Fort Carson emphasizes integrated pest management. Pesticides and herbicides are required for insect and rodent control in select structures and in the control of undesired vegetation including noxious weeds (DECAM, 2004h).

Asbestos-containing materials were prevalent in building construction until the 1970s; although the use of asbestos has declined dramatically, asbestos is occasionally found in new building materials (DECAM, 2004i). Lead-based paint is no longer used but may be found in older structures (USACE, 2006c). Specifically, asbestos can potentially be found in floor tiles, pipe wrappings, ceilings, and insulation. Lead can potentially be found in chipped or cracking painted walls or in surrounding soils. Paint in liquid form can also contain hazardous lead concentrations. Transformers manufactured prior to 1976 and light ballasts manufactured before 1979 are assumed to contain polychlorinated biphenyl (PCB) waste (DECAM, 2004j). There are 16 transformers and possible existing ballast light fixtures within the Cantonment that potentially contain PCB dielectric fluid (DECAM, 2006a).

Downrange Area

The principal industrial operations at BAAF involving the use of hazardous materials and petroleum-based products include the painting, repair, and maintenance of 47 aircraft and their supporting wheeled ground vehicles. Aircraft maintenance hangars, one hot-refuel point, and one outdoor wash rack are utilized to perform standard vehicle maintenance (DPW, 2004). Additionally, painting operations are conducted at a paint booth within one of the old hangars. Lead-acid batteries are used for all aircraft and their supporting wheeled vehicles.

Pesticides and herbicides are required for insect and rodent control in select structures at BAAF and in the control of undesired vegetation including noxious weeds (DECAM, 21004j; USACE, 2006b). Lead-based paint and asbestos-containing materials may be found in older facilities at BAAF (DECAM, 2006a). Possible transformers and existing ballast light fixtures that potentially contain PCB dielectric fluid may also exist (DECAM, 2006b).

The only use of hazardous materials outside of BAAF in the downrange area is the use of petroleum-based products required during the repair and maintenance of vehicles and replacement of obsolete or malfunctioning targetry systems such as lifters that contain hydraulic fluids (USAEC, 2006b).

3.12.1.2 Storage and Handling Areas

Cantonment Area

Hazardous materials are stored securely in maintenance areas, flammable storage lockers/ areas, and mobile transfer units (tank trucks) (DECAM, 2004g). Petroleum products are

stored in numerous aboveground storage tanks (ASTs) within the cantonment area and include newly constructed contractor-owned, contractor-operated bulk and retail fuel facilities that provide fuel to all military units on Fort Carson. Three commercial gas stations are operated on Fort Carson and each station contains three underground storage tanks (USTs) (DECAM, 2004b). Lists B-1 through List B-7 within the *SPCCP* (DECAM, 2004b) provide a detailed chemical inventory and chemical storage locations areas within Fort Carson.

Fort Carson primarily uses the battery storage facility in Building 8000 for the storage of lead-acid batteries. New lead batteries are stored there prior to transportation to individual units; spent lead-acid batteries are stored on pallets at the battery storage facility until the transportation to an offsite recycling facility. Small battery storage areas are located in other buildings (DECAM, 2004b).

Building 3708 was newly renovated for pest control and is used to store and mix pesticides (DECAM, 2004b). Minor amounts of pesticides are also stored and distributed at the commissary, post exchange, and the veterinary clinic (DECAM, 2004h).

Downrange Area

Petroleum-based products used in the repair of malfunctioning targetry systems and military vehicles are stored at various locations throughout the downrange area.

Petroleum-based products are stored in several ASTs and at the hazardous cargo loading area at BAAF located at the south end of the runway.

3.12.1.3 Waste Disposal

All hazardous waste generated at Fort Carson (including the Cantonment and the downrange area) is transported to the Hazardous Waste Storage Facility, Building 9248, for storage and eventual shipment offsite for disposal. Currently, there are five satellite accumulation points (SAPs) on Fort Carson for the collection and temporary controlled onsite storage of hazardous waste (DECAM, 2006a).

The installation has no active landfills, and all sanitary waste is disposed of at off post, commercial landfills (DECAM, 2004e).

3.12.1.4 Site Contamination and Cleanup

Fort Carson is not listed on the EPA's National Priority List, which designates high-priority cleanup sites under CERCLA, more commonly known as the Superfund Program. Investigation and cleanup of Fort Carson is conducted under the Corrective Action portion of their RCRA Part B Permit (#CO-06-09-29-01).

Investigation and cleanup of Fort Carson's contaminated sites is conducted in accordance with the RCRA Part B permit requirements. Typical contaminants of concern include organics (solvents, petroleum hydrocarbons, etc.), explosives (TNT, RDX, etc.), and inorganics.

For the 170 Solid Waste Management Units (SWMUs) within Fort Carson's Corrective Action program, site investigation and cleanup are being performed in accordance with

applicable Army, state, and federal requirements to achieve established cleanup goals and schedules.

Figure 3-7 shows the location of SWMUs at Fort Carson, regardless of cleanup status, at the Cantonment, BAAF, and downrange area.

To the extent practical, all SWMUs are avoided during construction projects. Fort Carson manages the SWMUs according to all federal, state, and local regulations, and Fort Carson's RCRA Part B permit (see Appendix A).

3.12.1.5 Special Hazards

Cantonment Area

The Cantonment is an area of high concern for radon potential (DECAM, 2006a) and requires monitoring and engineering precautions to limit radon exposure. The Consolidated Maintenance Facility (Building 8000) is used for holding radioactive components of the M1 tank. Unserviceable components are sent off post for repair. Building 8000 is over 1 mi from existing and proposed family housing sites (DECAM, 2006a). The *Radioactive Materials Management Plan* (DECAM, 2004l) for Fort Carson provides the requirements for handling these materials.

Downrange Area

Ammunition is stored at the ASP storage area located just north and east of Townsend Reservoir and is classified as Class V material according to the Army's supply categories. The ASP contains 20 standard ammunition storage igloos, two aboveground magazines, the ASP office, and a utility building (DECAM, 2001a). Lead waste is found at gun and artillery practice ranges where lead munitions are used (DECAM, 2004c). Unexploded ordnance (UXO) is found in the large impact area, which is the only area on Fort Carson authorized to be fired into with dud-producing ammunition. UXO deemed unsafe to detonate in place are transported to Range 121 for treatment via open detonation (OD). The OD unit is currently operating in interim status while a Subpart X permit application is being prepared by CDPHE. A slight increase in OD operations is expected with increased training and expanded training area usage.

3.12.2 Consequences

3.12.2.1 No Action Alternative

The No Action alternative will result in no additional personnel, training, or construction and operation at Fort Carson. Fort Carson will continue to comply with applicable laws and regulations and implement the BMPs described in the management plans and programs listed in Appendix A. Therefore, no impacts due to the use and storage of hazardous materials and subsequent generation and disposal of hazardous waste or creation of special hazards are anticipated under the No Action alternative.

3.12.2.2 Proposed Action

Personnel

Adding personnel as projected under the Proposed Action would result in an increase in the use of hazardous materials and subsequent generation, handling, storage, and disposal of hazardous waste. An increase in minor spills is anticipated, but due to extensive outreach

and training efforts on spill prevention, major site contamination and cleanup or other special hazards resulting from increases in personnel is not anticipated at the Cantonment, and downrange area. All parties would continue to implement the *P2 Plan*, *Hazardous Waste Management Plan*, *SPCCP*, and the *Installation Pest Management Plan* (DECAM, 2004h) for waste minimization, spill prevention, and proper hazardous waste management. No additional mitigation actions with regard to use of the hazardous materials and subsequent generation of hazardous wastes are necessary to pursue the Proposed Action.

Training

The increase in training would result in an increase in special hazards as described below. No changes would occur to the use of hazardous materials, storage and handling areas, waste disposal or site contamination, and cleanup resulting from increases in training. Under the Proposed Action, existing management plans would continue to be followed and would be updated as necessary, as described further below.

Special Hazards

Increased training as projected under the Proposed Action would result in an increase in special hazards, specifically munitions and UXO. One additional small-arms facility (Project Number 58162), one sniper certification station (Project Number 41917), three training ranges (Project Numbers 65618, 59626, and 62812), one machine gun range (Project Number 12440), and one digital multi-purpose range (Project Number 65619) would be incorporated into Fort Carson's munitions storage areas.

Fort Carson will continue to implement the *ASP SOP* (Directorate of Logistics, 2006) for storage and transportation of additional munitions. The 62nd Explosives Ordnance Detachment (EOD) will continue to respond to discoveries of UXO for safe open detonation either in place or at Range 121.

Construction and Operations

The increase in construction and operations would result in an increase in the use of hazardous materials and subsequent generation and disposal of hazardous waste, site contamination and cleanup, and special hazards as described below. No changes would occur to the storage and handling areas or waste disposal resulting from increases in construction and operation. Under the Proposed Action, existing management plans would continue to be followed and would be updated as necessary, as described further below. Increases in waste volume associated with the Proposed Action would be managed by corresponding increases in the number of personnel at the hazardous waste storage facility who will be assigned to handle and manage the additional waste.

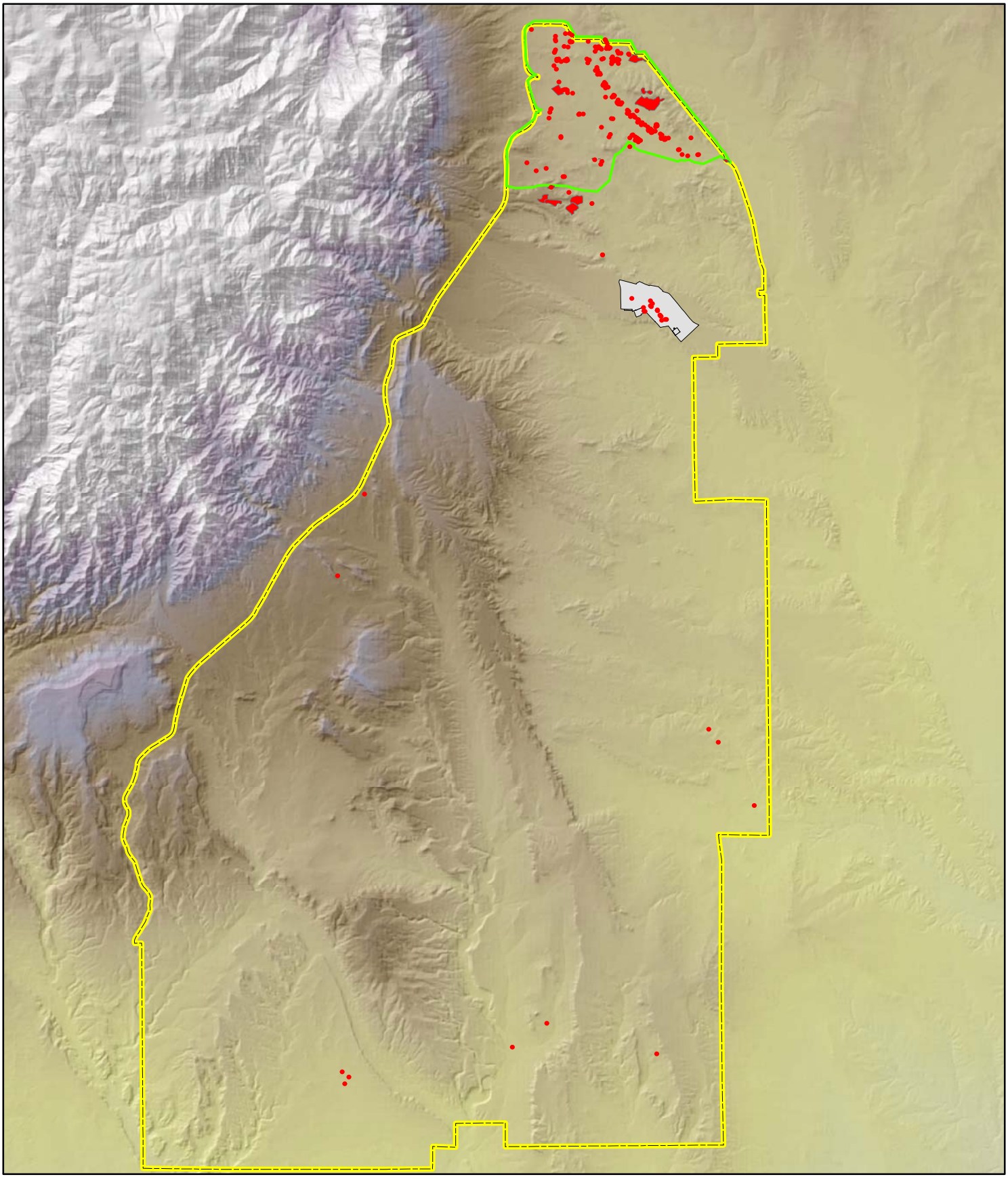


FIGURE 3-7
Location of SWMUs at Fort Carson

Uses of Hazardous Materials

Construction and operation of facilities as projected under the Proposed Action would result in an increase in the use of hazardous materials and petroleum-based products at the Cantonment, BAAF, and downrange area. Five vehicle maintenance facilities are scheduled to be constructed and used for vehicle storage to perform routine oil changes and lubes, wash-downs, and refueling (Project Numbers 13852, 59631, 65475, 63500, 64755, 65602, and 67115). Hazardous wastes typically generated from construction activities and vehicle maintenance operations are described in Table 3-1 of the Part B Permit (Attachment 3 *Waste Analysis Plan*, September 2006). Petroleum products and used oil will be stored in ASTs. Increased use of hazardous materials and subsequent generation of hazardous waste at the downrange area would occur at the qualification training ranges (Project Number 65618) and two digital multi-purpose ranges (Project Numbers 65619 and 59626). Fort Carson would continue to implement the *P2 Plan* (DECAM, 2004g), *Hazardous Waste Management Plan* (DECAM, 2004k), *SPCCP* (DECAM, 2004b), and FC Regulation 200-1, Chapter 13 (Underground Storage [USTs] and Above Ground Storage Tanks [ASTs]) for waste minimization efforts, hazardous waste management procedures, and spill prevention measures.

Construction and operation of facilities as projected under the Proposed Action would result in an increase in the generation of lead, asbestos, PCBs, and chlorofluorocarbon wastes at the Cantonment and BAAF. Demolishing unused buildings to construct a vehicle maintenance facility (Project Number 59631), expanding the railyard (Project Number 65616), and upgrading utilities (Project Numbers 66696 and 30630) are potential sources for generating these wastes.

Fort Carson would continue to implement the *Asbestos Management Plan* (DECAM, 2004i), *Lead Management Plan* (DECAM, 2004c), and *PCB Management Plan* (DECAM, 2004j) for handling, transporting, and disposing of these wastes.

Construction and operation of facilities projected under the Proposed Action would result in a potential increased risk within the Cantonment and downrange area to the exposure of naturally occurring radon. All parties would continue to implement the *Radon Management Plan* (DECAM, 2004m) in all new facilities and will comply with indoor air monitoring and radon remediation technology, and no additional mitigation actions would be necessary to pursue the Proposed Action.

Site Contamination and Cleanup

Construction of facilities as part of the Proposed Action may result in the disturbance of SWMUs. If construction within the boundary of an SWMU were proposed, coordination with the Restoration Program including consultation with CDPHE, would be required to address design features, avoidance measures, or other aspects of construction project siting to avoid or minimize disturbance of existing contaminated sites and prevent new spills.

Special Hazards

Construction and operation of facilities projected under the Proposed Action would result in an increase in the production of radiological materials within the Cantonment from four new or renovated medical/dental facilities (Project Numbers 64123, 64121, 64120, and 66789). Once operational, management of radiological materials from these facilities would

continue in accordance with the existing *Radioactive Materials Management Plan for Fort Carson* (DECAM, 2004m).

3.13 Cumulative Effects

The CEQ regulations implementing NEPA (40 CFR 1508.7) define a "cumulative impact" for purposes of NEPA as follows:

> *Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

For the purposes of this EIS, cumulative impacts would occur if incremental impacts of the Proposed Action, added to the environmental impacts of past, present, and reasonably foreseeable similar actions, would result in an adverse effect to resources in the ROI for Fort Carson. For an impact to be considered cumulative, there must be past, present, or reasonably foreseeable future actions that have the potential for incremental and potential impacts to occur that are similar to those of the Proposed Action (i.e., other actions that have the potential to result in impacts similar to those impacts caused by the Fort Carson Proposed Action).

In consideration of actions to include in the cumulative impacts assessment in this EIS, past, present, and reasonably foreseeable actions that have the potential to combine with incremental effects of the Proposed Action to result in cumulative impacts are those that:

- Are of a similar character, could affect environmental resources similar to those of the Fort Carson, or are located in close geographic proximity to Fort Carson; and
- Have an application for operations pending before an agency with permit authority.

3.13.1 Impact Analysis

In evaluating the cumulative impacts of the projects at and around Fort Carson, the project team considered relevant historical events in the region and contacted local, state, and federal agencies to identify reasonably foreseeable future actions. This involved coordination with surrounding municipalities and counties, various state agencies, and DoD installations. The project team also reviewed *Sustaining Nature and Community in the Pikes Peak Region, A Sourcebook for Analyzing Regional Cumulative Effects* (CDOT, 2003), an evaluation of cumulative effects in the Pikes Peak region from transportation projects sponsored by CDOT. In addition, the effects of the PCMS transformational activities are being addressed in the *PCMS Transformation EIS* in accordance with NEPA to assess the incremental social, economic, and environmental resources impacts of that action. The PCMS, however, is located distant from Fort Carson and the impacts attributable to the PCMS are not anticipated to affect the resources assessed in the *Fort Carson Transformation EIS*.

The format of this Cumulative Impacts subsection differs from other resources because it is organized by resource rather than alternative. This approach is intended to provide better

presentation of cumulative impacts for each resource. This subsection describes the past and present conditions of a given resource, followed by the reasonably foreseeable future effects of the Proposed Action and all other actions reasonably related to it in time and probability.

The actions considered in this section include those listed below.

3.13.1.1 Past Actions

The following past actions were determined to be relevant to the cumulative impact analyses:

- Constructing Fort Carson facilities and infrastructure, including the Cantonment and downrange area.
- Constructing roadways on and surrounding Fort Carson, including I-25, SH 115, Academy Boulevard, and Powers Boulevard.
- Constructing utilities, including water, sewer, gas and electric lines, for Colorado Springs and other municipalities on or adjacent to Fort Carson.
- Operation of Fort Carson as a military installation.

3.13.1.2 Present Actions

In consultation with surrounding municipalities and counties, various state agencies, and DoD installations, the following ongoing actions were determined to be relevant to cumulative impact analysis:

- Current operations on post, including training and deployments.
- Various construction, demolition, renovation, and maintenance activities on post, including expansion and upgrades to the Cantonment and downrange area.

3.13.1.3 Future Actions

The following actions were identified as reasonably foreseeable actions that could, in combination with the effects of the Proposed Action, contribute to cumulative environmental effects.

- Various maintenance and capital improvements projects at and near Fort Carson pertaining to housing, roadways, utilities, and other infrastructure.
- Constructing the arrival/departure air control group facility at the Colorado Springs Airport to support deployment of Fort Carson troops.
- Various capital improvements projects to surrounding municipal and county facilities now being planned or constructed.
- Improving roadway connections directly from I-25 to the Colorado Springs Airport, as currently being evaluated in the City's South Metro Accessibility Study and the SH 16 EA.

Fort Carson is being considered as one of five possible alternative locations for the future stationing of a Stryker Brigade Combat Team (SBCT). These various locations are being

assessed in the *Draft Supplemental Environmental Impact Statement for the Permanent Stationing of the 5th Stryker Brigade Combat Team*. If the Army makes the decision in the ROD for the Supplemental Environmental Impact Statement (SEIS) to station the SBCT at Fort Carson, the SBCT would train at the PCMS. It is unknown at this stage in the SBCT SEIS analysis whether Fort Carson is a likely or unlikely candidate for that SBCT or (if the SBCT did come to Fort Carson), if that would comprise an additional stationing action, or if an existing BCT stationed at Fort Carson would be sent elsewhere. Because of the lack of available information on such a possible future action, the SBCT stationing at Fort Carson is not considered a reasonably foreseeable action, and the cumulative impacts of Stryker and the PCMS transformation are not considered in the *PCMS Transformation EIS*. If a decision is made to station the SBCT at Fort Carson, a site-specific analysis of the impacts of that stationing decision would be conducted at a future date, including an analysis of the training at the PCMS. The site-specific NEPA analysis for the SBCT stationing action(s) would consider the cumulative effects of the PCMS transformation action (as part of the baseline) in combination with the SBCT action(s).

3.13.2 Air Quality

Planned construction activities at and near Fort Carson sponsored by federal, state, and local agencies would contribute to regional emissions of PM and CO from construction, training, equipment operations, and vehicle travel. Projects that, along with the Proposed Action, could contribute to cumulative air quality effects include:

- Improving Powers Boulevard/SH 16 and the I-25 interchange east of the installation;
- Improving Academy Boulevard north of the installation;
- Improving SH 115 west of the installation; and
- Various ongoing construction projects on the installation.

Construction projects generate PM emissions from site clearing and grading, and some other emissions from operation of equipment. Regional PM emissions are approximately half of the NAAQS, and cumulative emissions from construction projects are unlikely to lead to violation of the NAAQS because regional emissions would have to double over the existing emissions to approach the regulatory threshold (see Section 3.3). The only project criteria pollutant emissions regulated under the CAA that near or exceed regulatory thresholds is CO. The Colorado Springs area once violated the NAAQS for CO and is now a maintenance area for CO. As a maintenance area, regional CO emissions must be maintained to levels outlined in the SIP (see Section 3.3). The largest source of CO emissions is mobile sources from vehicle travel. All regional TIPs, including the three highway projects identified above, undergo a transportation conformity determination to review mobile source emissions and verify conformance to the maintenance plan and Transportation Implementation Plan. The proposed highway projects must evaluate, analyze, and determine that the project would comply with the air conformity regulations under the CAA. A General Conformity determination also was completed for the Proposed Action. Because of the regulatory limits that are enforced for CO, cumulative emissions associated with these projects are unlikely to lead to a violation of the NAAQS. Further, CO monitoring by the APCD would identify any violations, and corrective action would be taken by the region so the effects would be short-lived.

3.13.3 Cultural Resources

Past use of Fort Carson for intense military training has altered the integrity of numerous landforms and has likely destroyed important resources. Use of Fort Carson predates the NHPA and widespread protection of historic properties on federal land. Development of lands throughout the Pikes Peak region also has likely destroyed important cultural resources.

Fort Carson's current management program for cultural resources seeks to avoid affecting National Register-eligible sites. When avoidance is not possible, the Army follows Section 106 consultation procedures to reach agreement on appropriate mitigation for adverse effects to historic properties. Because of proactive management, present and projected future impacts to cultural resources on Fort Carson are anticipated to be minimal. Cultural resources on private lands surrounding Fort Carson remain unprotected, and important resources may be destroyed by continued development of areas surrounding Fort Carson.

3.13.4 Water Resources

Regional activities at and near Fort Carson sponsored by federal, state, and local agencies will result in increased runoff and potential for increased sedimentation, which could impair water quality in surrounding water bodies. Those regional activities that increase the amount of impervious surface could add to runoff and result in increased potential for flooding. Impacts of the Proposed Action are minimized by the continuation of a number of proven management measures at Fort Carson as discussed in Section 3.6.2.2 of this EIS.

The greater Colorado Springs area has experienced population growth well above state and national averages for several decades. That growth is forecast by PPACG to continue for the foreseeable future, an increase to which the Proposed Action will add incrementally but not substantially. Population growth demands that new water resources be developed, the planning for which is now underway by Colorado Springs Utilities and other municipal providers through projects such as the Southern Delivery System. According to the EIS currently being prepared by the Bureau of Reclamation for the Southern Delivery System proposal to construct new water storage reservoirs and an extensive network of delivery piping, growth in the Colorado Springs area is projected to occur with or without adequate water supplies (Bureau of Reclamation, 2006).

3.13.5 Biological Resources

The cumulative impact to biological resources consists of the irreversible changes to the ecosystem on and surrounding Fort Carson. Populations of various plant communities and species, some of which are threatened, endangered, or sensitive, suggest larger populations may have been present in the area before the post was constructed and training and operations occurred. The Proposed Action results in a variety of potential impacts, including mortality, disturbance, or displacement, and loss of habitat or nesting or foraging territory. The Proposed Action also includes continuation of a number of management measures to avoid and minimize impacts, as described in Section 3.7.

The area of undisturbed short-grass prairie and foothills habitats in the region are likely to continue to shrink as a result of the population growth and economic development along the Front Range anticipated by state and local governments.

3.13.6 Transportation

Fort Carson has been an important component of the economy in southern Colorado for more than 60 years. Troops have traveled via the region's roads, rails, and airports for daily commuting, training, and deployments for decades, adding incrementally to traffic volumes generated by civilian residents and nonmilitary commercial activities.

The city, county, and state transportation departments have maintained road networks in the region for decades. Current efforts include planning to reconstruct Powers Boulevard to a freeway with interchanges to enhance traffic movement around the eastern side of Colorado Springs. Future improvements to the roadway network also may include improving capacity on Drennan Road and Powers Boulevard to provide a more direct connection between I-25 and the airport, Banning-Lewis Ranch developments, and other features on Colorado Springs' south and east sides. Although specific planning is not yet underway, it is reasonably foreseeable that improvements will be made to SH 115 along the western boundary of the post.

As discussed in Section 3.10, the addition of 21,300 personnel and dependents will result in four types of impacts: increasing traffic and altering traffic patterns, temporary construction disturbances, increased rail use related to training at the PCMS, and increased transit ridership. This would result in short-term cumulative adverse impacts on transportation based on incremental interaction with other growth in the region. In the long term, the impact to transportation would be negligible because transportation improvement projects would provide sufficient infrastructure to accommodate the expected 50 percent increase in regional population (PPACG, 2004).

On-post roadways will be designed with future transportation needs in mind, and will have been coordinated with the City of Colorado Springs, PPACG, and CDOT to ensure adequate traffic operations are sustained.

3.13.7 Cumulative Impacts Summary

Some cumulative adverse effects could occur to fish, wildlife, and plants; air quality; transportation; and land-use resources. The preceding discussion of cumulative impacts is summarized in Table 3-24 below.

TABLE 3-24
Summary of Cumulative Effects
Fort Carson Transformation EIS, Fort Carson, Colorado

Resource	Past Actions	Present Actions	Proposed Action	Future Actions	Cumulative Effect
Air Quality	Operations, training, and construction-introduced emissions beginning 60 years ago that have affected air quality.	Maintain NAAQS; allowable emissions under CO maintenance area have increased for the region.	Emissions increase during construction, operations, and training.	Emissions increase from other regional construction and operations, added primarily by vehicle travel.	Maintenance plan will continue to monitor CO emissions. No violation of NAAQS expected.
Cultural Resources	Army and other development of the Pikes Peak region have destroyed cultural resources.	Some inevitable inadvertent impacts to cultural resources on Fort Carson. Impacts to resources not on federal property from capital improvement projects that do not have federal involvement.	Same as Present Actions.	Same as Present Actions.	Some inevitable inadvertent impacts to cultural resources on Fort Carson. Impacts to resources not on federal property from capital improvement projects that do not have federal involvement.
Water Resources	Increased impervious surfaces, development, and disturbance in floodplains, activities that introduce impurities to water resources.	Construct and maintain appropriate stormwater detention facilities, avoid or minimize development in floodplains, and capture or remediate contaminants introduced to surface or groundwater.	Increase impervious surfaces, construct appropriate stormwater detention facilities, and implement BMPs to minimize sedimentation loads; potential increase in activities that introduce contaminants to surface and groundwater; increase in “trans-basin” water, thus increasing flows due to foreign water.	Continued capital improvements and operational programs at the post to meet demands of Fort Carson operations.	Maintain acceptable water quality standards; no net increase in 100-year floodplain.
Biological Resources	Loss of native plant communities, fragmentation of wildlife habitat, and disturbance and displacement of species when Fort Carson was constructed and expanded.	Loss of native plant communities, fragmentation of wildlife habitat, and disturbance and displacement of species from construction, training, and operations.	Loss of native plant communities; fragmentation of wildlife habitat; increased disturbance and displacement of species.	Continued loss of native plant communities; fragmentation of wildlife habitat; increased disturbance and displacement of species.	Cumulative loss of native plant communities and permanent disturbance and displacement of species.
Transportation	Fort Carson established 60 years ago; introduced new travelers to regional transportation network.	Construction of new roads and improvements to existing roads on and near the post.	Construct new roadways on post that maintain level of service standards of local and state governments.	Fluctuations in level of service as increased usage tax existing system until improvements are implemented.	Development of extensive urban and rural transportation network that at times fails to meet level of service standards.

3.14 Mitigation Summary

Most potential adverse impacts identified in this EIS either would be negligible or could be avoided through adherence to BMPs and existing Army regulations during the construction and conduct of training exercises. Some unavoidable adverse impacts, however, could result from implementation of the Proposed Action. Impacts and mitigation measures are presented in Table 3-25 below.

TABLE 3-25
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Procedure/Mitigation
Land Use, Plans, and Policies		
Encroachment of Cantonment-type facilities along Wilderness Road may reduce availability of the downrange area for training activities.	Further encroachment on the downrange area from additional development around Wilderness Road.	Continue to coordinate among DPW Master Planning Division, G-3, and DPTM-Range Division staff in siting of new facilities.
Some residential land uses surrounding the installation are incompatible with noise generated by military training activities (also see Noise).	Continued residential land-use incompatibility (also see Noise).	Continue to follow AR 200-1 and *Installation Environmental Noise Management Plan* to monitor noise and discourage incompatible new development around Fort Carson (see Noise).
Increased training could degrade training lands and affect the long-term availability of training lands for military use.	Similar types of training impacts as with No Action, but magnitude could be greater because of increased frequency of training actions.	Continue to implement land management and environmental programs to balance training requirements and the need to maintain quality training lands for sustained military use.
Air Quality		
Air emissions associated with personnel or traffic at Fort Carson would continue unchanged.	Increased vehicular emissions on post and off post associated with additional personnel traveling around the installation and in the surrounding region. Air quality modeling results indicate emissions would be below NAAQS thresholds and would conform to the SIP for the Colorado Springs CO Maintenance Area.	Continue working with the City of Colorado Springs Mountain Metropolitan Transit and the PPACG to encourage transit ridership and carpooling to reduce vehicle travel miles.
Emissions associated with the Annual Prescribed Burn Program would not increase over existing conditions.	Emissions associated with the Annual Prescribed Burn Program would be the same as for the No Action alternative. (Prescribed Burn Program is influenced by environmental conditions than the level of training conducted.)	Continue to follow Annual *Prescribed Burn Plan* to limit adverse effects of prescribed burns.
Dust emissions from off-road training exercises would not increase over existing conditions.	Increased training could result in impacts to air quality from increased fugitive dust from increased off-road vehicle travel.	All training activities are subject to Fort Carson's *Fugitive Dust Control Plan*. Implementation of BMPs, including dust suppression and setting speed limits for training exercises, could minimize impacts.

TABLE 3-25
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Procedure/Mitigation
Air quality impacts from construction or demolition of facilities at Fort Carson would not increase over existing conditions.	Construction and demolition of facilities under the Proposed Action would result in impacts to air quality from exhaust emissions from construction equipment, fugitive dust from construction and demolition activities, and additional vehicle trips by construction workers. Construction impacts will be short term and limited to the duration and area of construction activities.	All construction and demolition activities are subject to Fort Carson's *Fugitive Dust Control Plan.* Site-specific dust control plans are required for all projects greater than 25 acres or disturbed for 6 months or longer (state permit) and an El Paso County permit is required for disturbed land greater than 1 acre. Implementation of BMPs, including dust suppression and establishment of speed limits in construction areas, could minimize short-term construction impacts.
Stationary source emissions from existing facilities would remain within allowable regulatory limits.	Operation of additional external combustion sources has the potential to result in impacts to air quality. Emissions from proposed stationary sources, however, including boilers/hot water heaters, would be less than the PSD major modification applicability thresholds for all criteria pollutants.	Increased emissions associated with stationary source operation will not exceed applicable air quality thresholds, and no further mitigation is necessary. Low NO_x burner systems being installed for all boilers and hot water heaters to reduce emissions
Emissions from activities at Fort Carson conform to the CO emission limits established in the SIP inventory.	Increased emissions associated with facility construction, demolition, mobile emissions, and stationary source operation for the peak year would not exceed the emission limits specified in the SIP inventory and would conform to the SIP for the Colorado Springs CO Maintenance Area.	CO emissions conform to the SIP, and no mitigation is required.
Noise		
No increase in noise levels associated with construction activities.	Temporary increase in noise levels adjacent to construction sites could affect sensitive receptors on Fort Carson. Noise associated with construction would not be expected to extend off Fort Carson.	Modification of construction activities, such as limiting nighttime construction or use of backup alarms, could be implemented to reduce noise around construction areas.
Noise contours for large-caliber weapons noise extend into adjacent noise-sensitive areas including El Rancho, Midway Ranch, and Turkey Canyon Ranch.	No new large-caliber weapons would be used although frequency of use will increase under the Proposed Action. Noise contours do not change; therefore, noise would be the same as under the No Action alternative.	Continue to follow AR 200-1 and *Environmental Noise Management Plan* to evaluate noise that may be produced by ongoing and proposed Army actions/activities, and minimize impacts and annoyance to the greatest extent practicable. Continue to implement Army Compatible Use Buffer Program to maximum extent possible.

TABLE 3-25
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Procedure/Mitigation
Geology and Soil		
No increased ground disturbance from construction projects.	Temporary increase in potential for sedimentation and erosion due to ground disturbance associated with construction and demolition projects.	Implementation of standard BMPs would minimize potential for soil erosion during construction and demolition activities.
Increased training activities such as tank defilades, tank traps, neutral pivot turns, repeated vehicle passes, and bivouacking may cause, direct impacts to soils such as compaction and ruts.	Similar types of training impacts as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Continue to implement land management and environmental programs to balance training requirements and the need to maintain quality training lands for sustained military use. Continue to implement reclamation projects to repair erosion in the downrange area.
Training on wet soils may increase rutting and permanently destroy existing vegetative cover (root systems).	Similar types of training impacts as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Continue to educate troops and implement training guidelines (e.g., no tank turns from a stopped position) to minimize impacts of training activities on soils. Continue to implement erosion control and maneuver damage repair of reclamation projects for areas damaged by training.
Increased wind and water erosion in areas where vegetative cover is compromised.	Similar types of training impacts as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Continue to implement erosion control and maneuver damage repair or reclamation projects for areas damaged by training activities or subject to other forms of vegetation and soil degradation.
Water Resources		
No increased ground disturbance or use of fuels, solvents, or other hazardous materials would occur from construction projects.	Ground disturbance from construction and demolition activities could result in erosion or sediment transport to surface waters. Spills of fuels, solvents, or other hazardous materials used during construction could adversely affect water resources.	Employ standard erosion control BMPs (e.g., silt fences, hay bales) during construction to reduce potential for pollutants, including sediment, to enter surface waters. Develop, implement, and enforce a Stormwater Management Plan designed to reduce the discharge of pollutants from MS4 to the maximum extent possible to protect water.
No change to impervious surface areas. No appreciable increase in stormwater flows.	Increase in impervious surfaces (from buildings and paved areas) could increase stormwater runoff and potential for pollutants to affect surface water quality and floodplains.	Comply with requirements of stormwater discharges from Federal Facility Small Municipal Separate Storm Sewer Systems permit to capture and treat runoff associated with new impervious surfaces.

TABLE 3-25
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Procedure/Mitigation
Increased use of fuels and solvents during training increases chances for accidental spills and pollutants affecting water resources.	Similar potential impacts as the No Action alternative but chances for accidental spills and pollutants affecting water resources could be greater because of increased frequency of training activities.	Existing SPCCP will be updated to indicate any new sources of potential spills.
Increased erosion from increased training activities, including mechanized maneuvers, crossing dry drainages, and training in wet conditions, may cause erosion and result in increased sedimentation of surface waters.	Similar types of training impacts as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Continue to implement environmental and land management programs to minimize the potential for wind and water erosion of soils and indirect impacts to water quality. Continue to develop and implement ITAM projects to repair training land damage and stabilize areas against erosion.
Increased use of groundwater to support increased training activities could affect water supply or stress aquifer.	Similar types of training impacts as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Fort Carson has sufficient water rights to accommodate groundwater use, and no mitigation is required.
Biological Resources		
No impacts to wildlife or vegetation would occur from construction activities.	Construction in the Cantonment and training areas would result in temporary ground disturbance, permanent loss of small areas of native vegetation, and minimal loss of native wildlife habitat.	Areas disturbed during construction would be reclaimed and revegetated with native or other suitable vegetation, as appropriate. Wildlife displacement and most wildlife habitat loss will be temporary and, therefore, no mitigation is necessary.
Mechanized training activities and pedestrian traffic would result in continued damage to vegetation, including loss of cover, injury to shallow roots, and altered plant species composition.	Similar types of training impacts as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Continue to use the Army's land and environmental management programs on Fort Carson to provide for sustainable land management. Continue to coordinate training activities among G-3, DPTM-Range Division, and DECAM staff. Continue to follow environmental plans and regulations, and use ITAM to repair vegetation damage.
Live-fire training activities can result in damage to vegetation from ammunition impacts. Firing of live-fire tracer rounds could result in accidental wildfires.	Similar types of training impacts to biological resources as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Continue to follow existing land and environmental management programs as noted above. Current use of prescribed burning to create buffer areas would provide additional protection from wildfires near live-fire training activities.

TABLE 3-25
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Procedure/Mitigation
Continued impacts to wildlife would occur from training activities.	Similar types of impacts to wildlife as with the No Action alternative but magnitude could be greater because of increased frequency of training activities.	Continue to use of the Army's land and environmental management programs as noted above. Buffer zones around sensitive wildlife locations, such as bird nests, would be accommodated where feasible. Existing species management plans would continue to be implemented.
Cultural Resources		
No impacts associated with construction or demolition projects.	No effect to known National Register-eligible sites expected from construction of facilities under the Proposed Action. Potential for inadvertent impact to cultural materials and/or human remains uncovered in the course of ground-disturbing activities during construction.	Construction areas have been surveyed, and no National Register-eligible properties are present and, therefore, no mitigation is required. Fort Carson's "Inadvertent Discovery of Archaeological Resources or Burials SOP" and "NAGPRA SOP" will be applied and enforced.
Potential for adverse effects to the NRHP-eligible Turkey Creek Rock Art District site because of increased training activity.	Same as the No Action alternative but potential could be greater because of increased frequency of training activities.	Any activities with the potential to adversely affect cultural resources will be evaluated and resolved under the Section 106 effect determination and mitigation processes.
Potential for inadvertent impact to cultural materials and/or human remains uncovered in the course of training activities.	Same as the No Action alternative but potential could be greater because of increased frequency of training activities.	No mitigation required for use of areas inventoried for cultural resources that contain no National Register-eligible historic properties. Areas that contain known National Register-eligible historic properties or that have not yet been surveyed will be used for dismounted training only until the proposed use area has been evaluated to determine that cultural resources can be protected against adverse impacts. If impacts cannot be avoided, further consultation with the Colorado SHPO and/or Native American Tribes, if applicable, regarding mitigation would occur prior to ground-disturbing activities. Fort Carson's "Inadvertent Discovery of Archaeological Resources or Burials SOP" and "NAGPRA SOP" will be applied and enforced.

TABLE 3-25
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Procedure/Mitigation
Socioeconomics		
No change to socioeconomic conditions.	Minor temporary economic benefits to the ROI associated with construction expenditures and employment. Minor long-term economic benefits (increased sales volume, employment, and income in the ROI) associated with population expansion at Fort Carson. Minor increase in demand on schools, housing, and public services/amenities in the ROI.	The economic and social measures within the ROI are adequate to absorb the population increases and construction demand. No mitigation is required.
Transportation		
No impacts to traffic associated with construction projects.	Temporary increase in traffic on the roadways in the Cantonment and surrounding Fort Carson due to construction.	Implementation of standard traffic control procedures during construction and limiting construction vehicle movements during rush hours and within administrative, housing, and school areas would minimize temporary construction impacts.
Minor increase in congestion on installation roadways.	Increased demand at access control points and traffic congestion on installation roadways from higher troop and dependent population.	Implementation of the suggested transportation improvements outlined in the *Fort Carson Comprehensive Transportation Study* would minimize impacts of increased traffic volumes. Opening Gates 6 and 19 would accommodate additional traffic demand.
Continued regional growth would increase traffic volumes on regional roadway systems by at least one-third in the vicinity of Fort Carson.	Further increase of traffic volumes on regional roadway networks resulting from additional troops and dependents relocated to Fort Carson.	Implementation by local agencies of programmed improvements contained in the PPACG Transportation Improvement Plan would accommodate Fort Carson traffic growth.
No change to rail, aviation, or transit systems.	Additional use of the rail line connecting Fort Carson and the PCMS due to increased training at the PCMS. Potential increased transit ridership on buses serving Fort Carson. No change to aviation systems.	Advanced scheduling of rail shipments through the Installation Transportation Officer would minimize the effects of increased use of the rail system. Continued coordination with Mountain Metropolitan Transit to assess Fort Carson's transit needs would accommodate for increased bus ridership.

TABLE 3-25
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Procedure/Mitigation
Utilities		
Potable water system sufficient to support the No Action alternative.	Existing water lines would not support the addition of personnel at Fort Carson.	Planned upgrades of water lines as well as construction of new service and supply lines and water pump would minimize impacts to the potable water supply.
Sanitary sewer is not available for the Training Support Complex, ASP, and training areas along Wilderness Road.	Increased personnel would result in an additional load on sanitary sewage facility, which may exceed the capacity of existing septic tanks, portable toilets, dry vault, and latrine toilets. The increase of personnel will further stress the inadequate sanitary sewer system.	Installation of additional sanitary sewer lines and connection to the Fort Carson Wastewater Treatment Plant will eliminate need for septic tanks, portable toilets, and vault latrine toilets during training activities and minimize impacts resulting from increased training. Modification to wastewater treatment plant to meet new ammonia effluent limitations, if necessary.
Stormwater system is at or near capacity. Flooding occurs in some areas.	Construction of new facilities will generate increased stormwater runoff from additional impervious surfaces. Stormwater conveyance system may be inadequate to handle increased stormwater flows.	Upgrade to stormwater system and implementation of post-construction BMPs would minimize impacts.
Existing natural gas system is inadequate to meet training needs.	Increased personnel and training would result in increased natural gas demand at Fort Carson. System is inadequate to meet demand.	Planned upgrades to electrical and natural gas systems and coordination with Colorado Springs Utilities to provide additional capacity would satisfy increased demand.
Existing electrical system is sufficient.	Increased personnel and training would result in increased electricity demand at Fort Carson.	Installation of an additional electric substation, transformer upgrades, and coordination with Colorado Springs Utilities to provide additional capacity would minimize impacts from increased demand on the energy supply.
Fort Carson will obtain a portion of its electricity from renewable energy resources and is installing a 2-megawatt solar array on the installation.	Commitments to renewable energy will continue under the Proposed Action.	Continue renewable energy commitments and energy efficient projects.
Upgrades to the communications system are needed within the Cantonment and downrange area.	Proposed action would upgrade the existing communications system on Fort Carson, improving communications for personnel and training activities.	Planned upgrades to the communication system included in the Proposed Action would satisfy demand.

TABLE 3-25
Summary of Environmental Impacts and Mitigation Measures
Fort Carson Transformation EIS, Fort Carson, Colorado

Impacts of the No Action Alternative	Impacts of the Proposed Action	Standard Procedure/Mitigation
No changes anticipated to solid waste generation or management.	Solid waste generation will increase with additional personnel and increased training.	Continue to manage generated solid wastes in accordance with the existing *ISWMP* would reduce the impact of increased solid waste generation.
Hazardous and Toxic Substances		
Quantity or frequency of use of or exposure to hazardous materials would not change.	Increased personnel would result in an increased use of hazardous materials associated with routine vehicle and equipment maintenance.	Continue to implement existing management plans.
Increased training would result in an increase in special hazards (munitions and UXO).	Similar types of training impacts as with the No Action alternative, but magnitude could be greater because of increased frequency of training activities.	Continue to implement management plans and SOPs for munitions handling and UXO removal.
No increase in use or exposure to hazardous materials would result from construction.	Construction/demolition and operation of new facilities would result in an increase in the use of petroleum-based products; an increase in the generation of and exposure to lead, asbestos, PCBs, and chlorofluorocarbon wastes; and a potential increased risk within the Cantonment and downrange area to the exposure of naturally occurring radon.	Continue to implement hazardous waste and radon management plans to minimize impacts from increased waste use and production during construction, and to minimize potential for radon exposure in new facilities.
No change in generation of/exposure to radiological materials.	Generation of/exposure to radiological materials would increase as a result of the new medical and dental facilities.	Management of radiological materials (and waste) in accordance with existing plans would minimize adverse impacts from exposure to increased materials.
No disturbance to existing SWMUs would result from construction.	Potential for disturbance of SWMUs during construction activities.	Coordination with the Restoration Program and consultation with plans, site documents, and DECAM staff to address design, avoidance, and project siting would help to avoid or minimize impacts to existing contaminated sites.

3.15 Unavoidable Adverse Impacts

Most potential adverse impacts identified in this EIS either would be negligible or could be avoided through adherence to BMPs and existing Army regulations during the construction and conduct of training exercises. Some unavoidable adverse impacts, however, could result from implementation of the Proposed Action. These are described in this section and detailed in Table ES-1 in the Executive Summary.

- Air quality would be adversely affected by increased emissions of criteria pollutants associated with operation of new facilities (additional external combustion sources, increased use of paint booths, and increased personnel travel). Air quality and visibility would be adversely affected during training exercises because of vehicle exhaust emissions, use of materials that cause smoke, and additional troop movements that cause more fugitive dust emissions. Construction of facilities would increase fugitive dust emissions and equipment emissions during the construction period. The concentration levels of these pollutants, however, when added to background air concentrations, would be below the applicable air quality standards and, therefore, would not significantly affect regional air quality. Visibility would be impacted during conduct of training exercises but impacts would remain local and short term.
- Increased stormwater runoff would increase erosion and sedimentation into surface waters, adversely affecting water quality. Floodplains could be altered by increased stormwater flows.
- Traffic volumes on Fort Carson would increase on most roadways within the cantonment area. Increased traffic volume would result in congestion and delay on some roadways, although congestion is not expected to be significant.
- Traffic volumes in the region are projected to increase with and without the increased population at Fort Carson. Independent of the Proposed Action, roadways in the vicinity of Fort Carson are expected to experience more than 30 percent increase in traffic volume by 2030, and many area roads are projected to become more congested. Under the Proposed Action, local and regional roadways would experience a further increase in traffic volume.
- Noise associated with increased training activities would increase noise levels in communities surrounding Fort Carson, including El Rancho, Midway Ranch, Turkey Canyon Ranch, and Fountain.
- The utility infrastructure at Fort Carson is not adequate to accommodate additional personnel. Potable water, wastewater, natural gas, electric, and stormwater utilities lack adequate capacity. Utility service could be temporarily or permanently interrupted with implementation of the improvements included in the Proposed Action.
- Waste generation, including wastes associated with vehicle maintenance, construction and demolition, and medical and dental procedures, would increase as a result of increased use of hazardous materials under the Proposed Action. Although materials and wastes would be managed to avoid exposure to the environment, there would be an increased risk for accidental spills because of increased handling of materials and generation of wastes.
- Facility construction in the cantonment area would result in approximately 59 acres of new impervious surfaces, and facility construction in the downrange area would result in 9 acres of new impervious surfaces. Vegetated areas would be permanently converted to impervious surface, and stormwater runoff would increase.
- Vegetative areas and terrestrial habitats throughout Fort Carson could be disturbed during training exercises, particularly in maneuver areas. Most disturbed areas would

be repaired. The repairs, which are implemented under the ITAM program, may include projects such as hardened stream crossings and creation of erosion control dams, which also would affect wildlife habitat. Continued management of biological resources under existing plans and regulations would minimize adverse impacts.

- Wildlife would be affected by loss of habitat, increased human and vehicular activity in the training area, increased traffic throughout maneuver areas, and noise. Less mobile and burrowing species (such as amphibians, some reptiles, and small mammals) could be affected during training exercises or from vegetation clearing and other site preparation activities for construction.
- Movement of tracked and wheeled vehicles, digging to support engineering or concealment activities, and use of land for bivouac sites adversely affect soils and make them more prone to wind and water erosion. Although the ITAM program is in place to identify and fund repair of maneuver damage, increased use of the land for training would result in some unavoidable damage to soils.
- Increased training activities have the potential to affect previously unidentified archaeological and paleontological resources. Most current training areas on Fort Carson have been heavily disturbed, however, and the likelihood of discovering intact resources is small. Monitoring during training exercises would further reduce the potential to adversely affect cultural materials, and Fort Carson would continue to implement its "Inadvertent Discovery of Archaeological Resources SOP" to minimize damage to archaeological resources. The potential for adverse impacts to paleontological resources is low because most training exercises will occur in locations where these resources are not known to exist.

3.16 Irreversible or Irretrievable Commitment of Resources

Irreversible or irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources would have on future generations. Irreversible effects primarily result from use or destruction of a specific resource (e.g., energy from hydrocarbons and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored after implementing a Proposed Action (e.g., extinction of threatened or endangered species).

Land and natural resources (flora, fauna, and water) would be used by the Army with short-term goals of sustainable use of the land and with a long-term goal of avoidance of irreversibility. Although affected during construction and training activities, no irreversible or irretrievable loss of natural resources would occur.

Inadvertent loss of archaeological or paleontological resources would be irreversible. Damaged resources cannot be replaced.

The increased training and operations activities would require increases in use of electricity, hydrocarbon fuels, and water. Construction of facilities would require use of construction materials, such as concrete and steel. Although the materials could be recycled, some

permanent loss of energy would be expected in the manufacture and recycling processes, and would be considered an irreversible effect.

3.17 Short-Term Uses of Man's Environment and Maintenance and Enhancement of Long-Term Productivity

The implementation of design features, BMPs, standard construction practices, and other measures described in this EIS and adherence to existing management plans and programs and federal, state, and local regulations that would be incorporated into the Army's Proposed Action is aimed at the sustainability of Fort Carson's military mission. With increased training activity, short-term uses of the environment would become more frequent and intensive. Nevertheless, the Army's need to maintain the long-term productivity of its training lands for continued military use also provide protection to land-based resources such as soils, water, vegetation, and wildlife. Additionally, Army regulations protect sensitive environmental resources, such as cultural resources, wetlands, and floodplains, from avoidable damage.

4.0 List of Preparers

This section provides a list of the individuals responsible for preparing the *Fort Carson Transformation EIS*.

Name of Preparer	Project Role (Organization[a])
	Lead Water Resources and Utilities Author
	Senior Air Conformity Reviewer
	Senior Biological Resources Reviewer
	Air Quality – Conformity (Booz Allen Hamilton)
	Cultural Resources Program Manager (Fort Carson DECAM)
	Task Manager for Water Resources, Geology and Soils, Utilities, and Hazardous and Toxic Substances
	Supporting Transportation Author
	Lead Transportation Author
	Lead Socioeconomics Author
	Air Quality – PSD (URS)
	Senior Biological Resources Reviewer
	Task Manager for Cultural Resources
	Air Quality – Conformity Project Manager (Booz Allen Hamilton)
	Air Quality – PSD Project Manager (URS)
	Air Quality – PSD and Air Emissions Inventory Reviewer
	Task Manager for Air Quality, Noise, Socioeconomics including Environmental Justice, and Transportation
	Air Quality – Conformity (Booz Allen Hamilton)
	Biological Resources Author (Wildlife)
	Cultural Resources Program Senior Archaeologist (Fort Carson DECAM)
	Senior Air PSD Reviewer
	Air Quality – Conformity (Booz Allen Hamilton)
	Senior NEPA Reviewer
	Lead Geology and Soils Author
	Project Manager
	Air Quality – Conformity (Booz Allen Hamilton)
	Lead Noise Author

Name of Preparer	Project Role (Organization[a])
	Fort Carson EIS Manager, Task Manager for Biological Resources and Land Use
	Lead Air Quality Author
	Biological Resources Author

Notes:

5.0 Distribution List

The following list of individuals and entities received a notice that the DEIS was available for comment. Additionally, hardcopies of the DEIS were provided to the libraries and public repositories listed, and a request was made that the DEIS be made available for public review at these locations. Notification of the availability of the FEIS has also been made to these individuals and entities. Copies of the FEIS were provided to the libraries and public repositories with a request to make the FEIS available to the public. To respect individuals' privacy concerns, names and addresses of private individuals who requested copies of the DEIS have not been included in this distribution list.

Members of Congress

U.S. Senate
411 Thatcher Building, Fifth and Main Streets
Pueblo, CO 81003

U.S. Senate
129 West "B" Street
Pueblo, CO 81003

U.S. House of Representatives
134 West "B" Street
Pueblo, CO 81003

Federal Agencies

U. S. Army Environmental Center – TSD
5179 Hoadley Road, Building 4430
Aberdeen Proving Ground, MD 21010

U.S. Army Environmental Center – TSD
5179 Hoadley Road, Building 4430
Aberdeen Proving Ground, MD 21010

U.S. Army Environmental Center, Region 8
Army Regional Environmental Coordinator
721 19th Street, 4th Floor, Room 427
Denver, CO 80202-2500

U.S. Forest Service
Comanche National Grassland
2840 Kachina Drive
Pueblo, CO 81008-1560

U.S. Forest Service
Comanche National Grassland
U.S. Forest Service
1420 East Third Street
La Junta, CO 81050

U.S. Forest Service
Comanche National Grassland
U.S. Forest Service
1420 East Third Street
La Junta, CO 81050

U.S. Forest Service
Comanche National Grassland
1420 East Third Street
La Junta, CO 81050

U.S. Environmental Protection Agency
Region 8
999 18th Street, Suite 300
Denver, CO 80202-2466

U.S. Environmental Protection Agency
Region 8
999 18th Street, Suite 300
Denver, CO 80202-2466

U.S. Department of Agriculture
Natural Resource Conservation District,
La Junta Area Office
Management Specialist
318 Lacey Avenue
La Junta, CO 81050-2039

U.S. Department of Agriculture
Natural Resource Conservation District,
Colorado Springs Area Office
1826 East Platte Avenue, Suite 114
Colorado Springs, CO 80909-5755

U.S. Department of Agriculture
Natural Resources Conservation District
Trinidad Field Services Center
3590 East Main Street
Trinidad, CO 81082

U.S. Army Corps of Engineers
Southern Colorado Regulatory Office
720 North Main Street, Room 300
Pueblo, CO 81003-3047

U.S. Army Corps of Engineers,
Southern Colorado Regulatory Office
720 North Main Street, Room 300
Pueblo, CO 81003-3047

U.S. Army Research Center
U.S. Army Research Laboratory
P.O. Box 12211
Research Triangle Park, NC 27709-2211

U.S. Bureau of Land Management
2850 Youngfield Street
Lakewood, CO 80215

U.S. Bureau of Reclamation,
Eastern Colorado Area Office
11056 West County Road 18 E
Loveland, CO 80537-9711

U.S. Department of Agriculture
Upper Arkansas Regional Weed Management
Cooperative
Sangre de Cristo RC&D
1630 Highway 50 West
Pueblo, CO 81008

U.S. Fish and Wildlife Service
Colorado Ecological Services Field
P.O. Box 25486
Denver Federal Center
Denver, CO 80225-0486

U.S. Fish and Wildlife Service
Management Assistance Office
134 Union Boulevard, 6th Floor
Lakewood, CO 80228-1807

U.S. Fish and Wildlife Service
1350 Sun Valley Lane
Manitou Springs, CO 80829

U.S. Geological Survey
Colorado Water Science Center
201 West Eighth Street
Norwest Bank Building, Suite 200
Pueblo, CO 81003

U.S. Geological Survey Pueblo Subdistrict
201 West Eighth Street
Norwest Bank Building, Suite 200
Pueblo, CO 81003

U.S. Geological Survey
Denver Federal Center
P.O. Box 25046 MS415
Denver, CO 80225

Federally Recognized Native American Tribes

Apache Tribe of Oklahoma
P.O. Box 1220
Anadarko, OK 73005

Cheyenne and Arapaho Tribes of Oklahoma
P.O. Box 38
Concho, OK 73022

Comanche Nation of Oklahoma
HC 32 Box 1720
Lawton, OK 73502

Kiowa Tribe of Oklahoma
P.O. Box 369
Carnegie, OK 73015

Northern Arapaho Tribe
P.O. Box 396
Fort Washakie, WY 82514

Northern Cheyenne Tribe
P.O. Box 128
Lame Deer, MT 59043

Oglala Sioux Tribe of the Pine Ridge Reservation
P.O. Box H
Pine Ridge, SD 57770

Shoshone Tribe (Eastern Band)
15 North Fork Road
P.O. Box 538
Fort Washakie, WY 82514

Southern Ute Indian Tribe
P.O. Box 737
Ignacio, CO 81137

Ute Mountain Ute Tribe
General Delivery
Towaoc, CO 81334

Jicarilla Apache Nation
P.O. Box 507
Dulce, NM 87528

Southern Cheyenne Tribe
620 South Wengle Avenue
Watonga, OK 73772

Southern Arapaho Tribe
P.O. Box 41
Concho, OK 73022

Southern Arapaho
P.O. Box 836
Canton, OK 73724

State Agencies

Colorado Department of Agriculture
State Weed Coordinator
700 Kipling Street, Suite 4000
Lakewood, CO 80215-8000

Colorado Department of Transportation
Environmental Programs
Branch Manager
2000 South Holly Street
Denver, CO 80222

Colorado Department of Public Health and Environment
Compliance Program
Manager
Hazardous Materials and Waste Management Division
HMWMD-CP-B2
4300 Cherry Creek Drive South
Denver, CO 80222-1530

Colorado Department of Public Health and Environment
Supervisor/Modeling
APCD-TS-B1
4300 Cherry Creek Drive South
Denver, CO 80222-1530

Colorado Department of Public Health and Environment
Planning Specialist
APCD-ADM-B1
4300 Cherry Creek Drive South
Denver, CO 80246-1530

Colorado Department of Public Health and Environment
Title V Coordinator
APCD-SS-B1
4300 Cherry Creek Drive South
Denver, CO 80246-1530

Colorado Department of Public Health and Environment
Unit Supervisor,
Construction Permits
APCD-SS-B1
4300 Cherry Creek Drive South
Denver, CO 80246-1530

Colorado Department Public Health and Environment
Unit Supervisor, Permits Division
APCD-SS-B1
4300 Cherry Creek Drive South
Denver, CO 80246-1530

Colorado Division of Wildlife
Conservation Biologist
4255 Sinton Road
Colorado Springs, CO 80907

Colorado Division of Wildlife
Conservation Biologist
600 Reservoir Road
Pueblo, CO 81005

Colorado Division of Wildlife
District Wildlife Manager
P.O. Box 94
Trinidad, CO 81082

Colorado Division of Wildlife
District Wildlife Manager
620 Oak
La Junta, CO 81050

Colorado State Forest Service, La Veta District
District Forester
P.O. Box 81
La Veta, CO 81055-0081

Colorado State Historic Preservation Office
1300 Broadway
Denver, CO 80203-2137

Colorado Department of Transportation
Habitat Biologist
905 Erie Avenue
Pueblo, CO 81001

Local Agencies and Officials

City of Colorado Springs
City Council
P.O. Box 1575
Colorado Springs, CO 80901

City of Pueblo
Board of County Commissioners
215 West 10th Street
Pueblo, CO 81003

El Paso County Commissioners
27 East Vermijo Avenue
Colorado Springs, CO 80903

El Paso County Department of Health and Environment
Air Program
301 South Union Boulevard
Colorado Springs, CO 80910-3123

El Paso County Department of Health and Environment
Air Program
301 South Union Boulevard
Colorado Springs, CO 80910-3123

El Paso County Department of Health and Environment
Air Program
301 South Union Boulevard
Colorado Springs, CO 80910-3123

El Paso County Department of Health and Environment
Environmental Quality Program Manager
301 South Union Boulevard
Colorado Springs, CO 80910-3123

Las Animas County Commissioners
200 East First Street, Room 207
Trinidad, CO 81082-3047

Pikes Peak Area Council of Governments
Transportation Director
15 South Seventh Street
Colorado Springs, CO 80905

Pikes Peak Area Council of Governments
Transportation Planner
15 South Seventh Street
Colorado Springs, CO 80905

Pikes Peak Area Council of Governments
Environmental Planning Program Manager
15 South Seventh Street
Colorado Springs, CO 80905

Pikes Peak Area Council of Governments
15 South Seventh Street
Colorado Springs, CO 80905

Pueblo City Council
1 City Hall Place
Pueblo, CO 81003

Private Organizations

Sierra Club, Sangre de Cristo Group
Chair
P.O. Box 8328
Pueblo, CO 81005

GMH Military Housing
7301 Woodfill Road
Fort Carson, CO 80913

The Nature Conservancy
2424 Spruce Street
Boulder, CO 80302

The Nature Conservancy
121 East Pikes Peak Avenue
Colorado Springs, CO 80903

The Nature Conservancy
Project Director
P.O. Box 805
La Veta, CO 81055

The Nature Conservancy
2424 Spruce Street
Boulder, CO 80302

Pinon Canyon Expansion Opposition
Coalition
P.O. Box 137
Kim, CO 81049

Colorado Springs Independent
235 South Nevada Avenue
Colorado Springs, CO 80903

Libraries

Fountain Library
230 South Main Street
Fountain, CO 80817

Fort Carson Grant Library
1637 Flint Street
Building 1528
Fort Carson, CO 80913

Penrose Pubic Library
20 North Cascade Avenue
Colorado Springs, CO 80903

Pueblo City-County Library
Robert Hoag Rawlings Public Library
100 East Abriendo Avenue
Pueblo, CO 81004-4290

Woodruff Memorial Library
522 Colorado Avenue
La Junta, CO 81050-2308

Rocky Ford City Library
400 South 10th Street
Rocky Ford, CO 81067-1718

Carnegie Public Library
202 North Animas Street
Trinidad, CO 81082-2643

Huerfano County Public Library
323 Main Street
Walsenburg, CO 81089-1842

East Library and Information Center
5550 North Union Boulevard
Colorado Springs, CO 80918

Manitou Springs Public Library
701 Manitou Avenue
Manitou Springs, CO 80829

Security Public Library
715 Aspen Drive
Colorado Springs, CO 80911

Canon City Public Library
516 Macon Avenue
Cañon City, Colorado 81212

Denver Central Library
Government Publications – Federal
10 West Fourteenth Avenue Parkway
Denver, CO 80204

6.0 References

Air Force Center for Environmental Excellence, 2005. *Air Conformity Applicability Model,* Version 4.2.5. Brooks Air Force Base, Texas. April.

Andersen, D.E., O.J. Rongstad, and W.R. Mytton, 1990. "Home-Range Changes in Raptors Exposed to Increased Human Activity Levels in Southeastern Colorado." *Wildlife Society Bulletin* 18:134-142.

APCD, 2001. *Operating Permit No. 95OPEP110 (Title V)*. Issued to the Department of the Army by CDPHE. September 1, 1998 (revised October 24, 2001).

APCD, 2003. *Revised Carbon Monoxide Maintenance Plan for the Colorado Springs Attainment/Maintenance Area*. December.

Army, 2002. *Record of Decision (ROD 021402), Final Programmatic Environmental Impact Statement for Army Transformation*. Signed by Lieutenant General David McKiernan. 11 April.

Army, 2004a. Training Circular 25-1, *Training Land*. March.

Army, 2004b. Training Circular 25-8, *Training Ranges*. April.

Army, 2004c. *The Army Strategy for the Environment: Sustain the Mission, Secure the Future*. Office of the Assistant Secretary of the Army for Installations and Environment, Washington, D.C. October.

Army, 2005. *U.S. Army Profile FY2005.* <http://www.armyg1.armymil/hr/demographics/FY05%20Army%20Profile.pdf>.Accessed May, 2006.

Army, 2006a. Memorandum: Sustainable Design and Development Design Update SPiRiT to LEED Transition. <http://www.hqda.army.mil/acsim/fd/virlibrary/virtualLibary/docs/SPIRIT_to_LEED_Memo_Jan_06.pdf>.January 5.

Benford, D., DPTM Range Division Manager, 2006. Personal Communication with Elizabeth Cutler, CH2M HILL. June 13.

Bureau of Reclamation, 2006. *Alternatives Analysis, Southern Delivery System Environmental Impact Statement Great Plains Region*. Prepared by Eastern Colorado Area Office. March.

CDOT, 2003. *Sustaining Nature and Community in the Pikes Peak Region, A Sourcebook for Analyzing Regional Cumulative Effects*.

CDOT, 2006. Colorado Department of Transportation. *Traffic Volumes Online Tool*. <http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic>. Accessed May, 2006.

CEQ, 1997. *Council of Environmental Quality Environmental Justice Guidance Under the National Environmental Policy Act.* December.

CGS. 1997. Selected Faults/Folds Report. Oil Creek Fault. <http//geosurvey.state.co.us/Default.aspx?tabid=303>. November 6. Accessed June 13, 2006.

CGS, 1999. *Colorado Earthquake Information*. November. <http//geosurvey.state.co.us/Default.aspx?tabid=303>.Accessed June 13, 2006.

City of Colorado Springs, 2005. *City of Colorado Springs Comprehensive Plan. 2020 Land Use Map*. December.

City of Fountain, 2005. *City of Fountain Comprehensive Development Plan*. August.

Cloonan, J., DECAM, 2006. Email Communication with Kira Zender, CH2M HILL. March 2.

Colorado Department of Education, 2006. <http://www.cde.state.co.us/index_stats.htm>. Accessed May 2006.

CNHP, 2006. *Proposal for Rare Plant Survey of Fort Carson Military Reservation*. May 11.

Davis, B., Fort Carson DPW, 2006. Personal Communication with Karin Lilienbecker, CH2M HILL. June 14.

DECAM and DPW, 2005. *Energy Management Plan, Fort Carson, CO.* December.

DECAM, 2001a. *Environmental Assessment (Programmatic) for Military Installation Land Use, 7th Infantry Division, Fort Carson, Colorado*. Prepared by Gene Stout and Associates; URS. March.

DECAM, 2001b. *General Downrange Seeding Specifications for Fort Carson*. As amended from the USACE Guide.

DECAM, 2002a. *Integrated Natural Resources Management Plan for Fort Carson and the Pinon Canyon Maneuver Site 2002-2006.* Prepared by Gene Stout & Associates. November.

DECAM, 2002b. The *Integrated Cultural Resources Management Plan*, *2002-2006* Prepared by Gene Stout and Associates, Fort Carson, Colorado.

DECAM, 2002c. *Biological Assessment and Management Plan for the Mountain Plover on Fort Carson and Pinon Canyon Maneuver Site*. Prepared by Gene Stout and Associates, Fort Carson, Colorado. Loveland, Colorado.

DECAM, 2002d. *Biological Assessment and Management Plan for the Mexican Spotted Owl on Fort Carson.* Prepared by Gene Stout and Associates, Fort Carson, Colorado. Loveland, Colorado.

DECAM, 2003. *Fort Carson Prescribed Burn Plan*. October.

DECAM, 2004a. *Fort Carson Fugitive Dust Control Plan*. June.

DECAM, 2004b. *Spill Prevention, Control, and Countermeasures Plan. Facility-Wide SPCC Plan, Fort Carson, Colorado.* Prepared by Shaw Environmental, Inc. January.

DECAM, 2004c. *Lead Management Plan, Fort Carson, CO*. November.

DECAM, 2004d. *Biological Assessment and Management Plan for the Black-Tailed Prairie Dog on Fort Carson and Pinon Canyon Maneuver Site.* Fort Carson, CO.

DECAM, 2004e. *Integrated Solid Waste Management Plan, Fort Carson, CO*. November.

DECAM, 2004f. *Fort Carson Installation Recycling Plan, Fort Carson, CO*. November.

DECAM, 2004g. *Pollution Prevention Plan Fort Carson, CO*. November.

DECAM, 2004h. *Installation Pest Management Plan, Fort Carson, CO*. November.

DECAM, 2004i. *Asbestos Management Plan, Fort Carson, CO*. November.

DECAM, 2004j. *Polychlorinated Biphenyl (PCB) Management Plan, Fort Carson, CO*. November.

DECAM, 2004k. *Hazardous Waste Management Plan, Fort Carson, CO*. November.

DECAM, 2004l. *Radioactive Materials Management Plan for Fort Carson. CO.*

DECAM, 2004m. *Radon Management Plan, Fort Carson, CO*. November.

DECAM, 2005a. *Record of Environmental Consideration, Interim Stationing of 2nd Brigade 2nd Infantry Division to Fort Carson, CO. June 16.*

DECAM, 2005b. *Environmental Assessment: Construction of Facilities at Fort Carson, Colorado.* June.

DECAM, 2005c. *Fort Carson Restoration Advisory Board Newsletter.* Number 46. May.

DECAM, 2005d. *Fort Carson Utilities Study Expansion Plan through 2010.* Prepared by Black & Veatch. December.

DECAM, 2006a. *Additional Family Housing Units Environmental Assessment, Fort Carson, CO*. Prepared by Gene Stout and Associates. March

DECAM, 2006b. *Master Plan and Expansion of the 10th Special Forces Group (Airborne) Draft Environmental Assessment*. January.

DECAM, 2006c. *Transformation Air Emissions Inventory for Fort Carson*. Prepared by URS. June.

DECAM, 2006d. Environmental Assessment, Installation Information Infrastructure Modernization Program (I3MP) Upgrade, Fort Carson and Pinon Canyon Maneuver Site (PCMS), Colorado. November.

DECAM, 2007. Wildlife Monitoring Studies and Programs at Fort Carson. Prepared by Richard Bunn in response to EPA comments on *Fort Carson Transformation DEIS*. January 3.

Defense BRAC, 2005. *2005 Defense Base Realignment and Closure Commission Report.* Prepared for President George W. Bush. September.

Diersing, V.E., R.B. Shaw, S.D. Warren, and E.W. Novak, 1988. "A User's Guide for Estimating Allowable Use of Tracked Vehicles on Nonwooded Military Training Lands." *Journal of Soil and Water Conservation*, March-April. pp. 191-195.

Directorate of Logistics, 2006. *Ammunition Supply Point (ASP) Standard Operating Procedure*. January.

DPW, 2004. *Butts Army Airfield Real Property Master Plan Digest*. Prepared by the Electronic Planning Information Center. August.

DPW, 2005. *Fort Carson, Colorado Comprehensive Transportation Study*. Prepared by Gannett Fleming, Inc. September.

DPW, 2006a. *Summary of Proposed Construction Projects, 2006 to 2011. 1391 Project Forms.*

DPW, 2006b. Fort Carson Landscape Plan website. http://www.carson.army.mil/Dpw/Dir%20of%20SVCS//L%20Items/landscape.plan_htm April 10>. April 10>. Accessed July 17.

EPA, 1999. *AP42- Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources.*

EPA, 2006a. Air Data, Monitor Values Report – Criteria Air Pollutants. <http://www.epa.gov/air/data/monvals.html. Updated July 6, 2006.

EPA, 2006b. Stormwater Program website. http://cfpub.epa.gov/npdes/home. Accessed July 18, 2006.

Fernandez, C., 1993. "The Choice of Nesting Cliffs by Golden Eagles *Aquila chrysaetos*: The Influence of Accessibility and Disturbance by Humans." *Alauda*. 61:105-110.

FORSCOM, 2006. *Training Strategy.*

Fyfe, R.W. and R.R. Olendorff, 1976. "Minimizing the dangers of nesting studies to raptors and other sensitive species." Canadian Wildlife Service, *Information Canada*. Catalogue No. CW69-1/23. Ottawa.

Gelbard, J.L. and J. Belnap, 2003. "Roads as Conduits for Exotic Plant Invasions in a Semiarid Landscape." *Conservation Biology*, Volume 17, Number 2. April.

Gerlach, T.P. and M.R. Vaughan, 1990. *Pronghorn Response to Military Activity in Southeastern Colorado*. Virg. Polytechnic Inst. and State Univ., Blacksburg, VA. Abstract.

Gese, E.M., O.J. Rongstad, and W.R. Mytton, 1989. "Changes in Coyote Movements Due to Military Activity." *Journal of Wildlife Management*. 53: 334-339.

Goss, B., DECAM Natural Resources Division, 2006b. Personal Communication with Julie Rochlitz (July 17) and Elizabeth Cutler (June 19), CH2M HILL.

Guthrie, V., Fort Carson, DPW, 2005. Personal Communication with Janet Rodriguez, CH2M HILL, Project Manager. October 17.

Kitchen, A.M., E.M. Gese, and E.R. Schauster, 2000. "Changes in Coyote Activity Patterns Due to Reduced Exposure to Human Persecution." *Can. J. Zool*. 78: 853-857

Kulbeth, J., 2006. Personal Communication with Liz Cutler, CH2M HILL. May 25.

Kuzmiak, J., USGS, 2006. Personal Communication with Julie Rochlitz, CH2M HILL. June 26.

Leonard, G.J., 1984. "Assessment of Water Resources at FTC Military Reservation Near Colorado Springs, Colorado." *Water Resources Investigations*. 83-4270. Lakewood, CO.

Linner, S., USFWS, 2006. Personal Communication Sandra White, CH2M HILL. June 20.

Luckenbach, R.A., 1975. "What the ORVs are Doing to the Desert." *Fremontia* s(4):3-11.

Luckenbach, R.A., 1978. *An Analysis of Off-Road Vehicle Use on Desert Avifaunas*. Transactions of the North American Wildlife and Natural Resources Conference. Wildlife Management Institute, Washington, D.C., 43:157-162.

Memphis State University, 1971. *Effects of Noise on Wildlife and Other Animals*. U.S. Government Printing Office. NTID300.5. Washington D.C.

Mountain Metropolitan Transit, 2006. *Mountain Metropolitan Transit System Map*. February.

National Association of Federally Impacted Schools, 2006. < http://www.nafisdc.org>. Accessed May.

Niehaus Inc., R.D., 2005. *Housing Market Analysis for Fort Carson, Colorado.* Santa Barbara, CA.

Office of the Chief of Staff for Installation Management, 2006. *Army Stationing and Installation Plan.* Prepared by VISTA Technology Services, Inc. June.

Partners in Flight, 2000. *Land Bird Conservation Plan: Colorado.* Version 1.0. January.

PPACG, 2004. *2030 Regional Transportation Plan.*

PPACG, 2006a. Regional Travel Demand Model Volume Plots for 2000, 2030 No Action, and 2030 Build scenarios. May and August.

PPACG, 2006b. *2005 Survey of Current Troop Residences by Zip Code*. Prepared by Booz Allen Hamilton. May.

PPACG, 2007. Level of Service Lookup Table and Regional Travel Demand Model Volume-to-Capacity Plots for 2030 No Action and 2030 Build scenarios. February.

Raynolds, R. B., D. Nelson, and F. Olsen. 1999. "Results of the Field Study of the Paleontological Resources of the Fort Carson Military Reservation, Fort Carson, Colorado." *Paleontological Investigations*. Denver, CO.

Rufici, K., DECAM Natural Resources Division, 2006. Personal Communication with Sandra White, CH2M HILL. August 29.

Savoy, R., DPTM – Range Division, 2006. Personal Communication with Sandra White, CH2M HILL. August 29.

Shaw, R.B. and V.E. Diersing, 1989. "Evaluation of the Effects of Military Training on Vegetation in Southeastern Colorado." *Headwaters Hydrology*, American Water Resources Association. June.

Shaw, R.B. and V.E. Diersing, 1990. "Tracked Vehicle Impacts on Vegetation at the Pinon Canyon Maneuver Site, Colorado." *Journal of Environmental Quality*, Volume 19, Number 2. April-June 1990.

Shaw, R.B., S.L. Anderson, K.A. Schulz, V.E. Diersing, 1989. *Plant Communities, Ecological Checklist, and Species List for the U.S. Army Pinon Canyon Maneuver Site, Colorado*. Colorado State University Department of Range Science, Science Series No. 37. August.

Topozone, 2006. Place Name Search, Timber Mountain, Wild Mountain and Booth Mountain Elevations. <www.topozone.com>. Accessed June 12, 2006.

Trame, A., 1997. *Known and Potential Impacts of Physical Disturbance from Maneuver Training on Threatened and Endangered Species*. USACERL Technical Report 97/70. Published by the USACE, Construction Engineering Research Laboratories. April.

Trombulak, S.C. and C.A. Frissell, 2000. "Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities." *Conservation Biology*. 14:18-30.

USACE, 1997. *Results of the NAGPRA Investigation of the Archaeological Collections from Fort Carson and Pinon Canyon Maneuver Site, Colorado.* Collections Inventory Report Series No. 5. Submitted to DECAM.

USACE, 2000. *Floodplain Delineation Study, Fort Carson, Colorado*. Prepared by the USACE, Omaha District. September 29.

USACE, 2002a. *Programmatic Environmental Impact Statement for Army Transformation*. Prepared by Tetra Tech, Inc. February.

USACE, 2002b. *Regional Permit Under Section 404 of the Clean Water Act (33 USC 1344) for Fort Carson and Pinon Canyon Maneuver Site Erosion Control Activities.* Regional Permit Number 2002-00707. Draft. November 25.

USACE, 2004. Unified Facilities Criteria, Low Impact Development (UFC 3-210-10). October 4.

USACE, 2005. *Fountain Creek Watershed Study Task – Order 2 Summary Report, Threatened and Endangered Species*. Prepared by URS Group, Inc. March.

USACE, 2006a. *Fort Carson Transformation EIS Scoping Meeting Summary Report.* Prepared by CH2M HILL. May.

USACE, 2006b. *Environmental Assessment: Construction of FY06 Facilities at Fort Carson, Colorado.* Prepared by CH2M HILL. February.

USAEC, 2005. *Evaluation of Storm Sewer Capacity (Phase 1), Fort Carson Military Reservation.* Draft. Prepared by Booz Allen Hamilton, Inc. December.

USAEC, 2006a. *Installation Environmental Noise Management Plan, Fort Carson, CO.* January.

USAEC, 2006b. *Programmatic Environmental Assessment for Standard Targetry Replacement*. Environmental Planning Support Branch, Training Support Division. January.

USACHPMM, 2006. *Operational Noise Consultation 52-ON-046N-06, Operational Noise Contours for Fort Carson, CO.* April.

U.S. Census Bureau and U.S. Department of Commerce, 1995. *Statistical Brief, Poverty Areas*. June.

U.S. Census Bureau, 2000. *DP-1: Profile of General Demographic Characteristics: 2000, Geographic Area: Fort Carson CDP, Colorado.*

U.S. Census Bureau, 2006a. "Poverty 2003." <http://www.census.gov/hhes/www/proverty03.html>. Accessed June

U.S. Census Bureau, 2006b. "American FactFinder." <http://factfinder.census.gov.> Accessed July.

USDA, 1979. *Prime Colorado Farmland by County*. NRCS. <http://www.co.nrcs.usda.gov/technical/soil/important-farmlands/prime-farm-lands.html>. Accessed May 23, 2006.

USDA, 2001a. *Adding Modern Soil Erosion Prediction and Rangeland Health Assessment to the LCTA Program at Fort Carson and Pinon Canyon.* USDA Agriculture Resource Service (ARS) and NRCS. May.

USDA, 2001b. *Evaluation of Erosion and Sedimentation for TMDL Compliance at Fort Carson and Pinon Canyon*. Final Report and Summary of Activities. USDA ARS. December.

USFWS, 1983. *Northern States Bald Eagle Recovery Plan.*

USFWS, 1991. *Fish and Wildlife Management Recommendations: Pinon Canyon Maneuver Site, Las Animas, Colorado*.

USFWS, 1998. *Draft Environmental Assessment for the Erosion and Sediment Control Program at Fort Carson, Colorado*. October.

USFWS, 2002. *Birds of Conservation Concern.* Division of Migratory Bird Management, Arlington, Virginia.

USFWS, 2005. *U.S. Fish and Wildlife Service Mountain-Prairie Region, Endangered Species, Colorado.* <http://mountain-prairie.fws.gov/endspp/CountyLists/COLORADO.htm>. Accessed 18 May, 2006.

USFWS, 2006. *Draft National Bald Eagle Management Guidelines.* February.

USGS, 2002. *Biological Soil Crusts, Webs of Life in the Desert*. USGS Fact Sheet FS-065-01. July 2001.

USGS, 2005. *Quaternary Fault and Fold database for the United States: Pueblo Sheet, Colorado.* <http://earthquake.usgs.gov/regional/qfaults/co>. Accessed May 17, 2006.

Walker, C., Fountain-Fort Carson School District 8, 2006. Personal Communication with Elizabeth Cutler, CH2M HILL. June 6

Walker, R. (LTC), DPTM-Range Division, 2006. Personal Communication with Doug Landwehr, CH2M HILL, June 8.

Weinstein, M., 1978. *Impact of Off-Road Vehicles on the Avifauna of Afton Canyon, California.* Bureau of Land Management. Department of the Interior. Final Report #CA-060-CT7-2734.

Widmann, B.L., R.M. Kirkham, M.L. Morgan, and W.P. Rogers, 2002. *Colorado Late Cenozoic Fault and Fold Database and Internet Map Server*. Colorado Geological Survey Information Series 60a. <http://geosurvey.state.co.us/pubs/ceno/>. Accessed June 12, 2006.

Wisdom, M.J., et al., 2000. *Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-Scale Trends and Management Implications*. Volume 1—Overview. Gen. Tech. Rep. PNW-GTR-485. Portland, OR. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 3 vol.

Yarmoloy, C., M. Bayer, and V. Geist. 1988. "Behavior Responses and Reproduction of Mule Deer, *Odocoileus herionus*, Does Following Experimental Harassment with an All-Terrain Vehicle." *Canadian Field-Naturalist*. 102:425-429.

7.0 Agencies and Persons Contacted

Name, Title	Affiliation	Resource Area Contribution
Environmental Planner	U.S. Army Environmental Center	Socioeconomics, Training Requirements
Sustainability Planner	Fort Carson	Project Description
Defense Department EIS Reviewer	EPA Region 8	EIS Point of Contact
	Fort Carson	Sustainability
Air Quality Program Coordinator	Fort Carson	Air Quality
Pat Barnes	Fort Carson/Garrison Resource Management (GRM)	Socioeconomics
Program Leader, Cooperative Conservation Team	Fort Carson	Biological Resources
Chief, Range Division	Fort Carson	Project Description, Utilities
	IMA Northwest Regional Office	Air Quality
	Fountain-Fort Carson School District	Socioeconomics
Title V Coordinator	CDPHE	Air Quality (PSD)
Project Manager	Fort Carson	Project Description, Air Quality (PSD)
Wildlife Biologist	Fort Carson	Biological Resources
Installation Restoration Program Coordinator	Fort Carson	Hazardous Materials, Geology and Soils
Transportation Director	Pikes Peak Area Council of Governments	Traffic
Noise Point of Contact	Fort Carson	Noise
Cultural Resources Program Manager	Fort Carson	Cultural Resources
Wetlands Point of Contact	USACE, Albuquerque District	Wetlands
Planner	DPW Master Planning	Proposed Action

Name, Title	Affiliation	Resource Area Contribution
Planning Specialist	CDPHE	Air Quality (Conformity)
RCRA/AST/UST Program Coordinator	Fort Carson	Hazardous Materials
	Fort Carson	Biological Resources
Public Affairs Officer	Fort Carson	Socioeconomics
Utilities Manager	Fort Carson	Utilities
Range Specialist	Fort Carson	Land Use, Biological Resources
SJA	Fort Carson	Multiple, Project Description
	El Paso County Department of Health and Environment	Air Quality
Unit Supervisor, Construction Permits	CDPHE	Air Quality (PSD)
	Fort Carson/G-3	Project Description, Land Use, Biological Resources
	Fort Carson/GRM	Socioeconomics
	USACE, Omaha District	Air Quality (PSD)
	CDPHE	Air Quality (PSD)
Unit Supervisor, Permits Division	EPA Region 8	Air Quality (Conformity)
Range Specialist	Fort Carson	Biological Resources
Mike McCarthy Air Program	El Paso County Department of Health and Environment	Air Quality
	CDPHE	Air Quality (Conformity)
GIS Lead	Fort Carson	Multiple
Environmental Planning, Program Manager	Pikes Peak Area Council of Governments	Air Quality (Conformity)
Chief, Force Integration	Fort Carson/G-3	Project Description
Transportation Planner	Pikes Peak Area Council of Governments	Transportation
Traffic Engineer	Fort Carson	Traffic

Name, Title	Affiliation	Resource Area Contribution
Senior Archaeologist	Fort Carson	Cultural Resources
Fort Carson NEPA Manager	Fort Carson	Multiple, Project Description
BRAC NEPA Support Team Project Manager	USACE, Mobile District	
Transportation Planner	Pikes Peak Area Council of Governments	Socioeconomics, Air Quality (Conformity)
Air Program	El Paso County Department of Health and Environment	Air Quality
Air Quality Support Specialist	Fort Carson	Air Quality
	USACE, Omaha District	Air Quality (PSD)
Range Specialist	Fort Carson	Biological Resources
ITAM Coordinator	Fort Carson/G-3	Multiple, Project Description
Archaeologist	USACE, Mobile District	Cultural Resources
	IMA Northwest Regional Office	Air Quality
Assistant Superintendent, Business	Fountain-Fort Carson School District 8	Socioeconomics
	DPTM-Range Division	Air Quality
	Pikes Peak Area Council of Governments	Traffic
Planner	Fort Carson	Land Use, Project Description, Air Quality (PSD)

8.0 Acronyms and Abbreviations

°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
ACAM	Air Conformity Applicability Model
ACR	Armored Cavalry Regiment
ADA	average daily attendance
ADNL	A-weighted day-night level
ADT	Average Daily Traffic
AFB	Air Force Base
AMF	Army Modular Force
APCD	Air Pollution Control Division
AQCC	Air Quality Control Commission
AR	Army Regulation
Army	U.S. Army
ASG	Area Support Group
ASIP	Army Stationing and Installation Plan
ASP	Ammunition Supply Point
AST	aboveground storage tank
BAAF	Butts Army Airfield
BCT	Brigade Combat Team
BMP	best management practice
BRAC	Base Realignment and Closure
CA	Comprehensive Agreement
CAA	Clean Air Act
CDNL	C-weighted day-night level
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality

CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CFR	Code of Federal Regulations
CGS	Colorado Geological Survey
CNHP	Colorado Natural Heritage Program
CO	carbon monoxide
CWA	Clean Water Act
dB	decibel
DECAM	Directorate of Environmental Compliance and Management
DEIS	Draft Environmental Impact Statement
DNL	day-night average sound level
DoD	Department of Defense
DPTM	Directorate of Plans, Training and Mobilization
DPW	Directorate of Public Works
EA	Environmental Assessment
EIFS	Economic Impact Forecast System
EIS	Environmental Impact Statement
ENMP	Environmental Noise Management Program
EO	Executive Order
EOD	Explosives Ordnance Detachment
EPA	U.S. Environmental Protection Agency
FC	Fort Carson (Regulation)
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FORSCOM	U.S. Army Forces Command
FPPA	Farmland Protection Policy Act of 1981
FR	*Federal Register*
FY	fiscal year
GDPR	Global Defense Posture Realignment
GIS	geographic information system

GOV	government-owned vehicle
gpm	gallons per minute
HAP	hazardous air pollutant(s)
HBCT	Heavy Brigade Combat Team
HCE	hexachloroethane
HQ	Headquarters
I3MP	Installation Information Infrastructure Modernization Program
I-25	Interstate 25
IBCT	Infantry Brigade Combat Team
ICRMP	Integrated Cultural Resources Management Plan
ID	Infantry Division
IGPBS	Integrated Global Presence and Basing Strategy
INRMP	Integrated Natural Resource Management Plan
ISWMP	Integrated Solid Waste Management Plan
ITAM	Integrated Training Area Management
IWTP	industrial wastewater treatment plant
km	kilometers
kW	kilowatts
LAN	local area network
lbs/yr	pounds per year
LCTA	Land Condition Trend Analysis
LEED	Leadership in Energy and Environmental Design
LUPZ	Land Use Planning Zone
Ma	million years ago
mcf	million cubic feet
mg/L	milligrams per liter
mgd	million gallons per day
MHW	megawatt hours
mi	mile
mm	millimeter

MMBTU	million British thermal units
MS4	Municipal Separate Storm Sewer System
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
National Register	National Register of Historic Places
NC	New Construction
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOE	nap of the earth
NOI	Notice of Intent
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NZ	Noise Zone
OD	open detonation
P2	Pollution Prevention (Plan)
PCB	polychlorinated biphenyl
PCMS	Pinon Canyon Maneuver Site
PM	particulate matter
POV	privately-owned vehicle
PPACG	Pikes Peak Area Council of Governments
ppm	parts per million
PSD	prevention of significant deterioration
PTE	potential to emit
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
ROI	Region of Influence
RTLA	Range and Training Lands Assessment (formerly LCTA)

RTV	rational threshold value
SAP	satellite accumulation point
SBCT	Stryker Brigade Combat Team
SDZ	surface danger zone
SEIS	Supplemental Environmental Impact Statement
SFG	Special Forces Group
SH	State Highway
SHPO	State Historic Preservation Office
SIP	State Implementation Plan(s)
SO_2	sulfur dioxide
SOP	standard operating procedure
SO_x	sulfur oxide
SPCCP	Spill Prevention Control and Countermeasures Plan
SPiRiT	Sustainable Project Rating Tool
SUAS	Small Unmanned Aerial System
SWMU	Solid Waste Management Unit
SWPPP	Stormwater Pollution Prevention Plan
TA	Training Area
TC	Training Circular
TIP	Transportation Improvement Plan
TMDL	total maximum daily load
tpy	tons per year
TUAS	Tactical Unmanned Aerial System
UAS	Unmanned Aerial System
UEx	Unit of Employment
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preservative Medicine
USAEC	U.S. Army Environmental Center
USAFA	U.S. Air Force Academy
USDA	U.S. Department of Agriculture

USDI	U.S. Department of Interior
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
UXO	unexploded ordnance
VOC	volatile organic compound

9.0 Index

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APPENDIX A

Relevant Fort Carson Regulations and Management Plans

APPENDIX A

Relevant Fort Carson Regulations and Management Plans

Fort Carson and the Pinon Canyon Maneuver Site (PCMS) operate under a number of management plans specific to the installations that provide guidance on operations, construction and demolition activities, waste management, the environment, and installation resources. Many of the management plans pertinent to the proposed action are required by Fort Carson's Regulation 200-1, Environmental Quality: Environmental Protection and Enhancement. Regulations and management plans pertinent to the proposed action are discussed below.

1.0 Regulations and Policies

Fort Carson Regulation 200-1, Environmental Quality: Environmental Protection and Enhancement (December 1999)

This regulation prescribes policies and procedures, and assigns responsibilities for the conservation, protection, and enhancement of the environment at Fort Carson, the PCMS, and supported facilities. The regulation provides an overview of the Fort Carson Environmental Program and discusses specific management policies relating to water resources, air quality, solid waste management, hazardous and toxic materials, noise pollution, historic preservation, natural resources, energy conservation, and other environmental resources.

Fort Carson Regulation 350-4, Training: Pinon Canyon Maneuver Site (January 2004)

This regulation prescribes procedures and responsibilities used to support training activities at the PCMS. Information includes scheduling, logistics, and environmental management of training rotations at the PCMS.

Fort Carson Regulation 350-9, Training: Integrated Training Area Management (ITAM) (August 2001)

This regulation prescribes responsibilities, management requirements, and general guidance to implement Fort Carson's Integrated Training Area Management (ITAM) program. The ITAM program focuses on aligning training activities with sustainable land management methods.

Fort Carson Regulation 350-10, Training: Maneuver Damage Control (MDC) Program (May 2004)

This regulation assists commanders in evaluating the value of training against the cost and possible environmental effects of maneuver damage by providing information on maneuver damage control. The regulation provides guidance on education and prevention of maneuver damage; reporting, correction, and repair of damage; consideration of inclement weather training issues; and areas of training restrictions.

Fort Carson Regulation 385-63, Firing Ammunition for Training, Target Practice, Administration and Control of Ranges and Training Areas (2006)

This regulation prescribes Fort Carson range operating procedures and safety policies/responsibilities for firing ammunition, lasers, guided missiles and rockets, as well as use of the military training areas of Fort Carson and the PCMS.

Fort Carson Regulation 200-6, Wildlife Management (December 1999)

This regulation governs hunting and fishing on the PCMS. Colorado Division of Wildlife state regulations (and associated permits and fees) also apply to hunting and fishing privileges at the PCMS.

Army Regulation 420-90, Fire and Emergency Services (April 2005)

This regulation prescribes Army policies and responsibilities covering all fire fighting (structural, aircraft, and wildland), emergency dispatching services by civilians or military, fire prevention (technical services), hazardous materials (HAZMAT)/Chemical, Biological, Radiological, Nuclear and High-yield Explosives (CBRNE) response, Weapons of Mass Destruction (WMD), Global War on Terrorism (GWOT), emergency medical services (EMS), rescue services, disaster preparedness, and ancillary services.

Army Regulation 200-3, Land, Forest, and Wildlife Management (March 2000)

This regulation sets forth policy, procedures, and responsibilities for the conservation, management, and restoration of land and the natural resources thereon consistent with the military mission and in consonance with national policies. The scope includes the conservation, management, and utilization of the soils, vegetation, water resources, croplands, rangelands, forests, and fish and wildlife species.

Army Regulation 200-4, Cultural Resources Management (October 1998)

This regulation prescribes Army policies, procedures, and responsibilities for meeting cultural resources compliance and management requirements. The scope of this regulation includes the National Historic Preservation Act (NHPA); American Indian Religious Freedom Act (AIRFA) and Executive Order (EO) 13007; Native American Graves Protection and Repatriation Act (NAGPRA); Archeological Resources Protection Act (ARPA), 36 CFR 79; and other requirements and policies affecting cultural resources management. These policies are designed to ensure that Army installations make informed decisions regarding the cultural resources under their control in compliance with public laws, in support of the military mission, and consistent with sound principles of cultural resource management.

Army Regulation (AR) 200-1, Environmental Quality: Environmental Protection and Enhancement (February 1997)

This regulation covers environmental protection and enhancement. The regulation provides an overview of the Army Environmental Program and discusses specific management policies relating to water resources, air quality, solid waste management, hazardous and toxic materials, noise pollution, historic preservation, natural resources, energy conservation, and other environmental resources.

Army Regulation (AR) 350-19, The Army Sustainable Range Program (August 2005)

This regulation assigns responsibilities and provides policy and guidance for managing and operating U.S. Army ranges and training lands to support their long-term viability and utility to meet the National defense mission; planning, programming, funding, and executing the core programs comprising the Army's Sustainable Range Program, the Range an Training Land Program, and the Integrated Training Are Management Program; integrating program functions to support sustainable ranges; assessing range sustainability; and managing the automated and manual systems that support sustainable ranges.

2.0 Management Plans

2.1 Plans Pertaining to Construction and Demolition

Fort Carson Lead Management Plan (November 2004)

The Lead Management Plan is a guidance document to direct all aspects of the lead management program for Fort Carson and the PCMS. The plan is designed to direct health, safety, and disposal activities associated with demolition, renovation, construction, and sandblasting activities associated with lead-based paint, indoor firing ranges, and other lead contamination. The plan discusses procedures to follow in response to lead contamination as well as procedures for worker protection and identification of lead hazards on the installation.

Fort Carson Asbestos Management Plan (November 2004)

The Asbestos Management Plan sets forth activities and procedures designed to minimize exposure to airborne asbestos fibers, particularly in regards to renovation, demolition, and maintenance activities. The plan focuses on workers and outside contractors who perform building renovation and maintenance, with the objective of protecting these workers as well as the premises and other occupants of the premises. This plan provides procedures to be followed when asbestos fibers are accidentally released. Specific work plans for asbestos abatement must be approved by the appropriate Fort Carson personnel and, in some cases, by regulatory agencies.

Fort Carson Fugitive Dust Control Plan (June 2004)

The Fugitive Dust Control Plan lists recommended measures to control fugitive dust resulting from construction and land development activities and from demolition, dismantling, and renovation activities.

2.2 Plans Pertaining to Operations

Fort Carson Integrated Natural Resources Management Plan (INRMP) (2002)

The Integrated Natural Resources Management Plan is a guide for the management of natural resources at Fort Carson and the PCMS. Objectives of this plan are to manage natural resources on the installation and ensure environmental stewardship of public lands entrusted to the care of the Army, ensure compliance with relevant laws and regulations, and integrate resource management. This plan includes general policies regarding the

conservation and protection of existing resources and the management of land resources in support of the military mission.

The plan provides for an inventory and description of the natural resource base at Fort Carson, including land management units, hunting areas, bivouac and training areas, and physiographic and land management zones. Natural Resource Management Program objectives and implementing management and monitoring programs are discussed for flora, fauna, threatened and endangered species, sensitive habitats, and related resources. An important element within this plan is a program for the monitoring, conservation, and protection of land resources to support the military training mission at Fort Carson and the PCMS on a sustained basis. Included within the Land Management Program are training area conservation programs, such as the Integrated Training Area Management Program, soil and watershed management, rangeland management, prescribed burning/wildfire control programs, and a Landscape Management Program.

Fort Carson Integrated Cultural Resources Management Plan (ICRMP) (2002)

The ICRMP provides guidance and procedures for the identification, evaluation, and protection of cultural resources while causing the least disturbance to the military mission. The plan details preservation and mitigation plans for specific archaeological and historic architectural resources at Fort Carson and the PCMS. The plan also defines ongoing processes for identifying and evaluating cultural resources on the installations and describes specific projects for cultural resources management.

Master Planning Strategy, Smart Growth Principles (May 2005)

The Master Planning Strategy Smart Growth Principles outlines the 10 principles Fort Carson uses to evaluate facility siting layouts and infrastructure development decisions at Fort Carson and acts to assist decision makers in understanding the various positive and negative impact on future facility opportunities.

The 10 Smart Growth principles are: 1) promote military cohesiveness and efficiency in training; 2) minimize development of open spaces; 3) improve walk-ability of installation neighborhoods; 4) site facilities to promote mass transit opportunities; 5) site facilities based on analysis of interrelationships among users of facilities to adjacent facilities; 6) create high-density mixed-use areas; 7) site facilities to leverage existing utility infrastructure and future renewable energy opportunities; 8) low-impact development; 9) encourage stakeholder collaboration in development decisions; and 10) use full life-cycle cost analysis instead of first cost criteria in making development decisions. Guidance on implementation of each principle and associated criteria to guide facility siting each project is described in the plan.

Fort Carson Pollution Prevention (P2) Plan (November 2004)

The Pollution Prevention Plan provides a comprehensive approach to waste and resource management that seeks to reduce the impact that an operation or activity has on the environment by reducing or eliminating the production of wastes, by using energy and raw materials more efficiently, and by promoting sustainable practices. The plan provides recommendations for green procurement, sustainable construction practices, a centralized hazardous materials control center, best management practices for vehicle maintenance, energy conservation, and materials substitutions, among others.

Prescribed Burn Plan (2003)

Fort Carson has prepared this plan to comply with the requirements of the Colorado Air Quality Control Commission Regulation No. 9, "Open Burning, Prescribed Fire and Permitting." Pursuant to that regulation, this document summarizes Fort Carson's use of prescribed fire as a land management tool and its integrated planning process related to fuel management. The plan incorporates requirements of other Army regulations and guidance, including Army Wildland Fire Policy Guidance (August 2002), AR 420-90 (Fire and Emergency Services), and AR 200-3 (Natural Resources - Land, Forest and Wildlife Management).

Fort Carson PCB Management Plan (November 2004)

The primary purpose of the PCB Management Plan is to provide handling and control procedures for polychlorinated biphenyls (PCBs) and a contingency plan for PCB spills. The plan includes the following requirements:

- During inspections, all transformers and light ballast fixtures are assumed to contain PCB waste unless otherwise marked.
- All personnel handling PCB waste will wear the proper personal protective equipment (PPE) and comply with the Fort Carson Health and Safety Plan.
- PCB waste is properly packaged, labeled, weighed, catalogued, and stored within the HWSF under the supervision of DECAM.
- Material safety data sheets (MSDSs) are prepared and laboratory samples are analyzed (if the contents are unknown or mixed) to ensure that safe handling procedures and accurate waste classification are met.
- All containers holding PCB must be in good condition and checked for leaks every 30 days.

Fort Carson Radon Management Plan (November 2004)

The Radon Management Plan documents results of surveys at Fort Carson and the PCMS to determine the extent of radon exposure in buildings on the installations. The plan identifies survey locations with high potential for mitigation, and recommended time frames for retesting and/or mitigation at these sites.

Installation Pest Management Plan (2001)

The Installation Pest Management Plan describes Fort Carson pest management requirements and describes the administrative, safety, and environmental requirements for surveillance and control of pests. The Pest Management Program utilizes Department of Defense-certified pest control personnel to control pests. Principles of Integrated Pest Management practices are stressed in the plan, which consists of judicious use of both chemical and non-chemical control techniques to achieve effective pest control with minimal environmental contamination.

Fort Carson Facility-Wide Spill Prevention, Control, and Countermeasures Plan (January 2004)

The Spill Prevention, Control and Countermeasures Plan provides procedures to follow for employing spill prevention and response measures should a spill occur. The plan is applicable to all areas of the installation that handle oil, hazardous waste, or hazardous substances. The plan includes a discussion of general types of spill prevention procedures, methods, and equipment used at Fort Carson facilities. The plan provides a summary of each location having the potential for a reportable spill including type and size of facility, quantity and material stored, probable spill route, and type of secondary containment provided in accordance with Title 40 of the Code of Federal Regulations, Part 112.7(b). The primary goal of the plan is to prevent spills.

Fort Carson Facility Response Plan (January 2004)

The Facility Response Plan is designed to minimize hazards created by spills involving petroleum, oils, lubricant, or hazardous materials. The plan complements the Fort Carson Spill Prevention Control and Countermeasure Plan. Its purpose is to minimize the potential for spills, to prevent spills from reaching navigable waterways, and to correct causes of spills. The plan designates responsibilities and procedures for a proper response to spill events.

Army Regulation (AR) 200-1, Chapter 13, Underground Storage Tanks (USTs) and Aboveground Storage Tanks (ASTs) (November 2004)

The UST and AST chapter includes information on the storage of hazardous waste, petroleum products and used oil, and practices implemented to minimize the risk of storage and potential spills into the environment. The report outlines the responsibilities of personnel involved with USTs and ASTs, the procedures involved in materials storage, UST and AST operations, maintenance, and record keeping requirements, and troubleshooting of facility repairs.

Ammunition Supply Point Standard Operating Procedure (January 2006)

This manual prescribes basic ammunition management procedures pertinent to ammunition and explosive support.

2.3 Plans Pertaining to Waste Management

Fort Carson Installation Recycling Plan (November 2004)

The Installation Recycling Plan sets forth the components of the Qualified Recycling Program that the installation is required to follow to meet federal, state, and Army regulations pertaining to recycling and environmental management. The plan provides direction on collecting and segregating waste materials intended for recycling and reuse of resources. Recycling efforts are required for construction and demolition activities.

Fort Carson Hazardous Waste Management Plan (November 2004)

The Hazardous Waste Management Plan establishes procedures, policies, and standards; assigns responsibilities; and provides guidance for personnel who generate, handle, manage, transport, and dispose of hazardous waste on Fort Carson. The plan discusses hazardous waste accumulation points, the centralized hazardous waste control center, and

procedures for the management of existing facilities. The objective of the plan is to effectively manage hazardous waste generated from military operations in an environmentally safe manner from the point of generation to reuse or ultimate disposal without impairment to the mission at Fort Carson.

Integrated Solid Waste Management Plan (November 2004)

The Integrated Solid Waste Management Plan describes the waste management program, procedures, and requirements for solid waste generated at Fort Carson. The plan identifies various types of wastes being generated and their current disposition. It also identifies source reduction and pollution prevention programs and projects implemented at Fort Carson. The plan provides guidelines for construction and demolition waste management and requires construction and demolition waste management plans for different types of waste.

2.4 Plans Pertaining to Erosion Management

Reclamation Planning (2002)

Reclamation planning sustains training resources and offsets adverse effects associated with military training on soils by identifying improvements needed to reclaim rested areas and includes planning for the duration of rested and deferred areas. Reclamation planning includes identifying locations and justification for erosion control structures, check dams, and road and trail reclamation; reseeding disturbed areas; cost-benefit analysis; and project evaluations and monitoring data.

3.0 Permits

Fort Carson obtains project-specific permits for various operations and construction. Some operational permits are applicable to general operations at the installation and are described below.

Clean Water Act Section 404 Regional Permit No. 2002-00707 (December 2002)

This regional permit authorizes Fort Carson to conduct erosion control activities on post and at the PCMS that may result in minimal individual and cumulative impacts to wetlands from dredge and fill activities. Typical erosion control measures include erosion control and stock watering impoundments, banksloping of erosion courses, check dams, rock armor, hardened crossings, culverts and bridges, erosion control terraces and water diversions, water turnouts, and other erosion control activities approved by USACE.

Small Municipal Separate Storm Sewer System (MS4) Permit No. COR042000 (June 2003)

In compliance with the provisions of the Clean Water Act, Fort Carson operates under a National Pollutant Discharge Elimination System General Permit for Storm Water Discharges from Federal Facility Small Municipal Separate Storm Sewer Systems in Colorado. This permit authorizes Fort Carson to discharge pollutants (in the form of stormwater runoff) into the waters of the United States in accordance with the conditions and requirements of the permit. The permit, which became effective June 23, 2003, and expires on June 22, 2008, requires Fort Carson to develop a stormwater management system

that addresses six key areas. The six areas include public outreach, public involvement, illicit discharges, construction site storm water control, post-construction (i.e., new development or redevelopment) storm water control, and pollution prevention.

Resource Conservation and Recovery Act (RCRA) Part B Permit No. CO-95-09-29-03 (October 1995)

The installation maintains a RCRA Part B permit issued by the CDPHE, Hazardous Materials and Waste Management Division, for the storage of hazardous waste at Fort Carson. The Permit became effective on October 29, 1995, in accordance with the Colorado Hazardous Waste Act, Sections 25-15-301 through 316, C.R.S. and the regulations thereunder. The Permit will remain effective until October 28, 2006 at which time the renewed Part B permit No. CO-06-09-29-01 will become effective until October 29, 2016, unless revoked and reissued, or terminated under 6 Colorado Code of Regulations (CCR) 1007-3, Sections 100.61 or 100.25. The permit requirements are consistent with the Hazardous Waste Management Plan referenced above.

Title V

In accordance with the provisions of Colorado Air Pollution Prevention and Control Act, Fort Carson operates under a Title V permit issued by the CDPHE, Air Pollution Control Division. The permit number 95OPEP110 was issued for Fort Carson on September 1, 1998, and last revised on October 24, 2001. Until the permit expires or is modified or revoked, Fort Carson is allowed to discharge air pollutants in accordance with the requirements, limitations, and conditions of the permit.

APPENDIX B

Construction Projects at Fort Carson

APPENDIX B
Fort Carson Construction Projects

Project Name	Project Number	Location	Brief Scope Description	Building Area (SF)	Paved Area (SF)	Construction Disturbance (SF)	Demolition (SF)	Construction Start	Construction End
Butts Air Field									
Utilities Upgrade - Butts AAF/ Wilderness	30630	Butts AAF	12-inch potable water supply line from existing water line near Range Control Complex to area near Ammunition Supply Point on Wilderness Road.	0	0	178,600	0	May-08	May-09
Butts Air Field				**0**	**0**	**178,600**	**0**		
Cantonment									
Battle Command Training Center	13852	Cantonment	Open bay area and hardstand area to support tactical vehicles; conference rooms, classrooms, storage area.	107,075	92,696	209,760	0	Mar-08	Sep-09
Physical Fitness Center	58139	Cantonment	Will include gym, swimming pool, exercise and weight rooms, indoor track, climbing wall/indoor ropes course. Will include administrative offices, locker rooms, sauna/steam room, etc.	59,500	111,027	179,053	0	Mar-08	Jul-09
Vehicle Maintenance Facility – 43rd ASG	59631	Cantonment	Main facility: administrative offices, storage, conference room, and vehicle maintenance bays. Two access control buildings will also be constructed. Demolish seven onsite buildings (21,140 SF total).	30,192	247,500	291,577	21,140	Mar-08	Jun-09
Child Development Center Ages 0-5	62832	Cantonment	Capacity for 303 children ages 0 - 5 years. Outdoor playground included (15,150 SF).	24,316	96,798	127,170	0	Mar-07	Sep-08
Air Support Operations Squadron (ASOS) Support Complex	63500	Cantonment	Administrative offices, operations space, vehicle maintenance space. Open-sided shelter for equipment and vehicle storage.	74,000	114,590	198,020	0	Mar-08	Jun-09
Hospital Addition/ Alteration	64120	Cantonment	Renovate existing hospital and construct addition to house more beds and administrative and clinical functions.	41,000	117,106	166,011	0	Mar-08	Mar-11
Troop Medical Clinic	64121	Cantonment	Construct outpatient medical care clinic.	10,000	20,600	32,130	0	Mar-08	Mar-09
Consolidated Family Care/ Troop Medical/ Dental Clinic	64123	Cantonment	Construct medical and dental clinic for troops and families.	129,700	91,946	232,728	0	Mar-08	Sep-09
Training Support Center Upgrade	64755	Cantonment	Warehouse storage addition to existing Training Support Center.	13,800	2,383	16,993	0	3/6/2006 (Originally programmed but not under construction)	Mar-07

APPENDIX B
Fort Carson Construction Projects

Project Name	Project Number	Location	Brief Scope Description	Building Area (SF)	Paved Area (SF)	Construction Disturbance (SF)	Demolition (SF)	Construction Start	Construction End
Child Development Center	65330	Cantonment	Child development center: a) capacity for 244 children ages 0 - 5; b) capacity for 195 children ages 6 - 10. Includes computer lab, activity rooms, kitchen, storage, etc.	42,781	171,124	224,600	0	Mar-07	Mar-08
Child Development Center	65335	Cantonment	Child development center: a) capacity for 244 children ages 0 - 5; b) capacity for 195 children ages 6 - 10. Includes computer lab, activity rooms, kitchen, storage, etc.	42,781	171,124	224,600	0	Mar-08	Mar-09
71st OD Group Headquarters Support Facility	65602	Cantonment	Construct consolidated brigade/ battalion operations facility with vehicle hardstand, for 71st OD Group.	74,070	14,288	36,002	0	Mar-10	Jul-11
Expand Railyard	65616	Cantonment	Expand Fort Carson railyard and upgrade off-post Kelker Junction rail interchange yard. Three new rail loading spurs and new concrete loading docks on Fort Carson. Demolish existing 9,000-SF warehouse. Addition (2,500 SF) to existing Railyard Operations Facility.	2,500	36,300	40,740	9,000	Mar-09	Jun-10
Utilities Upgrade Phase I	66696	Cantonment and other areas	Replace and/or upgrade portions of several existing utility systems (electrical, sanitary sewer, natural gas, potable water) and install new natural gas supply line.	0	0	1,000,000	0	Jun-07	Jun-08
Dining Facility	66706	Cantonment	Dining facility with capacity for 800 - 1,300 personnel. Will include exterior employee smoking structure and dining pavilion.	30,257	138,006	176,676	0	Mar-07	Mar-08
Renovate Larson Dental Clinic	66789	Cantonment	Repair existing Larson Dental Clinic (Building 1227) to comply with facility master plan. Includes repair of existing 15,600 SF of failing building infrastructure.	0	0	0	0	Sep-06	Mar-08
4th BCT Vehicle Maintenance Facility	67115	Cantonment	Standard motor pool (associated with the 4th BCT complex - project 64575)	35,290	247,500	296,930	0	Oct-08	Oct-09
Training Support Center	3676	Cantonment	Two-story training support center for administration, storage, classrooms, and multiple training areas. 100 parking spaces.	100,000	56,650	231,683	0	Apr-10	Aug-11
Fiber Optics Range Cable	58129	Cantonment and other areas	60 miles of fiber optic cable extending from Cantonment to 18 locations.	0	0	1,584,000	0	Mar-08	Mar-09
Cantonment TOTAL				**817,262**	**1,729,638**	**5,268,672**	**30,140**		

APPENDIX B
Fort Carson Construction Projects

Project Name	Project Number	Location	Brief Scope Description	Building Area (SF)	Paved Area (SF)	Construction Disturbance (SF)	Demolition (SF)	Construction Start	Construction End
Downrange									
Construct/Upgrade a Sniper Certification Range	41917	Range	Standard sniper field fire range, control towers, ammunition breakdown building. Re-use operations, storage, latrine, and dining facility.	10,402	115,050	131,725	0	3/1/1999 (Originally programmed but not under construction)	Mar-00
Individual/Crew Served Weapons Course	58162	Range	Pistol training range, and support buildings for operations, instruction, and ammunition breakdown.	500	0	525	0	Mar-08	Mar-09
Construct a Digital Multi-purpose Training Range	59626	Range	Includes Range Operations Control Area (several buildings for teaching, storage, operations, etc.) and downrange targetry systems (outdoor training areas and equipment).	10,402	115,050	131,725	0	Mar-09	Sep-10
Indoor Baffle Range	62812	Range	Indoor range for all-weather weapons training.	23,000	0	24,150	0	Jan-08	Aug-08
Construct a Automated Qualification Training Range	65618	Range	New training range with new control towers, and new buildings for ammunition breakdown, operations/storage, general instruction, and restroom/bleachers.	500	0	525	0	Mar-09	Mar-10
Construct a Digital Multi-purpose Range Complex – 2	65619	Range	Construct new multi-purpose training range and new buildings for operations control, review, storage, general instruction, and latrine/showers.	10,402	115,050	131,725	0	Jun-10	Dec-11
Downrange TOTAL				**55,206**	**345,150**	**420,374**	**0**		

APPENDIX C

Air Quality Supporting Documentation

for

U.S. Army, Fort Carson, Colorado



ATTACHMENT C.1

PSD Applicability Report

PSD APPLICABILITY ANALYSIS

for

Fort Carson, Colorado
Colorado Springs, Colorado

Prepared for
Fort Carson, Colorado

September, 2006

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Appendices

Appendix A Potential to Emit Calculations for Construction Projects - FY2006 Through FY2010

List of Acronyms

AAFES	Army and Air Force Exchange Service
AFCEE	Air Force Center for Environmental Excellence
AMF	Army Modular Force
APCD	Air Pollution Control Division
BACT	Best Available Control Technology
bhp	brake horsepower
BRAC	Base Realignment and Closure
Btu/hr	British thermal unit per hour
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
CO	Carbon monoxide
CY	calendar year
DECAM	Fort Carson Directorate of Environmental Compliance and Management
DoD	Department of Defense
EPA	United States Environmental Protection Agency
Fort Carson	Fort Carson, Colorado
IGPBS	Integrated Global Presence and Basing Strategy
km^2	square kilometers
MD	Management Division
MMBtu/hr	million British thermal units per hour
NESHAP	National Emissions Standard for Hazardous Air Pollutants
NO_x	nitrogen oxides
NSPS	New Source Performance Standards
OAR	Office of Air and Radiation
Pb	Lead
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than 10 micrometers
PSD	prevention of significant deterioration
PTE	Potential to emit
SCF/yr	standard cubic feet per year
SIC	Standard Industrial Classification
SO_x	sulfur oxides
tpy	tons per year
VOC	volatile organic compound

Executive Summary

New major stationary sources of air emissions or major modifications to existing stationary sources are required to obtain Prevention of Significant Deterioration (PSD) preconstruction permits. A source that is subject to PSD permitting must demonstrate through dispersion modeling that no significant deterioration of ambient air quality will occur. Additionally, the applicant must control emissions using the Best Available Control Technology (BACT).

This document demonstrates that the proposed Transformation activities at Fort Carson, Colorado (Fort Carson) will not be subject to the PSD permitting requirements under New Source Review (NSR) regulations based on the following findings:

- Fort Carson is currently classified as a major stationary source because it has the potential to emit (PTE) over 250 tons per year (tpy) of nitrogen oxides (NOx), as shown in Table ES-1.
- Fort Carson's boilers and hot water generators are classified as a major stationary source because they have a combined heat input of over 250 million British thermal units per hour (MMBtu/hr), and they have a PTE over 100 tpy of NOx and carbon monoxide (CO).
- The increase in emissions due to Transformation activities is less than the applicable major modification threshold for all criteria pollutants, as shown in Table ES-2.

Table ES-1. Current PTE at Fort Carson

Pollutant	Post-wide PTE (tpy)	Boilers and Hot Water Generators PTE (tpy)
Nitrogen Oxides (NO_x)	**338.24**	**190.80**
Sulfur Oxides (SO_x)	69.82	38.76
Carbon Monoxide (CO)	223.98	**161.75**
Volatile Organic Compounds (VOCs)	6.84	10.60
Particulate Matter (PM)	61.25	20.04
Particulate matter with an aerodynamic diameter less than 10 micrometers (PM_{10})	58.60	17.81

Table ES-2. PTE Increase from Proposed Stationary Sources at Fort Carson

Potential Point Source Emissions (tpy)	PM_{10} (tpy)	NO_X (tpy)	CO (tpy)	SO_X (tpy)	VOC (tpy)	Lead (Pb) (tpy)
Proposed Stationary Point Sources	6.73	33.71	69.91	0.79	14.92	negligible
Major Modification Threshold	15	40	100	40	40	0.6

1.0 Background

Due to activities associated with Base Realignment and Closure (BRAC), Integrated Global Presence and Basing Strategy (IGPBS), and Army Modular Force (AMF) activities (all referred to as Transformation activities), the number of personnel at Fort Carson and, consequently, the facilities required to support, them will increase. In addition to the Transformation facilities, additional facilities are being constructed to support Fort Carson's current mission. Together, the Transformation and current mission activities will result in an increase in the emissions of criteria air pollutants due to the following activities:

- Installation of new emission sources
  - Boilers equipped with Low nitrogen oxide (NOx) burners
  - Miscellaneous external combustion equipment
  - Emergency generators with power output ratings of between 101 brake horsepower (bhp) and 1,742 bhp
- Increased usage of existing paint booths.

New major stationary sources or major modifications to existing stationary sources are required to obtain Prevention of Significant Deterioration (PSD) preconstruction permits. A source that is subject to PSD permitting must demonstrate through dispersion modeling that no significant deterioration of ambient air quality will occur. Additionally, the applicant must control emissions using the Best Available Control Technology (BACT). This document demonstrates that, the proposed modifications at Fort Carson are not a major modification and, therefore, will not be subject to PSD permitting.

2.0 Location Description

Fort Carson consists of military support facilities and training areas. Fort Carson's extensive training areas include 67 ranges, 56 other training locations, and the Butts Army Air Field. Fort Carson is located in the east-central portion of Colorado at the foot of the Rocky Mountain Front Range. Fort Carson occupies land between the cities of Colorado Springs and Pueblo, a distance of approximately 25 miles. The northwest tip of Fort Carson is located in El Paso County and lies within the Colorado Springs metropolitan area, approximately 8 miles south of downtown Colorado Springs (population 360,890). This area comprises approximately 22.3 square kilometers (km^2) and is known as the Cantonment Area. The Cantonment Area contains military housing, facilities, and the Post Headquarters. The balance of training rangeland occupies approximately 535 km^2 in southern El Paso, Fremont, and Pueblo Counties. Fort Carson's boundaries are adjacent to Colorado Springs to the north, State Highway 115 to the west, private land to the south, and Interstate 25 to the east. Land use adjacent to Fort Carson includes municipal, residential, agricultural, industrial, and other privately held interests. Fort Carson measures from 2 to 15 miles in width east to west and 24 miles in length north to south.

The majority of the air pollutant-emitting sources at Fort Carson are located in the cantonment area, which is located in El Paso County. Other than military training involving fog oil and graphite, there are no significant stationary point sources located in the training range area.

Fort Carson is located in an attainment area for all criteria pollutants. There are no Federal Class I designated areas within 100 kilometers of the facility. Florissant Fossil Beds National Monument is a Federal land area within 100 kilometers of the facility. Florissant Fossil Beds has been designated by the State of Colorado to have the same sulfur dioxide increment as a Federal Class I area (Colorado Department of Public Health and Environment (CDPHE), 1998).

3.0 PSD Program Description

New major stationary sources or major modifications to existing stationary sources are required to obtain PSD preconstruction permits. The PSD permitting process requires the applicant to demonstrate no significant deterioration of ambient air quality in an attainment area. The following are elements and associated information necessary for determining PSD applicability of a new source:

- Define the source by determining all related activities under the same 2-digit Standard Industrial Classification (SIC) code that are controlled by the same owner or operator and located on contiguous or adjacent properties, including all support facilities.
- Define the applicability thresholds for the major stationary source.
- Define the source's potential to emit (PTE) by determining the sum of emissions for each pollutant from each emission unit. This calculation includes fugitive emissions from the 28 source categories listed in Table 3-1 and sources subject to New Source Performance Standards (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAP) as of August 7, 1980.
- Assess local area attainment status by determining whether the area is in an attainment or unclassifiable region for at least one criteria pollutant. PSD applies only in attainment or unclassifiable regions.
- Determine the pollutants that are subject to PSD review. Each attainment and other regulated pollutant emitted in "significant" quantities are also included.
- Compare the source's PTE to the appropriate major source thresholds. The source is a major source if the emissions of any pollutant exceed applicable threshold regardless of the area designation (i.e. attainment, non-attainment, or non-criteria pollutants). If an individual unit is classified as one of the 28 regulated source categories (Table 1) and its emissions exceed 100 tons per year (tpy), then the unit is a major source. If the facility is not classified as one of the 28 regulated source categories and if its emissions exceed 250-tpy, then the facility is a major source.

Table 3-1: PSD Source Categories with 100 tpy Major Source Thresholds (AFCEE 2000).

1. Coal cleaning plants (with thermal dryers)	15. Coke oven batteries
2. Kraft pulp mills	16. Sulfur recovery plants
3. Portland cement plants	17. Carbon black plants (furnace process)
4. Primary zinc smelters	18. Primary lead smelters
5. Iron and steel mills	19. Fuel conversion plants
6. Primary aluminum ore reduction plants	20. Sintering plants
7. Primary copper smelters	21. Secondary metal production plants
8. Municipal incinerators capable of charging more than 250 tons of refuse per day	22. Chemical process plants
9. Hydrofluoric acid plants	23. Fossil-fuel boilers (or combination thereof) totaling more than 250 million British thermal units per hour heat input
10. Sulfuric acid plants	24. Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels
11. Nitric acid plants	25. Taconite ore processing plants
12. Petroleum refineries	26. Glass fiber processing plants
13. Lime plants	27. Charcoal production plants
14. Phosphate rock processing plants	28. Fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input

Major modifications are subject to the PSD review only if:

- The existing source that is modified is a "major" source and the net emissions increase resulting from the modification is "significant", or
- The modification is made at a minor source, and that change by itself qualifies as a new major source.

4.0 Current PSD Status

The first step in determining PSD applicability at Fort Carson is to determine whether the facility is classified as a major stationary source. This determination is based on the facility's potential to emit (PTE), which is defined as follows.

> "Potential to emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable." [40 *Code of Federal Regulations* (CFR) 52.21(b)(4)].

Several source categories at Fort Carson were not included when calculating PTE, based on United States Environmental Protection Agency (EPA) guidance:

- Mobile sources and non-road engines were excluded based on EPA guidance, which states, "Nonroad engines are a category of units/equipment that, under the Clean Air Act Section 302(z), are excluded from the definition of "stationary source," and, hence, are exempt from stationary source permitting requirements." (EPA 2001).
- Sources under the control of the National Guard were excluded based on EPA guidance, which states "when making major source determinations at a military installation, the Agency believes it is appropriate to consider pollutant-emitting activities that are under the control of different military services not to be under common control. Activities under the control of the National Guard may be considered under separate control from activities under the control of military services." (EPA 1996).
- Certain personnel-related activities, including Army and Air Force Exchange Service (AAFES) gas stations (SIC code 55), residential housing (SIC code 95), and schools (SIC code 82) were excluded from PTE calculations based on EPA guidance, which states, "Military installations include numerous activities that are not normally found at other types of sources. These types of activities include residential housing, schools, day care centers, churches, recreational parks, theaters, shopping centers, grocery stores, gas stations, and dry cleaners. These activities are located on military installations for the convenience of military personnel (both active duty and retired), their dependents, and Department of Defense (DoD) civilian employees working on the base, and they often do not represent essential activities related to the primary military activity(ies) of the base. Therefore, the EPA believes these types of activities may appropriately be considered not to be support facilities to the primary military activities of a base. As such, these activities may be treated as separate sources for all purposes for which an industrial grouping distinction is allowed. Such activities should be separately evaluated for common control, SIC code, and support facility linkages to determine if a major source is present." (EPA 1996).
- Fugitive emission sources were excluded based on EPA guidance, which states "if the primary activity of a stationary source falls within a source category that is not listed, then as a general matter, fugitive emissions from the emissions units at the source are

not included in determining whether the source is a major stationary source. However, if the source also contains emission units which do fall within a listed source category (or categories), then you include fugitive emissions from these listed emissions units to determine if the source is a major stationary source." (EPA 2003).

The sources included in the PTE calculation are listed in Appendix A, Table A-1. The current PTE for each source and the assumptions used to calculate it are provided in Appendix A, Table A-2. Additional detail on PTE calculations is provided in the Fort Carson Transformation Air Emission Inventory (DECAM 2006).

Fort Carson is subject to regulation as a major stationary source if its PTE exceeds the following applicability thresholds:

- Boilers and hot water generators: Fort Carson's boilers and hot water generators have a total combined heat input of approximately 617 million British thermal units per hour (MMBtu/hr). Therefore they are regulated as one of the 28 PSD source categories (category 23, fossil-fuel boilers (or combination thereof) totaling more than 250 MMBtu/hr) and are subject to a major source threshold of 100 tpy (40 CFR 52.21(b)(1)(i)(a)). This 100-tpy threshold applies only to the boilers and hot water generators.
- Post-wide: Fort Carson as a whole is subject to a major source threshold of 250 tpy based on its standard industrial classification (SIC) of national defense (SIC code 97) 40 CFR 52.21(b)(1)(i)(b)).

As shown in Table 4-1, Fort Carson is currently classified as a major stationary source because it has the potential to emit over 250 tpy of NOx (PTE of 338 tpy). Additionally, Fort Carson's boilers and hot water generators are classified as a major source (source within a source) because they have the potential to emit over 100 tpy of NOx and carbon monoxide (CO) (PTE of 191 and 162 tpy, respectively). Based on its status as a major source, Fort Carson is subject to PSD permitting if it exceeds the major modification thresholds in Table 4-2 for any criteria pollutant:

Table 4-1 Fort Carson Actual Emissions and Current PTE

Pollutant	Post-wide		Boilers and Hot Water Generators Only	
	CY 2005 Actual Emissions (tpy)	Current PTE (tpy)	CY 2005 Actual Emissions (tpy)	Current PTE (tpy)
Nitrogen Oxides (NO_x)	53.65	**338.24**	35.36	**190.80**
Sulfur Oxides (SO_x)	3.17	69.82	2.24	38.76
Carbon Monoxide (CO)	40.61	223.98	31.17	**161.75**
Volatile Organic Compounds (VOCs)	15.08	6.84	2.04	10.60
Particulate Matter (PM)	5.01	61.25	3.17	20.04
Particulate matter with an aerodynamic diameter less than 10 micrometers (PM_{10})	4.77	58.60	3.03	17.81

Table 4-2. Major Modification Thresholds Applicable to Proposed Sources at Fort Carson

	PM_{10} (tpy)	NO_X (tpy)	CO (tpy)	SO_X (tpy)	VOC (tpy)	Lead (Pb) (tpy)
Major Source Modification Threshold	15	40	100	40	40	0.6

Table 5-2. Potential Emission Increase from Proposed Combustion Sources at Fort Carson

Potential Point Source Emissions (tpy)	PM_{10} (tpy)	NOx (tpy)	CO (tpy)	SOx (tpy)	VOC (tpy)	Lead (tpy)
Proposed Combustion Sources	6.24	33.71	69.91	0.79	4.94	negligible

Table 5-3. Potential Emission Increase from Paint Booths at Fort Carson (DECAM 2006)

Potential Point Source Emissions (tpy)	PM_{10} (tpy)	NOx (tpy)	CO (tpy)	SOx (tpy)	VOC (tpy)	Lead (tpy)	Method of Determining PTE
Bldg 207 Paint Booth	0.002	0.000	0.000	0.000	0.104	negligible	Actual emissions multiplied by a growth factor of 2.00
Bldg 2427 Paint Booth	0.007	0.000	0.000	0.000	0.557	negligible	Actual emissions multiplied by a growth factor of 2.00
Bldg 8000 Paint Booths	0.474	0.000	0.000	0.000	8.790	negligible	Requested permit limits (96EP340-16)
Bldg 9551 Range Paint Booth	0.007	0.000	0.000	0.000	0.521	negligible	CY 2002 actual emissions multiplied by a growth factor of 2.00
Total PTE Increase (tpy)	0.49	0.00	0.00	0.00	9.97	negligible	

Table 5-4. Total PTE Increase at Fort Carson

Potential Point Source Emissions (tpy)	PM_{10} (tpy)	NOx (tpy)	CO (tpy)	SOx (tpy)	VOC (tpy)	Lead (tpy)
Proposed Combustion Sources	6.24	33.71	69.91	0.79	4.94	negligible
Paint Booths	0.49	0.00	0.00	0.00	9.97	negligible
Total PTE Increase	6.73	33.71	69.91	0.79	14.92	negligible
Major Modification Threshold	15	40	100	40	40	0.6

As shown in Table 5-4, the proposed modifications at Fort Carson will not be subject to PSD review because the proposed emission increase will be below the major modification threshold.

6.0 References

Air Force Center for Environmental Excellence, Pro-Act Fact Sheet. 2000. *The Clean Air Act: Prevention of Significant Deterioration (PSD) and New Source Review (NSR) Construction Permits*). August 2000.

Colorado Department of Public Health and Environment (CDPHE). Division or Section of OPCD/Stationary Sources Program. 1995. *Inter-Office Communication, Reissued Nov. 13, 1997 For New APEN Exception/EPA Policy RE: PS-Memo 95-9 Emergency Generators.* September 11, 1995.

CDPHE. 1998. Air Pollution Control Division. *Technical Review Document for Operating Permit 95OPEP110.* June 1998.

DECAM. 2006. *Transformation Air Emission Inventory for Fort Carson Colorado.* September 2006

EPA. 1989. U.S. EPA Memorandum *Request for Clarification of Policy Regarding the "Net Emissions Increase",* from John Calcagni, Director Air Quality Management Division to William B. Hathaway, Director Air, Pesticides, and Toxics Division. September 18, 1989

EPA. 1996. U.S. EPA OAQPS. *Major Source Determinations for Military Installations under the Air Toxics, New Source Review, and Title V Operating Permit Programs of the Clean Air Act.* August 1996.

EPA. 1998. U.S. EPA Office of Air Quality Planning and Standards, OAR (MD-10). *Potential to Emit (PTE) Guidance for Specific Source Categories Memorandum.* April 14, 1998

EPA. 2001. U.S. EPA Region IX. *Letter to the Law Office of Marc Chytilo.* December 14, 2001

EPA. 2003. U.S. EPA Air and Radiation Division (A-18J). *Clarification on Fugitive Emissions Policy letter to Janet McCabe, Indiana Department of Environmental Management.* March 6, 2003

EPA, 2005. *Compilation of Air Pollutant Emission Factors (AP-42),* Fifth Edition, Volume I Supplements A, B, C, D, E, F, Updates 2001, 2002, 2003, 2004 & 2005

5.0 PSD Applicability

Based on its status as a major source, Fort Carson is subject to PSD permitting if the PTE increase from the proposed modification exceeds the major modification thresholds in Table 4-2 for any criteria pollutant. To avoid the complexities of defining the modification, as this modification consists of multiple projects supporting multiple/different and unrelated Army missions, this PSD analysis uses a five-year timeframe and includes any facilities proposed to be constructed that are currently funded. This included new facilities that will support the Transformation activities, as well as facilities that will support Fort Carson's current mission, all of which have approved funding for fiscal years (FYs) 2006 through 2010. Projects proposed beyond FY2010 have not been funded and either may never happen due to funding constraints or may be delayed beyond FY2010.

This project grouping is consistent with EPA guidance, which states, "the Environmental Protection Agency's (EPA's) historic policy has been not to consider accumulated emissions from a series of small (i.e., less than significant) emissions increases if the emissions increase from the proposed modification to the source is, standing alone without regard to any 2 decreases, less than significant." (EPA 1989). Notably, some projects included in recent or in-progress Fort Carson National Environmental Policy Act documents (Environmental Assessment or Environmental Impact Statement) were not included in the PSD analysis as those proposed projects do not now have available funds to support their construction.

Using Fort Carson specifications, all new boilers, hot water generators, and water heaters, were assumed to be equipped with low NO_x burners with a NO_x emission concentration of 30 parts per million (ppm) or lower, and internal combustion sources were assumed to meet Tier II emission standards (40 CFR Part 89.112).

The PTE for the proposed modification is shown in Tables 5-2 and 5-3. Assumptions used to calculate the proposed PTE increase are provided in Appendix A, Table A-3. Emission calculations are provided in detail in the Fort Carson Transformation Air Emission Inventory (DECAM 2006).

Table 5-1. Proposed Combustion Sources at Fort Carson

Description	Size (Total of all)	Annual Hours of Operation
Proposed Exempt Low NO_x (30 ppm) Boilers	94 MMBtu/hr Total	8,760
Proposed Exempt Low NO_x (30 ppm) Miscellaneous External Combustion Units	92 MMBtu/hr Total	8,760
Proposed Exempt Emergency Generators <600hp	225 BHP Total	500
Proposed Exempt Emergency Generators >600hp	2,300 BHP Total	250

Appendix A

Table A-1
PSD Source Analysis

Emission Unit	Stationary?	Point Source?	Common Control?	Include in PSD Analysis?
Boilers and Hot Water Generators				
Bldg 1860 Hot Water Generators (2 @ 47 MMBtu/hr each)	Y	Y	Y	YES
Bldg 1860 Hot Water Generators (31.25 MMBtu/hr)	Y	Y	Y	YES
Bldg 6290 Boilers (2 @ 40 MMBtu/hr each)	Y	Y	Y	YES
Bldg 7504 Hot Water Generators (2 @ 26 MMBtu/hr each)	Y	Y	Y	YES
Bldg 8000 Boilers (3 @ 13.213 MMBtu/hr total)	Y	Y	Y	YES
Bldg 8300 Boiler (12.553 MMBtu/hr)	Y	Y	Y	YES
Bldg 9609 Boilers (3 @ 7.333 MMBtu/hr each)	Y	Y	Y	YES
Existing Categorically Exempt Boilers Standard Configuration	Y	Y	Y	YES
Existing Categorically Exempt Low NOx Boilers	Y	Y	Y	YES
Proposed Exempt Low NOx Boilers	Y	Y	Y	YES
Other External Combustion Sources				
Existing Exempt Miscellaneous External Combustion Units	Y	Y	Y	YES
Proposed Exempt Miscellaneous External Combustion Units	Y	Y	Y	YES
External Combustion Units in Residential Housing	Y	Y	N	NO
Internal Combustion Units				
Bldg 1550 Generator	Y	Y	Y	YES
Bldg 3909 Generator	Y	Y	Y	YES
Bldg 7501 Hospital Generators (2 @ 1310 hp each)	Y	Y	Y	YES
Bldg 8000 Dynamometers	Y	Y	Y	YES
Butts Air Field Engine Test Stand	Y	Y	Y	YES
Categorically Exempt Diesel Emergency Generators <600hp	Y	Y	Y	YES
Categorically Exempt Diesel Emergency Generators >600hp	Y	Y	Y	YES
Categorically Exempt Natural Gas/Propane Emergency Generators	Y	Y	Y	YES
Auxiliary Ground Power Units	N	Y	Y	NO
Coating Activities				
Bldg 207 Paint Booth	Y	Y	Y	YES
Bldg 2427 Paint Booth	Y	Y	Y	YES
Bldg 8000 Paint Booths	Y	Y	Y	YES
Bldg 9551 Range Paint Booth	Y	Y	Y	YES
Bldg 9635 (Butts Air Field Paint Booth)	Y	Y	Y	YES
MOGAS Stations				
Bldg 900 Service Station	Y	Y	N	NO
Bldg 1515 Service Station	Y	Y	N	NO
Bldg 3600 Service Station	Y	Y	N	NO
Categorically Exempt Storage Tanks and Associated Operations				
Diesel (No. 2 Oil) Storage Tanks	Y	Y	Y	YES
Glycol Storage Tanks	Y	Y	Y	YES
JP-8 Storage Tanks	Y	Y	Y	YES
MOGAS Storage Tanks	Y	Y	Y	YES
Military Training				
Munition Firing	N	N	Y	NO
Smoke Munitions	N	N	Y	NO
Open Burning/Open Detonation	N	N	Y	NO
Fog Oil and Graphite	Y	Y	Y	YES

Table A-1
PSD Source Analysis

Emission Unit	Stationary?	Point Source?	Common Control?	Include in PSD Analysis?
Chemical Usage				
Basewide Chemical Usage	N	N	Y	NO
Pesticide Use	N	N	Y	NO
Road Paint Striping	N	N	Y	NO
Solvent Use	Y	N	Y	NO
X-Ray	Y	N	Y	NO
Landfill-Related Emissions				
Municipal Landfill	Y	N	Y	NO
Miscellaneous Particulate Emissions				
Abrasive Blasting	Y	Y	Y	YES
Bldg 1864 Cooling Towers	Y	N	Y	NO
Bldg 7501 Cooling Towers	Y	N	Y	NO
Rock Crusher	Y	N	Y	NO
LB&B Yard	Y	N	Y	NO
Rocky Mountain Asphalt Yard	Y	N	Y	NO
Troop Construction Yard	Y	N	Y	NO
Tank Trails	Y	N	Y	NO
Fire Training				
Fire Training Facility	Y	Y	Y	YES
Prescribed Burning				
Prescribed Burning	Y	N	Y	NO
Miscellaneous APEN/Permit Exempt Sources				
Industrial Wastewater Treatment Plant	Y	N	Y	NO
Sewage Treatment Plant	Y	N	Y	NO
Soil Vapor Extraction Systems	Y	Y	Y	YES

Table A-2 Current Potential to Emit Summary

Emission Unit	PM (tpy)	PM_{10} (tpy)	NO_X (tpy)	CO (tpy)	SO_X (tpy)	VOC (tpy)	HAPs (tpy)	Method of Determining PTE
Boilers and Hot Water Generators								
Bldg 1860 Hot Water Generators (2 @ 47 MMBtu/hr each)	4.76	3.30	23.00	12.83	20.70	0.85	0.32	Permit limits (12EP291-1)
Bldg 1860 Hot Water Generators (31.25 MMBtu/hr)	2.13	1.47	6.85	5.45	9.41	0.36	0.14	Permit limits (03EP1084)
Bldg 6290 Boilers (2 @ 40 MMBtu/hr each)	0.57	0.57	7.50	6.30	0.05	0.41	0.14	Permit limits (11EP682)
Bldg 7504 Hot Water Generators (2 @ 26 MMBtu/hr each)	0.77	0.68	9.50	6.80	7.15	0.45	0.15	Permit limits (82EP044)
Bldg 8000 Boilers (3 @ 13.213 MMBtu/hr total)	0.44	0.44	5.79	4.86	0.03	0.32	0.11	Permit limits (02EP0952)
Bldg 8300 Boiler (12.553 MMBtu/hr)	0.06	0.06	0.75	0.63	0.005	0.04	0.014	Requested permit limits (86EP051 / 2003 APEN)
Bldg 9609 Boilers (3 @ 7.333 MMBtu/hr each)	0.91	0.90	11.95	9.95	0.60	0.65	0.22	Requested permit limits (02EPO0953 / 2005 APEN)
Existing Categorically Exempt Boilers Standard Configuration	9.24	9.24	121.61	102.15	0.73	6.69	2.30	8760 hours of operation
Existing Categorically Exempt Low NOx Boilers	1.16	1.16	3.85	12.78	0.09	0.84	0.29	8760 hours of operation
Source Category Total	**20.04**	**17.81**	**190.80**	**161.75**	**38.76**	**10.60**	**3.68**	
Other External Combustion Sources								
Categorically Exempt Miscellaneous External Combustion Units	3.43	3.43	45.09	37.88	0.27	2.48	0.85	8760 hours of operation
Internal Combustion Units								
Bldg 1550 Generator	0.27	0.16	9.30	2.13	1.57	0.25	0.004	Permit limits (03EP0338)
Bldg 3909 Generator	0.28	0.16	9.72	2.23	1.64	0.26	0.004	Permit limits (03EP0337)
Bldg 7501 Hospital Generators (3 @ 1676 hp each)	0.73	0.59	35.50	8.14	0.60	0.95	0.01	Permit limits (05EP0230)
Bldg 8000 Dynamometers	1.10	1.10	15.50	3.34	1.03	1.26	0.79	Permit limits (96EP340-9)
Butts Air Field Engine Test Stand	0.36	0.36	0.53	1.93	0.52	0.16	0.06	Permit limits and Permit Application (02EP0104)
Categorically Exempt Diesel Emergency Generators <600hp	1.71	1.71	24.06	5.19	1.59	1.95	0.02	Max. hours of operation allowed by Colorado Reg. 3 AQCC
Categorically Exempt Diesel Emergency Generators >600hp	0.12	0.07	4.13	0.95	0.07	0.11	0.002	Max. hours of operation allowed by Colorado Reg. 3 AQCC
Categorically Exempt Natural Gas/Propane Emergency Generators	0.042	0.042	3.50	0.43	0.0006	0.13	0.09	Max. hours of operation allowed by Colorado Reg. 3 AQCC
Source Category Total	**4.61**	**4.19**	**102.24**	**24.32**	**7.01**	**5.07**	**0.98**	
Coating Activities								
Bldg 207 Paint Booth	0.004	0.004	0	0	0	0.21	0.07	Actual emissions multiplied by a growth factor of 2.00
Bldg 2427 Paint Booth	0.013	0.013	0	0	0	1.11	0.53	Actual emissions multiplied by a growth factor of 2.00
Bldg 8000 Paint Booths	0.56	0.56	0	0	0	10.44	0.19	Permit limits (96EP340-16)
Bldg 9551 Range Paint Booth	0.0145	0.0145	0	0	0	1.04	0.028	CY 2002 actual emissions multiplied by a growth factor of 2.00
Bldg 9635 (Butts Air Field Paint Booth)	0.341	0.341	0	0	0	0.44	0.13	Permit limits (02EP0955)
Source Category Total	**0.94**	**0.94**	**0.00**	**0.00**	**0.00**	**13.24**	**0.96**	
Categorically Exempt Storage Tanks and Associated Operations								
Diesel (No. 2 Oil) Storage Tanks	0	0	0	0	0	0.13	0.02	24 turnovers per year
Glycol Storage Tanks	0	0	0	0	0	0.00001	0.00001	24 turnovers per year
JP-8 Storage Tanks	0	0	0	0	0	0.1	0.004	24 turnovers per year
MOGAS Storage Tanks	0	0	0	0	0	6.31	0.17	Actual emissions multiplied by a growth factor of 2.00
Source Category Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**6.52**	**0.20**	

Table A-2 Current Potential to Emit Summary

Emission Unit	PM (tpy)	PM_{10} (tpy)	NO_X (tpy)	CO (tpy)	SO_X (tpy)	VOC (tpy)	HAPs (tpy)	Method of Determining PTE
Military Training								
Fog Oil and Graphite	31.82	31.82	0.00	0.00	0.00	31.82	0.00	Permit Limits (96EP340-14)
Miscellaneous Particulate Emissions								
Abrasive Blasting	0.07	0.07	0	0	0	0	0	Permit limits (95OPEP110).
Fire Training								
Fire Training Facility	0.02	0.02	0.11	0.03	0.00	0.05	0.0014	APEN limit of 4000 gal/CDPHE concurrence
Miscellaneous APEN/Permit Exempt Sources								
Soil Vapor Extraction Systems	0	0	0	0	0	0	0	SVE systems have been removed
Installation-wide Subtotal *(Boilers and Hot Water Generators Only)*	20.04	17.81	190.80	161.75	38.76	10.60	3.68	
Installation-wide Total	**60.93**	**58.28**	**338.24**	**223.98**	**46.04**	**69.79**	**6.66**	

Table A-3 Potential to Emit Increase from Proposed Construction Projects

Potential to Emit Calculations for Construction Projects - FY2006 Through FY2010

Project Number	Building	Heated Square Footage[1]	Total Boiler Heat Input (Btu/hr)[1]	Heat Input Other Sources (Btu/hr)[1]	Potential to Emit (tons per year)					
					NOx[2,3]	VOC	CO	SOx	PM	PM_{10}
31469	O'Connell Barracks	80,000	4,080,000	6,400,000	1.62	0.25	3.78	0.027	0.34	0.34
31469	O'Connell Company Ops.	45,000	675,000	1,215,000	0.29	0.04	0.68	0.005	0.06	0.06
59626	Digital Multi-purpose Training Range	10,402	0	0	0	0	0	0	0	0
62812	Indoor Baffle Range FY08	23,000	1,150,000	230,000	0.21	0.033	0.50	0.004	0.045	0.045
65362	EAB Barracks	217,000	10,850,000	15,190,000	4.03	0.62	9.39	0.067	0.85	0.85
65473 / 65474 / 65475	BCT-H Complex - Brigade-Battalion HQ's	141,000	6,345,000	2,115,000	1.31	0.20	3.05	0.022	0.28	0.28
65473 / 65474 / 65475	BCT-H Complex - Company Operations Facilities	355,064	5,325,960	9,586,728	2.31	0.35	5.38	0.038	0.49	0.49
65473 / 65474 / 65475	BCT-H Complex - Tactical Equipment Maintenance Facilities	237,932	14,275,920	1,189,660	2.39	0.37	5.58	0.040	0.50	0.50
65473 / 65474 / 65475	BCT-H Complex - Barracks	525,942	26,823,042	42,075,360	10.65	1.63	24.85	0.178	2.25	2.25
65473 / 65474 / 65475	BCT-H Complex - Org. Storage	64,900	3,245,000	908,600	0.64	0.10	1.50	0.011	0.14	0.14
65473 / 65474 / 65475	BCT-H Complex - Dining Facility	26,500	2,252,500	530,000	0.43	0.066	1.00	0.007	0.091	0.091
65478 / 65479	Div HQ Complex - Command & Control (C2) Facility	135,380	6,092,100	2,030,700	1.26	0.19	2.93	0.021	0.27	0.27
65478 / 65479	Div HQ - Battalion HQ's	12,852	578,340	192,780	0.12	0.018	0.28	0.002	0.025	0.025
65478 / 65479	Div HQ - Company Operations Facilities	67,200	1,008,000	1,814,400	0.44	0.067	1.02	0.007	0.092	0.092
65478 / 65479	Div HQ - Tactical Equipment Maintenance Facilities	37,200	2,232,000	186,000	0.37	0.057	0.87	0.006	0.079	0.079
65478 / 65479	Div HQ - Barracks	89,304	4,554,504	7,144,320	1.81	0.28	4.22	0.030	0.38	0.38
65478 / 65479	Div HQ - Org. Storage	18,230	911,500	255,220	0.18	0.028	0.42	0.003	0.038	0.038
65616	Railyard Expansion	2,500	112,500	37,500	0.02	0.004	0.05	0.000	0.005	0.005
63728	10 SFG Battalion Headquarters	14,470	651,150	217,050	0.134	0.021	0.31	0.002	0.028	0.028
63728	10 SFG Warehouse	17,630	352,600	88,150	0.07	0.010	0.16	0.001	0.014	0.014
63728	10 SFG Hazmat	6,750	337,500	101,250	0.068	0.010	0.16	0.001	0.014	0.014
63728	10 SFG Vehicle Maintenance	31,990	1,919,400	159,950	0.32	0.049	0.75	0.005	0.068	0.068
63728	10 SFG Company Operations	20,200	303,000	545,400	0.13	0.020	0.31	0.002	0.028	0.028
63728	10 SFG Oil Storage	480	9,600	2,400	1.86E-03	2.83E-04	4.33E-03	3.09E-05	3.92E-04	3.92E-04
Total for Boilers/Other External Combustion Units		**2,180,926**	**94,084,616**	**92,215,468**	**28.80**	**4.40**	**67.20**	**0.48**	**6.08**	**6.08**
65473	Division Battalion Headquarters	One (1) 75 kW Diesel Emergency Generator[4]			0.28	0.063	0.21	0.052	0.012	0.012
65473 / 65474 / 65475	Remote Switching Unit	One (1) 150 kW Diesel Emergency Generator[5]			0.55	0.13	0.29	0.10	0.02	0.02
65478	Division Headquarters (C2)	One (1) 1300 kW Diesel Emergency Generator[6]			2.31	0.14	1.25	0.09	0.07	0.07
65478	BCT-H Headquarters	One (1) 1000 kW Diesel Emergency Generator[6]			1.77	0.22	0.96	0.07	0.06	0.06
		Total for Emergency Generators			**4.91**	**0.54**	**2.71**	**0.31**	**0.16**	**0.16**
		Total for All Sources Listed Above			**33.71**	**4.94**	**69.91**	**0.79**	**6.24**	**6.24**
		PSD Significance Thresholds			**40**	**40**	**100**	**40**	**25**	**15**

Table A-3 Potential to Emit Increase from Proposed Construction Projects

1. Due to the lack of specific project information, such as boiler and water heater sizes, criteria pollutant potential emissions were calculated assuming an operating schedule of 24 hours per day, 365 days per year and that all of the units are commercial-size natural gas units. Heat loading factors (Btu/hr/sf) provided by the Omaha District Corps of Engineers were used to estimate the necessary heat input of boilers and other external combustion sources (i.e. domestic hot water heaters):

8,760	**hours/year**

2. The burners on all units will be low NOx with a manufacturer specified 30 ppm NOx value. Using the correction of ppm/850, the NOx emission factor appropriate to use for the proposed units is 0.035 lb NOx/MMBtu or 36 lb NOx/10^6 scf.

3. Emission factors for the criteria pollutants except for NOx are from Section 1.4 of AP-42. Emission factors used are as follows:

36	**lb/10^6 scf**	**NOx**
5.5	**lb/10^6 scf**	**VOC**
84	**lb/10^6 scf**	**CO**
0.6	**lb/10^6 scf**	**SOx**
7.6	**lb/10^6 scf**	**PM**
7.6	**lb/10^6 scf**	**PM_{10}**

A natural gas heating value had to be assumed to convert the known energy (Btu) value into a 10^6 scf value:

1,020	**Btu/scf**

4. Criteria pollutant potential emissions were calculated assuming the generators are uncontrolled and operate a maximum of 500 hours per year. The emission factors for NOx, CO, and PM/PM_{10} are based on US EPA's Tier 2 emission standards for generators with a rated power of 75 to 130 kW. 5.0 g/hp-hr for NOx (non-methane hydrocarbon + NOx standard), 3.75 g/hp-hr for CO, and 0.225 g/hp-hr for PM (40 CFR Part 89.112). All PM was assumed to be PM_{10}. The remaining criteria pollutant emission factors are from Section 3.4 of AP-42. A sulfur content of 0.05 weight percent was assumed. Emission factors used are as follows:

1.10E-02	**lb/hp-hr**	**NOx**
2.51E-03	**lb/hp-hr**	**VOC**
8.27E-03	**lb/hp-hr**	**CO**
2.05E-03	**lb/hp-hr**	**SOx**
4.96E-04	**lb/hp-hr**	**PM**
4.96E-04	**lb/hp-hr**	**PM_{10}**

5. Criteria pollutant potential emissions were calculated assuming the generators are uncontrolled and operate a maximum of 500 hours per year. The emission factors for NOx, CO, and PM/PM_{10} are based on US EPA's Tier 2 emission standards for generators with a rated power of 130 to 225 kW. 5.0 g/hp-hr for NOx (non-methane hydrocarbon + NOx standard), 2.6 g/hp-hr for CO, and 0.15 g/hp-hr for PM (40 CFR Part 89.112). All PM was assumed to be PM_{10}. The remaining criteria pollutant emission factors are from Section 3.4 of AP-42. A sulfur content of 0.05 weight percent was assumed. Emission factors used are as follows:

1.10E-02	**lb/hp-hr**	**NOx**
2.51E-03	**lb/hp-hr**	**VOC**
5.73E-03	**lb/hp-hr**	**CO**
2.05E-03	**lb/hp-hr**	**SOx**
3.31E-04	**lb/hp-hr**	**PM**
3.31E-04	**lb/hp-hr**	**PM_{10}**

6. Criteria pollutant potential emissions were calculated assuming the generators are uncontrolled and operate a maximum of 250 hours per year. The emission factors for NOx, CO, and PM/PM_{10} are based on US EPA's Tier 2 emission standards: 4.8 g/hp-hr for NOx (non-methane hydrocarbon + NOx standard), 2.6 g/hp-hr for CO, and 0.15 g/hp-hr for PM (40 CFR Part 89.112). All PM was assumed to be PM_{10}. The remaining criteria pollutant emission factors are from Section 3.4 of AP-42. A sulfur content of 0.05 weight percent was assumed. Emission factors used are as follows:

1.06E-02	**lb/hp-hr**	**NOx**
6.42E-04	**lb/hp-hr**	**VOC**
5.73E-03	**lb/hp-hr**	**CO**
4.05E-04	**lb/hp-hr**	**SOx**
3.31E-04	**lb/hp-hr**	**PM**
3.31E-04	**lb/hp-hr**	**PM_{10}**

STATE OF COLORADO

[redacted]

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-2000
TDD Line (303) 691-7700
Located in Glendale, Colorado

http://www.cdphe.state.co.us

Laboratory Services Division
8100 Lowry Blvd.
Denver, Colorado 80230-6928
(303) 692-3090

Colorado Department
of Public Health
and Environment

REC'D SEP 21 2006

September 19, 2006

[redacted]

Ref: Fort Carson FID 0410014 95OPEP110

Subject: Review of PSD Letter

Dear [redacted]

The Division received and reviewed your September 7, 2006 letter concerning the Prevention of Significant Deterioration (PSD) analysis for Fort Carson's upcoming construction aetivities. As explained in that letter, a number of stationary sources will be construeted at Fort Carson due to an increase in personnel. Most of this eonstruetion involves APEN Exempt boilers and water heaters, along with a few emergency generators.

Your PSD analysis covers a five-year timeframe and includes any Army facilities proposed to be constructed during this time. The Division agrees that including all the planned construction for the next five years into one project for PSD review is adequately conservative. The Division understands this aggregation was done for simplicity and does not set any precedent for future PSD reviews.

Your letter provides emission calculations that show no pollutant Potential to Emit (PTE) increases from the proposed project exceed the PSD significance levels. The Division has reviewed your emission calculations and finds them acceptable, provided the list of equipment is accurate and the emission factors are appropriate for the equipment that ultimately gets installed. Your use of the various annual hourly limits to determine PTE was correct (8760 hr/yr for the boilers, 500 hr/yr for the smaller emergency generators, and 250 hr/yr for the larger emergency generators). Thus, the Division does not find the proposed construction should be subject to PSD review. Obviously, should Fort Carson's plans change and emission increases associated with this project exceed the significance levels, Fort Carson would need to contact the Division and revise the analysis.

One additional comment needs to be made regarding the proposed emergency generators. It is true that the large emergency generators are APEN required and construction permit exempt (as long as they operate less than 250 hr/yr). However, these generators are not considered insignificant activities with regards to the Title V Operating Permit (Regulation No. 3, Part C.II.E). Thus, Fort Carson must include these units in their Operating Permit as a significant activity. An application will be due no later than twelve months after startup (Regulation No. 3, Part C.III.B.2).

The Division is pleased that Fort Carson has decided to install low NO_x burners on all the units. We thank you for committing to this action. Feel free to contact me should you have any questions regarding this letter. I can be reached at (303) 692-3183.

Sincerely,

[redacted]

Operating Permit Unit
Stationary Sources Program
Air Pollution Control Division

[redacted]

U.S. Army, Fort Carson, Colorado



ATTACHMENT C.2

Clean Air Act General Conformity Analysis and Determination

Clean Air Act
General Conformity Analysis and Determination
Fort Carson, Colorado

March 30, 2007

Prepared for:
Fort Carson
The Directorate of Environmental
Compliance and Management

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Executive Summary

Fort Carson, Colorado (Fort Carson) and the U.S. Army are undergoing transformational activities to respond to the emerging challenges of the 21st century. The planned restationing of military personnel and equipment associated with the Base Realignment and Closure (BRAC) Act, and the Integrated Global Presence and Basing Strategy (IGPBS), as well as the restructuring of units known as the Army Modular Force (AMF) initiative, will result in expanded activities at Fort Carson, an Army installation located southwest of Colorado Springs. These initiatives, referred to in this document as Transformation, associated with the proposed Federal action are planned for 2006-2011.

To carry out the associated requirements, there will be construction of new facilities to support additional soldiers and their dependents, demolition of facilities, modification/construction of range and training areas, an increase in the number of training rotations at Fort Carson, and an increase in associated privately-owned vehicle (POV)/government-owned vehicle (GOV) traffic. As a result of these proposed actions an increase of air pollutants is expected to occur that has the potential to impact existing air quality conditions.

This report is an analysis and determination of General Conformity for Fort Carson and examines the expected emissions associated with the transformation activities from mobile and stationary sources located and operated in the Fort Carson Cantonment Area. The results are based on the latest planning assumptions derived from the population, employment, and travel data acquired from multiple sources to determine compliance with the Clean Air Act General Conformity Rule, as well as all relevant requirements and milestones in the Colorado State Implementation Plan (SIP). While currently in attainment for all criteria pollutants, the Colorado Springs area is classified as maintenance for past exceedences of the Carbon Monoxide (CO) eight hour standard. The Cantonment Area of Fort Carson falls within the boundaries of the Colorado Springs Maintenance Area for CO. Since CO is the only pollutant of concern for Fort Carson and the Colorado Springs area, only emissions from CO were considered.

The General Conformity Rule requirements are applicable and a conformity determination is required for a Federal action if the total direct and indirect emissions from all stationary, area and mobile sources caused by the Federal action within the maintenance area exceed the 100 tons per year (tpy) *de minimis* levels; are regionally significant (emissions are 10% or greater of a nonattainment or maintenance area's total emissions inventory of the pollutant); and are otherwise not exempt from the General Conformity Rule, per 40 CFR 93 Subpart B. However, if the action or portion of the action is subject to the Transportation Conformity Rule, that portion of the action is not subject to the General Conformity Rule.

The latest and most accurate emissions estimation techniques were applied to address the increase/realignment of existing military units/tenants (approximately 8,500), and associated emission generating activities. CO emissions were calculated for the proposed transformation activities; they were quantified using AP-42 emission factors (EPA, 1999) and by employing the Air Conformity Applicability Model (ACAM), version 4.2.5 (AFCEE 2005). The calculations quantified the direct and indirect emissions within the Cantonment/maintenance area from the proposed Federal action, occurring from 2006 through 2011, to understand the net effect of the

change in emissions. The analysis indicates that the maximum emissions from the mobile source activities of POVs and GOVs are expected to occur in 2009.

Approximately 18 new construction/modification projects are planned at Fort Carson, subject to available funds, including more than 800 thousand square feet (sf) of new or additional building space. Planned demolition activities are expected to occur in 2008 and 2009, with minimal CO emissions generated from large diesel-burning equipment. Additionally, the Federal action will result in increased emissions due to the proposed construction of heating equipment and emergency generators in support facilities. Finally, emissions are expected from a variety of small miscellaneous activities anticipated to take place as a result of increased personnel and construction of new facilities.

The maximum CO emission increase from all applicable sources is estimated to occur in 2009 with a total 222 tpy (106 tpy from privately-owned vehicles, 41 from government-owned vehicles and 74 tpy for all other sources). These emissions exceed the 100 tpy CO threshold limit. However, it was determined that Fort Carson is able to satisfy the CAA by demonstrating conformity as follows:

- The state Transportation Improvement Plan (TIP) will include sufficient allowance for the maximum increase in emissions at Fort Carson for additional POV travel. The Pikes Peak Area Council of Governments (PPACG) is updating the TIP to include a re-calculation of the transportation budget for CO emissions in accordance with the Colorado SIP. The TIP will be approved prior to the maximum year of expected Fort Carson emissions in 2009. Therefore, the 106 tpy of POV emissions meet the requirements of the criteria for demonstrating conformity (per 40 CFR 93.158(a)(5)(ii)) as those emissions will be accounted for in the TIP.

- All remaining emissions (115.2 tpy) related to GOV emissions facility construction, stationary sources (boilers, other heat input sources, and generators), and miscellaneous area sources, meet the requirement of the criteria at 40 CFR 93.158(a)(5)(i)(A), so that the total emissions would not exceed the emissions' inventory specified in the applicable SIP. The PPACG, Colorado Department of Public Health and Environment (CDPHE), and U.S. Environmental Protection Agency (EPA) Region VIII have agreed that there is sufficient allowance in the SIP inventory for CO to include the Fort Carson transformation emissions.

Based on the concurrence of the PPACG, CDPHE, and the US EPA Region VIII with this analysis, Fort Carson can demonstrate that the planned Federal action complies with the General Conformity Rule requirements and conforms with the Colorado SIP. This conclusion of a positive general conformity determination for the proposed Federal action fulfills the Army's obligation and responsibility under 40 CFR Part 93, Subpart B, Determining Conformity of General Federal Actions to State or Federal Implementation Plan.

1.0 INTRODUCTION

The U.S. Army is undergoing transformational activities to respond to the emerging challenges of the 21st century. The planned restationing of military personnel and equipment associated with the directives of Base Realignment and Closure (BRAC) Act of 1990 as amended (Public Law 101-50) and Integrated Global Presence and Basing Strategy (IGPBS), and restructuring of units known as Army Modular Force (AMF) initiative will result in expanded activities at Fort Carson, Colorado Springs, Colorado (Fort Carson Transformation EIS, 2006). These initiatives, associated with the proposed Federal action are referred to as Transformation in this document.

This document demonstrates that the Transformation activities at Fort Carson not only complies with the General Conformity Rule requirements of the Clean Air Act Amendments of 1990 (CAAA), but also demonstrates that the action conforms with the Colorado's State Implementation Plan (SIP). The conformity analysis and determination is based on the latest planning assumptions derived from personnel and travel data acquired from multiple sources (Appendix A). The report addresses increased numbers of military units, tenants, and emissions generating activities and to assess whether the resulting direct and indirect emissions in the Cantonment Area of Fort Carson conform to the SIP.

Historically, ambient air quality standards have been met in Colorado Springs, except for carbon monoxide (CO). Currently, Colorado Springs is in attainment for all criteria pollutants and the area is classified as maintenance for CO until 2015. Since carbon monoxide is the only pollutant of concern for Fort Carson and the Colorado Springs area, this report provides an analysis and determination of General Conformity, specifically examining the expected CO emissions associated with the transformation activities from mobile and stationary sources located and operated in the Fort Carson maintenance area.

2.0 CLEAN AIR ACT

The Clean Air Act (CAA) of 1970, 42 U.S.C. 7401 *et seq*., amended in 1977 and 1990, is the primary Federal statute governing air pollution. The CAA designates six criteria pollutants as indicators of air quality, for which National Ambient Air Quality Standards (NAAQS) have been promulgated to protect public health and welfare. These pollutants are: particulate matter with a diameter of less than 10 micrometers (PM_{10}); particulate matter with a diameter of less than 2.5 micrometers ($PM_{2.5}$); carbon monoxide (CO); sulfur dioxide (SO_2); nitrogen dioxide (NO_2); lead (Pb); and ozone (O_3).

Federal law requires that states and local air quality districts develop and follow a SIP that describes existing air quality conditions and prescribes measures to be taken to monitor, control, maintain, and enforce compliance with the NAAQS. Areas that do not meet NAAQS are designated as nonattainment for a particular criteria pollutant with this status further defined for the extent to which the standard is exceeded. Areas that had previously been designated as a nonattainment area may be redesignated as an attainment areas once they have achieved the NAAQS. These areas are referred to as maintenance areas and are subject to the requirements of a maintenance plan for a specified number of years.

2.1 General Conformity Rule

The General Conformity Rule is used to determine if actions meet the requirements of the CAA and the applicable SIP. The Federal agency responsible for the action must determine if its actions meet these requirements applicable to the area where the action is located and before the action occurs. A Federal action is defined under this rule as any activity engaged in, supported by, or funded by a department or agency of the Federal government and applies only to Federal actions located in areas designated as nonattainment or maintenance for any criteria pollutant. Conformity to a SIP, as defined in the CAA, means the proposed activity will not:

1) Cause or contribute to a new violation of the NAAQS;
2) Increase frequency or severity of an existing violation; or
3) Delay attainment of any standard, interim emission reduction or milestone.

If the action is shown to be exempt, the analysis is documented in a Record of Non-applicability (RONA) and the action can proceed as planned. The term RONA was established by the Military Services in their implementing guidance for conformity. If the total net emissions increase caused by a Federal action exceeds *de minimis* levels, in this case for CO emissions, then a conformity determination is required. A determination of conformity must be made for all actions in the applicable area except: 1) actions covered by the Transportation Conformity Rule; 2) actions where the total net emissions are below specified *de minimis*[1] levels and are not regionally significant[2]; and 3) certain other actions that are exempt or presumed to conform per 40 CFR 93 Subpart B. Total net emissions include direct and indirect (see Section 2.2.1) emissions from all stationary and area sources, construction sources and mobile sources caused by the Federal action within the applicable area.

No public participation is required for applicability analyses that result in *de minimis* determinations. However, procedural requirements allow for public review of the conformity determination. State and local air agencies are notified and consulted for their expertise and a Federal agency must consider comments from any interested parties in making its conformity determination. The Federal agency must provide a 30-day notice of the proposed action and draft conformity determination to the appropriate EPA Region, State and local air quality agencies, the Metropolitan Planning Organization (MPO), the public, and, if applicable, Federal Land Managers whose lands may be impacted by the action those agencies to allow the opportunity to review the determination and submit comments.

2.1.1 Procedures for Conformity Analysis

Two criteria for emissions must be met for those emissions to be included in the analysis:

1) The emissions must be caused by the Federal action but may occur later in time and/or may be farther removed and discreet from the action itself, yet are still reasonably foreseeable (i.e., emissions from projected future Federal actions that can be quantified at the time of the conformity determination); and

2) The Federal agency must be able to practicably control and maintain control over the emissions.

[1] *de mininis* levels are 100 tons per year for CO in a maintenance area
[2] Regionallly significant means emissions are 10% or greater of a nonattainment or maintenance area's total emissions inventory of the pollutant.

Emission sources that are not under the Army's control are exempt such as travel of dependents on post, commuter traffic not on post, and emissions associated with off-post housing.

The General Conformity analysis conducted for Fort Carson is based on the latest planning assumptions derived from the population, employment, and travel data acquired from the local Pikes Peak Area Council of Governments (PPACG) MPO. The comparison to the de minimis threshold is focused on the year with maximum emissions.

2.1.2 Procedures for Demonstrating Conformity

The latest and most accurate emission estimation techniques must be applied, unless written approval to employ modifications or substitutions is obtained from the EPA regional administrator. These techniques include motor vehicle emission models used to prepare or revise the SIP, and factors for non-motor vehicle sources, databases, and models specified and approved by EPA.

Two types of technical analyses can be used to demonstrate CAA conformity: a dispersion modeling demonstration for primary pollutants (i.e., directly emitted) to show there will be no violations of NAAQS for direct and indirect emissions; or an emissions analysis that demonstrates there will be no net emissions increase and that direct and indirect emissions will not interfere with the timely attainment and maintenance of NAAQS. Dispersion modeling may not be possible for some types of emission sources due to lack of appropriate models. If dispersion modeling is not used for the conformity demonstration, then some options for demonstrating conformity include, but are not limited to, documenting consistency with emission estimates in SIP documents or identification of concurrent or prior emission reductions that will compensate for emission increases associated with the proposed action.

A conformity determination must demonstrate that total direct and indirect emissions are consistent with all relevant requirements and milestones in the applicable SIP, including:

- Reasonable further progress schedules;
- Assumptions specified in the attainment or maintenance demonstration; and
- SIP prohibitions, numerical emission limits, and work practice requirements.

2.2 Existing Air Quality and Colorado SIP Status

Carbon monoxide is the only pollutant of concern for Fort Carson and the Colorado Springs area. The primary source of CO emissions in Colorado Springs is vehicular travel (84% of the total in 2005) (APCD, 2003). There are also some minor contributions from combustion sources; such as, aircraft, power plants, boilers, generators, and open and wood burning. The current emissions inventory estimates for CO emissions in the Colorado Springs maintenance area are 498.39 tons per day in 2005, which should decline to 409.35 tons per day by 2015 (APCD, 2003). Since transportation sources are usually the main source of air pollutants, the State works closely with the local Metropolitan Planning Organizations (MPOs) to develop transportation plans that are consistent with Clean Air Act goals.

Colorado is directed by the Clean Air Act to develop and implement SIPs in Colorado for nonattainment and maintenance areas. Historically, ambient air quality standards have been met in the Colorado Springs area, except for CO. Currently, Colorado Springs is in attainment

for all criteria pollutants and the area is classified as maintenance for past exceedences of the CO eight hour standard, although no exceedances of the CO standard have been measured since 1997. In 1999 Colorado requested a redesignation of the Colorado Springs area to attainment and proposed a maintenance plan to ensure that the CO standards continue to be met in the future. The EPA approved Colorado's request, making the plan effective October 1999. The maintenance plan establishes measures to control emissions to ensure the air quality standard is maintained in areas that have been redesignated as attainment from a previous nonattainment status. Thus far there have been no exceedences of the CO standard for the Colorado Springs area since the nonattainment redesignation to maintenance. It is required that a maintenance plan revision be submitted to EPA eight years after the original redesignation request or maintenance plan (2007) is approved. Since approval of the initial maintenance plan, there have been two subsequent approved revisions (2001 and 2003), which are included in the SIP as follows:

- Updates to motor vehicle emission inventories using the latest EPA-approved tools (MOBILE6.2 model);
- Elimination of the oxygenated gasoline program in El Paso County;
- Elimination of the basic Inspection/Maintenance (I/M) program in El Paso County (beginning January 1, 2007);
- Extension of the maintenance designation year through 2015; and
- Revisions to the mobile source CO emissions inventory from 212 to 531 tons per day for 2015 and beyond.

3.0 DESCRIPTION AND PURPOSE OF THE FEDERAL ACTION

The proposed Federal action consists of implementing the required Department of Defense (DoD) and Army directives stemming from the BRAC, IGPBS, and AMF initiatives planned for Fort Carson between 2006-2011. All of these initiatives are considered as one Federal Action, however only the Federal action occurring in the Cantonment area of Fort Carson north of Titus Boulevard and McGrath Avenue (Figure 1) is considered in this analysis.

Under the direction of these transformation activities, Fort Carson will receive additional troops as a result of BRAC and IGPBS, as well as restructure its forces and implement new training requirements under AMF. To carry out the requirements associated with these initiatives, there will be construction of new facilities to support additional soldiers and their dependents, demolition of facilities, modification/construction of range and training areas, an increase in the number of training rotations at Fort Carson, and an increase vehicular traffic associated with these projects.

4.0 LOCATION OF FORT CARSON

Fort Carson, the Mountain Post, is an Army installation located southwest of Colorado Springs, Colorado, east of the Rocky Mountain Front Range, and occupies portions of El Paso, Pueblo, and Fremont counties. It is located on the south side of the City of Colorado Springs, in El Paso County, between Interstate 25 and Highway 115. The City of Denver lies approximately 65 miles to the north of Fort Carson, and the City of Pueblo is located approximately 10 miles

south of Fort Carson's southern boundary. Fort Carson comprises approximately 138,000 acres, and ranges from 2-15 miles wide and is 24 miles from north to south.

The Cantonment area (i.e., inhabited area where administrative and maintenance activities occur) is located in the northern portion. Much of the activity at Fort Carson has directly related to supporting and training the 3rd Armored Cavalry Regiment; 3rd Brigade Combat Team, 4th Infantry Division and 7th Infantry Division Headquarters; 43rd Area Support Group; and 10th Special Forces Group (Airborne). In addition, the installation provides support to the U.S. Army Reserve, the National Guard, the Reserve Officers Training Corps, the U.S. Air Force Reserve, the U.S. Naval Reserve, and the U.S. Marine Corps Reserve.

5.0 CONFORMITY ANALYSIS

5.1 Emissions Methodology and Results

The CO emissions are calculated using various tools and data. Emissions from mobile, stationary, and area sources are quantified using AP-42 emission factors (EPA, 1999) and by employing the Air Conformity Applicability Model (ACAM), version 4.2.5 (AFCEE 2005). The latest vehicular emission model, MOBILE6.2, is used as an input file to ACAM.

The calculations quantify the direct and indirect emissions from the proposed Federal action, occurring from 2006 through 2011, to understand the net effect of the change in emissions. In this case, personnel data, new construction activities (including demolition), and heating requirements for the new buildings were used in the analysis.

Details regarding the calculations used are discussed in the subsequent sections and in Appendix A.

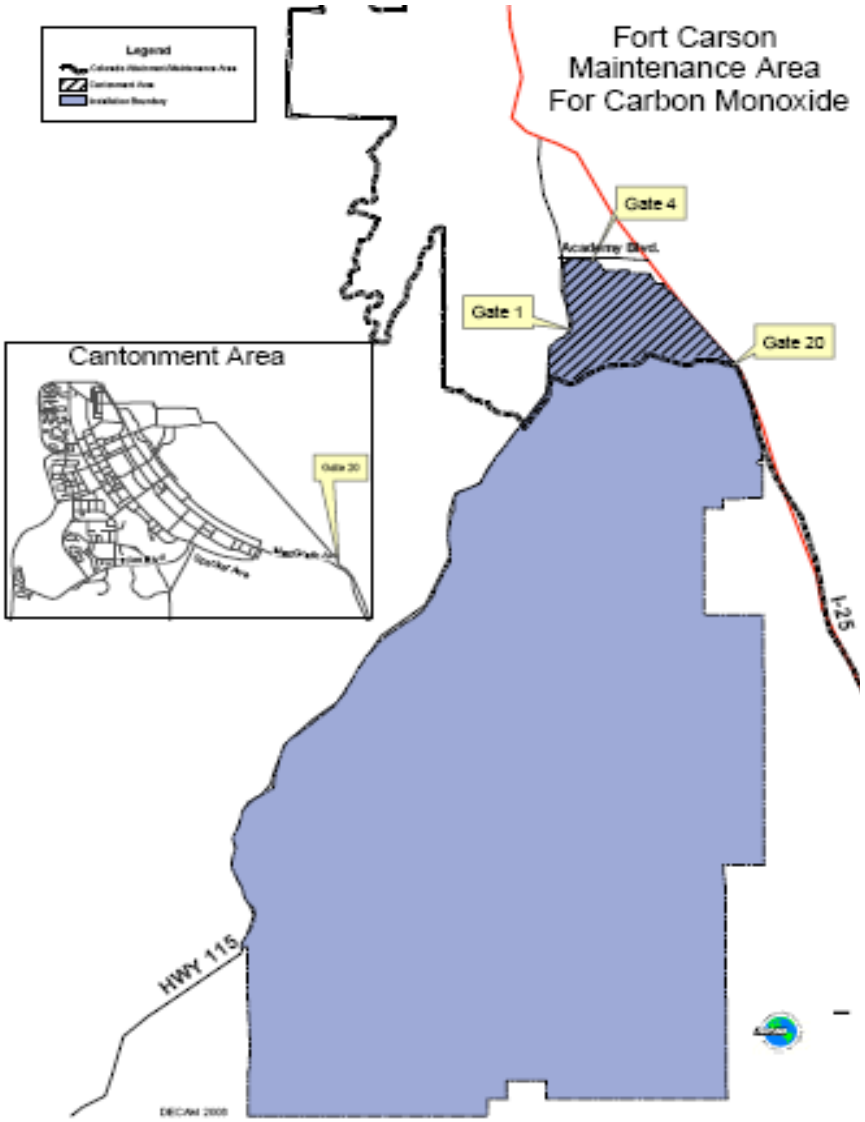


Figure 1. Fort Carson Maintenance Area for Carbon Monoxide

5.1.1 Personnel

The influx of additional units and transformation of existing units will result in a total force structure to include three heavy BCTs (HBCT), one infantry BCT (IBCT), Special Forces battalions, and other support units stationed at Fort Carson. In 2005 there was a total of 17,804 military and civilian personnel. Overall, there will be a net gain of military personnel at Fort Carson of approximately 8,500 between 2006 and 2011. In addition, there will be an increase in Department of Defense Civilian and contractor employees as a result of the increase in active duty units. The greatest net gain of personnel is expected to occur primarily in 2009 as shown in Table 1.

Table 1. Estimated Authorized Active Duty Troop[3] and Civilian Personnel at Fort Carson (2006-2011)

Personnel	2006	2007	2008	2009	2010	2011
Change in Military Personnel[4]	- 363	+ 642	+ 465	+ 7,302	+27	+ 424
Change in Civilian Personnel/ Contractors	- 84	+ 148	+ 107	+ 1,680	+7	+ 98
NET TOTAL PERSONNEL	**17,357**	**18,147**	**18,719**	**27,700**	**27,733**	**28,255**

[3] Authorized Active Duty Troops are the active duty U.S. Army personnel that will be stationed at Fort Carson. This does not include Army Reserve or National Guard troops that may be stationed or train at Fort Carson.

[4] The military numbers only include those military personnel that transfer into the region (installation) from outside the region. It does not include personnel reassignments within the region or at the installation. It represents the net change in personnel at the installation attributable to the action.

Mobile vehicle travel includes emissions from privately-owned vehicles (POVs) commuting to the installation and government-owned vehicles (GOVs) (e.g., sedans, station wagons, buses, and passenger, utility, and heavy-duty trucks) used primarily on Fort Carson within the Cantonment area. The Federal action would result in an overall increase in full-time military personnel. Consequently, the number of vehicle miles traveled and associated emissions are expected to increase.

5.1.2 Methodology/Results

The additional personnel were entered into ACAM for the beginning of the first quarter of each calendar year to calculate emissions from mobile sources. The emission factors for on-road vehicular sources are from MOBILE6.2 (EPA, 2004) and have been adjusted for altitude and oxygenated fuels without the I/M program (MacRae, 2006).

The following inputs were required:

- Number of additional military and non-military personnel. This is the total change in military and civilian personnel from existing personnel in 2006 base year: 10,453 (Table 1).
- New employee POV commuting distance: EPA stated that only commuting travel inside the installation's boundary needs to be considered in the conformity determination (Kimes, 2005). Emissions associated with other household travel are not under Army control; therefore, these indirect emissions are excluded from the conformity analysis calculations. The average one-way commute for traffic on Fort Carson: estimated 2 miles (Redmond, 2005).
- Commutes for civilian employees are assumed to occur 264 work days per year (22 work days per month for 12 months a year).
- Percent of active duty military personnel living on the installation: 35% (Newsome, 2006).
- GOV annual vehicle miles traveled (VMT) per new employee: the ACAM default value of 229 miles per year per employee was used (AFCEE, 2005).

By using these assumptions, the model shows that 2009 is the year of maximum CO emissions from personnel vehicles. Further calculation details are in Appendix A.

Table 2. Summary of Personnel Emissions for CO for Federal Action (Tons/Year) at Fort Carson

Mobile Source Activity	2006	2007	2008	2009	2010	2011
POV VMT	-5.31	3.94	10.12	106.30	103.21	105.43
GOV VMT	-2.12	1.57	4.02	41.39	39.74	40.16
TOTAL	**-7.43**	**5.51**	**14.14**	**147.69**	**142.95**	**145.59**

5.2 Facility Construction

The primary source of CO emissions from new construction, demolition, and additions/modifications to existing support facilities and utilities in the Fort Carson Cantonment area would result from vehicles used to implement construction activities. All construction would occur within previously developed or disturbed areas. Approximately 18 projects are planned in the Fort Carson Cantonment area, subject to available funds, including more than 800 thousand square feet (sf) of new or additional building space (Table 3). These projects typically consist of:

- New and renovated administrative facilities, such as headquarters and training centers;
- New and renovated soldier and dependent support facilities, such as dining and community and recreation centers;

- New and renovated equipment support facilities, such as warehouses and maintenance facilities; and
- Upgrade or expansion of applicable roads and utilities.

Table 3. Proposed Construction Projects at Fort Carson Cantonment Area[5]

Fiscal Year (FY)[6] Expected to be Funded	Building Number/Project Name	Size (sf)
FY06	64755 Warehouse Storage Addition to Training Support Center	13,800
FY06	66696 Utilities Upgrade Phase I	0
FY06 SUBTOTAL		**13,800**
FY07	65330 Child Development Center	42,781
FY07	62832 Child Development Center	24,316
FY07 SUBTOTAL		**67,097**
FY08	13852 Battle Command Training Center	107,075
FY08	58129 Fiber Optics Cable	0
FY08	58139 Fitness Center	59,500
FY08	59631 43 ASG Vehicle Maintenance Facility	30,192
FY08	63500 13 ASOS Support Complex	74,000
FY08	64120 Hospital Addition	41,000
FY08	64121 Troop Medical Clinic	10,000
FY08	64123 Family Clinic	129,700
FY08	65335 Child Development Center	42,781
FY08	66706 Dining Facility	30,257
FY08	67115 4th BCT Vehicle Maintenance	35,290
FY08 SUBTOTAL		**559,795**
FY09	65616 Rail Yard Alteration	2,500
FY09 SUBTOTAL		**2,500**
FY10	3676 RSTC Training Support Center	100,000
FY10	65602 71st OD Group Support Facility	74,070
FY10 SUBTOTAL		**174,070**
TOTAL		**817,262**

5.2.1 Methodology/Results

ACAM calculates emissions from worker commutes by multiplying construction worker trips times an emission factor (AFCEE, 2005). The number of worker trips were estimated from the square footage of buildings to be constructed (see Appendix A for details). The following are input parameters that ACAM required for the new buildings:

Description: The total square feet of commercial and office facilities to be constructed.

[5] The primary size (sf) of the construction projects are associated with all planned actions to support the realignment of troops.

[6] The Federal Fiscal Year is October 1st through September 30th.

Use in Model: Emission indicator (construction employee commuting emissions, residential and non-residential architectural coating, stationary and mobile equipment construction emissions, and heating emissions).

For each building, the number of days for Phase I (site grading) and II (building) construction was calculated. Acreage to be graded for Phase I activities was entered as well.

Table 4 illustrates the CO emissions resulting from construction projects for both Phase I site grading and Phase II building construction.

Table 4. Summary of Construction Activity Emissions for CO from Federal Action at Fort Carson Cantonment Area (Tons/Year)

Construction Activity	2006	2007	2008	2009	2010	2011
Phase I –Grading Operations	0	0	0	0	0	-
Phase I- Grading Equipment	2.05	0.40	2.65	0.05	0.30	-
Phase II- Worker Trips[b]	1.14	2.60	6.80	5.67	2.17	2.92
Phase II- Stationary Equipment[a] -diesel engine	1.16	2.65	5.11	4.05	1.69	1.80
Phase II – Mobile Equipment	7.82	17.82	34.40	27.25	11.38	12.10
Phase II- Acres Paved -Equipment	0	0	0	0	0	0
Phase II- Residential Architectural Coatings	0	0	0	0	0	0
Phase II – Non-Residential Architectural Coatings	0	0	0	0	0	0
TOTAL	**12.17**	**23.46**	**48.96**	**37.02**	**15.54**	**16.82**

[a] Adjustment for diesel engines for stationary equipment.
[b] Adjusted for altitude (McCrae, 2006).

5.3 Facility Demolition

Demolition activities are planned to occur in two years (2008 and 2009) and are not very excessive (Table 5). CO emissions from this activity are generated from large diesel equipment (e.g., bulldozers, scrapers, wrecking ball equipment).

Table 5. Proposed Construction/Demolition Activities at Fort Carson Cantonment Area

Fiscal Year (FY) Project Funded	Building Number/Project Name	Demolition (sf)
FY08	59631 43 ASG Vehicle Maintenance Facility	21,140
FY09	65616 Rail Yard Alteration	9,000
TOTAL		30,140

5.3.1 Methodology/Results

Emissions were calculated using the following current ACAM assumptions:

- Two pieces of heavy diesel equipment are used 6 hours per day for every 10,000 square feet of building area demolished (AFCEE, 2005).
- It takes 20 days for the 30,140 sf or 1,507 sf per day to be demolished.
- An emission factor of 0.78 pounds per 1000 sf was used (SCAQMD, 1993).

Less than one ton per year of CO will be emitted from demolition activities as shown in Table 6.

Table 6. Summary of Proposed Demolition Activity Emissions for CO from Federal Action at Fort Carson Cantonment Area (Tons/Year)

Fiscal Year (FY) Project Funded	Building/Project No.	Demolition Time (days)	Demolition (sf)	CO Emissions (Tons/Year)
FY08	59631 43 ASG Vehicle Maintenance Facility	14	21,140	0.12
FY09	65616 Rail Yard Alteration	6	9,000	0.02
TOTAL		20	30,140	**0.14**

5.4 Stationary Sources

Building Heating and Hot Water Heaters (Boilers)
The Federal action would result in an increase of emissions due to the proposed construction of heating equipment in support facilities. The buildings that contain heating power units in the Cantonment area would also increase CO emissions (Table 8).

Table 3 shows the building area inputs in square feet that are used to calculate emissions for facility boilers at the Fort Carson Cantonment area.

Emergency Generators

There are six new diesel-fired emergency generators, four of less than 600 horsepower (hp) and two of greater than 600 hp, proposed to be installed within the Cantonment/maintenance area. It was assumed they will be proposed for owner requested limits for two generators less than 600 hp operating 500 hours per year per generator and two generators of less than 600 hp operating 100 hours per year per generator. The two generators of greater than 600hp would operate 250 hours per year per generator. The six generators begin operating in calendar year 2006 and will operate throughout the years of the proposed action. Table 7 shows the proposed emergency generator operating hours proposed for the Federal action at Fort Carson Cantonment area.

Table 7. Proposed Emergency Generator (Diesel- Fired) Operating Hours at Fort Carson Cantonment Area 2006-2011

Emergency Generator Size (hp)	Operating Time (Hours/Year) per Generator[a]
67	100
67	100
1743	250
1341	250

Emergency Generator Size (hp)	Operating Time (Hours/Year) per Generator[a]
100	500
200	500

[a] The calculation conservatively assumes generators run at maximum design rate, which overestimates emissions.

5.4.1 Methodology/Results

Building Heating and Hot Water Heaters (Boilers)

Building heating and hot water heater heat input were estimated to be 50 BTU/hr per square foot of new building construction (Jones, 2006). The AP-42 emissions factor for CO (AP-42, Table 1.4-1, 1998) was used to determine yearly emissions (See Appendix A). CO emissions from boilers are shown for each year of the proposed Federal action in Table 8.

Table 8. Summary of Proposed Boiler Emissions for CO from Federal Action at Fort Carson Cantonment Area (Tons/Year)

Fiscal Year (FY) Project Funded	Building/Project No.	Total Boiler Heat Input Sources (BTU/hr)[a]	Other Heat Input Sources (BTU/hr)[b]	CO Emissions (Tons/Year)
FY06	64755 Warehouse Storage Addition to Training Support Center	690,000	0	0.06
FY06	66696 Utilities Upgrade Phase I	0	0	0.00
FY06 SUBTOTAL			0	**0.06**
FY07	65330 Child Development Center	2,139,050	0	0.19
FY07	62832 Child Development Center	1,215,800	0	0.11
FY07 SUBTOTAL				**0.30**
FY08	13852 Battle Command Training Center	5,353,750	0	0.48
FY08	58129 Fiber Optics Cable	0	0	0.00
FY08	58139 Fitness Center	2,975,000	2,975,000	0.54
FY08	59631 43 ASG Vehicle Maintenance Facility	1,509,600	1,509,600	0.27
FY08	63500 13 ASOS Support Complex	3,700,000	0	0.33
FY08	64120 Hospital Addition	1,845,000	615,000	0.22
FY08	64121 Troop Medical Clinic	500,000	0	0.05
FY08	64123 Family Clinic	7,782,000	2,594,000	0.94
FY08	65335 Child Development Center	2,139,050	0	0.19
FY08	66706 Dining Facility	1,512,850	1,512,850	0.27
FY08	67115 4th BCT Vehicle Maint.	0	0	0.0
FY08 SUBTOTAL				**3.29**
FY09	65616 Rail Yard Alteration	125,000	0	0.01
FY09 SUBTOTAL				**0.01**
FY10	3676 RSTC Training Support Center	5,000,000	0	0.45
FY10	65602 71st OD Group Support Facility	3,703,500	0	0.33
FY10 SUBTOTAL				**0.78**
TOTAL (Cumulative Emissions for years of proposed action)				**4.45**

[a]Total boiler heat input is estimated based on each facility type. Ranges are from 15-85 Btu/hr/SF (Omaha District Corps of Engineers, 2006).
[b]Total heat input of miscellaneous external combustion (non-boiler) sources is estimated on each facility type and ranges from 5-80 Btu/hr/SF (Omaha District Corps of Engineers, 2006).

Emergency Generators

CO emissions from two emergency generators less than 600 hp based on a usage limit of 500 hours per generator per year and two emergency generators less than 600 hp based on a usage limit of 100 hours per generator per year were estimated using AP-42 emission factors (AP-42-Table 3.3-1, 1998). CO emissions from emergency generators greater than 600 hp based on a usage limit of 250 hours per generator per year were estimated using AP-42 emission factors (AP-42-Table 3.4-1, 1998). The total CO emissions for these proposed units are 2.66 tons per year (Table 9).

Table 9. Summary of Proposed Emergency Generator (Diesel-Fired) Emissions for CO from Federal Action at Fort Carson Cantonment Area 2006-2011(Tons/Year)

Emergency Generator Size (hp)	Total Generator Operating Time (Hours/Year)[a]	CO Emissions (Tons/Year)[b]
67	100	0.02
67	100	0.02
1743	250	1.20
1341	250	0.92
200	500	0.17
100	500	0.33
TOTAL (Cumulative Emissions for years of proposed action)		**2.66**

[a]The calculation conservatively assumes generators run at maximum design rate, which overestimates emissions.
[b] Emission factors from AP-42 Fifth Edition, Section 3.3, October 1998, Table 3.3-1 for stationary diesel engines < 600 hp and AP-42 Fifth Edition, Section 3.3, October 1998, Table 3.4-1 for stationary diesel engines > 600 hp.

5.5 Miscellaneous Sources

Additional CO emissions will be generated by miscellaneous source activities (e.g. refuse, degreasing, surface coating, pesticides, and residential sources such as lawn mowers, etc.) anticipated to occur as a result of increased personnel and construction of new facilities. These activities are too small and/or too disaggregate to be calculated separately, so they have been considered as one category in ACAM.

5.5.1 Methodology/Results

For personnel actions, the ACAM model calculates emissions from miscellaneous area sources based on an aggregate emission factor and the number of personnel proposed to be added as a result of the Federal action. Aggregate per employee or per capita factors were developed for this category. (See Appendix A for details). The miscellaneous source emission factors were developed from ACAM (AFCEE, 2005). See Appendix A for additional details on inputs and assumptions for Miscellaneous Sources.

As shown in Table 10, the maximum estimated CO emissions from the miscellaneous sources is 32.56 tons per year (2011).

Table 10. Summary of Miscellaneous Source Emissions for CO from Federal Action at Fort Carson Cantonment Area (Tons/ Calendar Year)

Miscellaneous Area Source Emissions[a]	2006	2007	2008	2009	2010	2011
Miscellaneous	-1.70	1.35	3.47	30.45	30.58	32.56

[a] Note: General category used in ACAM to account for lawnmowers and other miscellaneous sources.

6.0 CONFORMITY ANALYSIS FINDINGS

As previously discussed, if the total direct and indirect CO emissions from the Federal action exceed the 100 tpy threshold, then a conformity determination will be required. Table 11 shows the total emissions for each source applicable to this conformity determination as a result of the Federal action at Fort Carson from 2006-2011. The maximum CO emissions from all emissions sources is expected to occur in 2009 with 221.5 tpy. In making a conformity analysis, the year with the greatest emissions is used to determine whether the emissions that result from the Federal action exceed the specified *de minimis* levels. Since the threshold for CO emissions is 100 tpy, the maximum emissions exceed this threshold, and therefore a conformity determination is required for the Fort Carson Federal action.

Table 11. Summary of Total CO Emissions from Federal Action at Fort Carson Cantonment Area (Tons/Year)

Emissions Source	2006	2007	2008	2009	2010	2011
Construction	12.17	23.46	48.96	37.02	15.54	16.82
Demolition	N/A[1]	N/A	0.12	0.02	N/A	N/A
Mobile (POV)	-5.31	3.94	10.12	106.30	103.21	105.43
Mobile (GOV)	-2.12	1.57	4.02	41.39	39.74	40.16
Boilers	.06	.36	3.65	3.66	4.44	4.44
Emergency Generators	2.66	2.66	2.66	2.66	2.66	2.66
Miscellaneous	-1.70	1.35	3.47	30.45	30.58	32.56
TOTAL (Non-POV)	**11.07**	**29.4**	**62.88**	**115.2**	**92.96**	**96.64**
TOTAL CO Emissions	**5.76**	**33.34**	**73**	**221.5**	**196.17**	**202.07**

[1]N/A = not applicable

6.1 Criteria for Demonstrating Conformity

A Federal action is determined to conform if the total direct and indirect emissions are in compliance or consistent with all relevant SIP requirements and milestones and meet any one or a combination of the requirements listed at 40 CFR 93.158:

- Direct and indirect emissions from the activity are specifically identified and accounted for in the attainment or maintenance demonstration of a SIP approved after 1990 (40 CFR 93.158(a)(1) or;

- The emissions are determined and documented by the State Agency responsible for SIP preparation to result in a level of direct and indirect emissions associated with the Federal action are together with all other emissions in the nonattainment or maintenance area, would not exceed the emissions inventories specified by the approved applicable SIP (40 CFR 93.158(a)(5)(i)(A) or;

- If SIP conformity cannot be demonstrated by any of the above options then a conformity determination is possible only if the air quality management agency notifies EPA that appropriate changes will be made in the applicable SIP documents and the air quality management agency commits to a schedule for preparing an acceptable SIP amendment that accommodates the net increase in direct and indirect emissions from the Federal action without causing any delay in the schedule for attaining the relevant Federal ambient air quality standard (40 CFR 93.158(a)(5)(i)(B).

- The Federal action (or portion thereof), as determined by the MPO, is specifically included in a current transportation plan and transportation improvement program (TIP) which have been found to conform to the applicable SIP under 40 CFR part 51, subpart T, or 40 CFR part 93, subpart A (40 CFR 93.158(a)(5)(ii) or;

- The Federal action (or portion) fully offsets its emissions within the same nonattainment or maintenance area through a revision to the applicable SIP or an equally enforceable measure that effects emission reductions equal to or greater than the total of direct and indirect emissions from the Federal action so that there is no net increase in emission of that pollutant; 40 CFR 93.158(a)(5)(iii).

The conformity determination for Fort Carson was prepared in accordance with the final rule of the U.S. Environmental Protection Agency (EPA, 1993) incorporated by reference by Colorado Air Quality Control Commission (AQCC), Regulation No. 10; U.S. Army Center for Health Promotion & Preventive Medicine/ United States Army Environmental Center (USACHPPM/USAEC) *Technical Guide for Compliance with the General Conformity Rule*, August 2002, and the USACHPPM *Technical Guide for Preparing a Record of Nonapplicability for the General Conformity Rule*, December 2004.

6.2 Statement of Conformity

The maximum CO emission increases estimated to occur within the Fort Carson Cantonment/maintenance area due to construction/demolition of facilities, installation of stationary sources, and increases in personnel to support transformation activities at Fort Carson total 222 tpy (106 tpy from privately-owned vehicles, 41 from government-owned vehicles and 74 tpy for all other sources). These emissions exceed the 100 tpy CO threshold limit and the activities are not exempt. However, Fort Carson is able to satisfy conformity for this Federal action by meeting the criteria for demonstrating conformity as follows:

- Fort Carson has consulted with the PPACG and is aware they are updating the TIP by re-calculating and establishing the transportation budget for carbon monoxide emissions in accordance with the State Implementation Plan. The transportation budget

for CO emissions will include sufficient allowance for the maximum increase in emissions at Fort Carson for additional POV travel and will be approved prior to the maximum year of Fort Carson emissions (2009). Therefore, the 106 tpy POV emissions, meet the requirements of the criteria at 40 CFR 93.158(a)(5)(ii) as those emissions will be accounted for in the TIP.

- All remaining emissions (115.2 tpy) related to GOV emissions, facility construction, stationary sources (boilers, other heat input sources, and generators) and miscellaneous area sources, meet the requirement of the criteria at 40 CFR 93.158(a)(5)(i)(A): the total emissions (115.2 tpy) would not exceed the emissions budget specified in the applicable SIP of 531 tons per day by 2015 or 149,412.75 per year specified in the Colorado Springs CO Maintenance Plan and SIP. The PPACG, Colorado Department of Public Health and Environment (CDPHE), and U.S. EPA Region VIII were consulted on May 17, 2006 and July 25, 2006. These agencies have agreed that there is sufficient allowance in the SIP inventory for carbon monoxide to include these emissions related to the Federal action at Fort Carson.

7.0 CONCLUSION

Based on concurrence from the EPA and CDPHE, it has been determined that the Federal action planned for Fort Carson conforms to the applicable SIP for the Colorado Spring carbon monoxide maintenance area. The Army is supporting an activity at Fort Carson that has been demonstrated not to cause or contribute to new violations of the carbon monoxide air quality standards in the Colorado Springs maintenance area. Implementation of the Federal action will not result in exceedances of the CO standards in the Colorado Springs area, nor any required interim emission reductions or other milestones. The conclusion of a positive general conformity determination for the Federal action planned for Fort Carson fulfills the Army's obligation and responsibility under 40 CFR Part 93, Subpart B.

Appendix A - Carbon Monoxide Emissions Calculations

This is a brief discussion that outlines the ACAM and other emissions calculation inputs and assumptions (AFCEE, 2005). Only that information pertinent to Fort Carson, CO conformity is included.

1.0 INPUT PARAMETERS

1.1 Personnel Proposed Action Units

The personnel proposed action unit represents the number and type of personnel (whether active duty, training, Army National Guard (ARNG) or US Army Reserve Command (USARC) and the fiscal quarter in which they will realign to or from the selected installation. These proposed action units will generate emissions from a wide variety of common sources that occur from similar support activities at other representative military installations. ACAM calculates emissions for these sources based on per-employee emission factors. Several input parameters are included to define the source activity levels for the realignment. Default settings for these parameters are provided from base-specific data from the database or entered by the user in the installation information window, if available. However, in most cases the defaults will be set with generic values.

Operating Profile

Description: Selection of the military operating scenario to which the realigned personnel belong.
Use in Model: Active duty and training operating profiles are used for heating and miscellaneous sources. For ARNG, USARC, and Civilian operating profiles, the user has the option of specifying the average number of person-days per month that additional part-time ARNG, USARC, or civilian personnel are active. Emissions are then calculated the same for the full-time ARNG or USARC personnel as for active duty personnel. Part-time personnel are treated as a fraction of full-time personnel for purposes of calculating emissions; these emissions are then added to the emissions for full-time personnel to calculate the total realignment emissions.
Input Options: Active duty, training, ARNG, ARC, Civilian.
Default Settings: Active duty. For Fort Carson both Active Duty and Civilian classifications were used. Fort Carson disaggregated ARNG in 2003.

MOBILE6.2 Options

Description: Selection of parameters to calculate MOBILE6.2 vehicle emission factors appropriate for the geographic region in which the installation is located. User has the option to change many of the default values provided for GOV and privately owned vehicle (POV), including fleet mix fractions and the inspection/maintenance (I/M) program in effect (whether basic, enhanced, or non-existent).

Use in Model: Base-specific emission indicator (on-road post employee)
Input Options: There are many options that the user may specify, please refer to the MOBILE6.2 User's Manual for valid data ranges and complete data descriptions.
Default and Fort Carson Settings: MOBILE6.2 default values are used except when specific data for Colorado Springs were available. Table A-1 shows the data used:

Table A-1. MOBILE6.2 Inputs Parameters used for Fort Carson

AVERAGE SPEED: (Default speeds for roadways)
VMT FRACTIONS: (Default vehicle fleet)
REG DIST: (Default vehicle registration distributions)
MILE ACCUM RATE: (Default mileage accumulation rates)
I/M PROGRAMS: (No inspection/maintenance program)
ABSOLUTE HUMIDITY: (Default absolute humidity value)
CLOUD COVER: (Default percent cloud cover)
PEAK SUN: (Default hours of peak sun intensity)
SUNRISE/SUNSET: (Default time of sunrise and sunset)
ANTI-TAMP PROG: (No anti-tampering program)
STAGE II REFUELING: (No Stage II program)
POLLUTANTS: (Default-HC, NOx, and CO calculated)
EXPAND EXHAUST: (Default-Composite EF only)
SOAK DISTRIBUTION: (Default soak time)
STARTS PER DAY: (Default number of engine starts or trips)
STARTS DIST: (Default engine starts or trips by hour of day)
TEMPERATURE: 35.5^{o} F January and 62.1^{o} F July
OXYGENATED FUELS: 25 % Alcohol at 0.027% by weight: RVP to exceed limit
FUEL PROGRAM: Conventional Gasoline West
REID VAPOR PRESSURE: 9 in July and 12.5 in January

1.2 Commercial, and Office Facility Construction

Description: The total square feet of residential, commercial, and office facilities to be constructed at the post. User inputs include area of commercial/retail units in square feet, area of office/employment units in square feet.
Use in Model: Emission indicator (employee commuting emissions, non-residential architectural coating, stationary and mobile equipment construction emissions, heating emissions).

Number of Days for Phase I and II Construction

Description: The total number of days in the current calendar year that will be required for grading (phase I) and actual building/facility construction (phase II).
Use in Model: Used to convert emissions calculated in lbs/day to lbs/year. For several sources, a separate day per year value that these specific activities are conducted is required (paving, architectural painting, building demolition).
Input Options: 0 to 365 for each phase (See Table A-2 for Fort Carson construction inputs and schedule)
Default Settings: No default settings used for this input option.

Gross Acres to be Graded

Description: The total number of acres to be graded during construction of facilities to support realignment of aircraft.
Use in Model: Emission indicator for both grading equipment and grading emissions.
Input Options: For Fort Carson the acres that are proposed to be graded in Phase I are shown in Table A-4.
Default Settings: No default settings used for this input option.

1.3 Building Demolition

Using emissions concepts in ACAM, demolition emissions were calculated for buildings 59631-43 ASG Vehicle Maintenance Facility and 65616- Rail yard Alteration.
Description: The square footage of buildings to be demolished and the schedule.
Use in Model: Emission indicator similar to grading equipment.

1.4 Boiler Operations Fuel Use

ACAM was not used for this emissions calculation. Facility heating was estimated by the U.S. Army Corps of Engineers (Jones, 2006) to be 50 BTU/hr per every square foot of new building construction. The AP-42 emissions factor for CO emissions (AP-42, Table 1.4-1, 1998) was used to determine tons of CO emissions for each year.
Specific emissions calculations were completed using AP-42.

Description: The quantity of fuel used annually per boiler. For Fuel Oil Boilers, the units are 1000 gal/yr. For Natural gas boilers, the units are 10^6 ft^3/yr.
Use in Model: Emission indicator.
Input Options: Fuel Oil (No. 6 or Distillate): 0 to 1000 (1000 gal/yr.)
Natural Gas: 0 to 500 (10^6 ft^3/yr)
Default Settings: No default settings for this input option. The user has option to use alternate heating equations with defaults for heating requirements per square foot.

1.4 Emergency Generator Operations Fuel Use

ACAM was not used for this emission calculation. Carbon Monoxide emissions from two emergency generators less than 600 hp based on a usage limit of 500 hours per generator per year and two emergency generators less than 600 hp based on a usage limit of 100 hours per generator per year were estimated using AP-42 emission factors (AP-42-Table 3.3-1, 1998). CO emissions from emergency generators greater than 600 hp based on a usage limit of 250 hours per generator per year were estimated using AP-42 emission factors (AP-42-Table 3.4-1, 1998). There are six new generators proposed and it was assumed they would all be operational in FY06 and will operate throughout the years of the proposed action.

Description: The quantity of fuel used annually per generator, in units of 1000 gal/yr.
Use in Model: Emission indicator.
Input Options: Diesel Fuel: 0 to 1000 (1000 gal/yr)
Gasoline Fuel: 0 to 1000 (1000 gal/yr)

Table A-2. Construction Schedule

FY Project Funded	Construction Begins (CY-Quarter)	Construction Ends (CY-Quarter)	Building Number and Project Name	Demolition (sf)	Primary Size (sf)	Paved Area (sf)	Paved Area (acres)	Construction Disturbance (sf)	Construction Disturbance (Acres)
FY 06	2006- 1st Qtr	2007- 1st Qtr	64755 Warehouse Storage Addition to Training Support Center		13,800	2,383	0	16,994	0
FY 06	2006- 1st Qtr	2007- 4th Qtr	66696 Utilities Upgrade Phase I				0	1,000,000	23
FY 07	2007- 1st Qtr	2008- 1st Qtr	65330 Child Development Center		42,781	171,124	4	224,600	5
FY 07	2007-1st Qtr	2008-3rd Qtr	62832 Child Development Center		24,316	96,798	2	127,170	3
FY 08	2008- 1st Qtr	2009- 3rd Qtr	13852 Battle Command Training Center		107,075	92,696	2	209,760	5
FY 08	2008- 1st Qtr	2009- 1st Qtr	58129 Fiber Optics Cable		0	0	0	1,584,000	36
FY 08	2008- 1st Qtr	2009- 3rd Qtr	58139 Fitness Center		59,500	111,027	3	179,053	4
FY 08	2006-1st Qtr	2009-2nd Qtr	59631 43 ASG Vehicle Maintenance Facility	21,140	30,192	247,500	6	291,577	7
FY 08	2008-1st Qtr	2009-2nd Qtr	63500 13 ASOS Support Complex		74,000	114,590	3	198,020	5
FY 08	2008-1st Qtr	2011- 1st Qtr	64120 Hospital Addition		41,000	117,106	3	166,011	4

FY Project Funded	Construction Begins (CY-Quarter)	Construction Ends (CY-Quarter)	Building Number and Project Name	Demolition (sf)	Primary Size (sf)	Paved Area (sf)	Paved Area (acres)	Construction Disturbance (sf)	Construction Disturbance (Acres)
FY 08	2008-1st Qtr	2009-1st Qtr	64121 Troop Medical Clinic		10,000	20,600	0	32,130	1
FY 08	2008-1st Qtr	2009-1st Qtr	64123 Family Clinic		129,700	91,946	2	232,728	5
FY 08	2008- 1st Qtr	2009- 1st Qtr	65335 Child Development Center		42,781	171,124	4	224,600	5
FY 08	2006- 1st Qtr	2007- 3rd Qtr	66706 Dining Facility		30,257	138,006	3	176,676	4
FY 08	2006- 1st Qtr	2009- 1st Qtr	67115 4th BCT Vehicle Maint.		35,290	247,500	6	296,930	7
FY 09	2009- 1st Qtr	2010- 2nd Qtr	65616 Railyard Alteration	9000	2,500	36,300	1	40,740	1
FY 10	2010- 2nd Qtr	2011-3rd Qtr	3676 RSTC Training Support Center		100,000	56,650	1	231,683	5
FY 10	2010- 1st Qtr	2011- 3rd Qtr	65602 71st OD Group Support Facility		74,070	14,288	0	36,002	1
Conformity Total				**30,140**	**817,262**	**1,729,638**	**40**	**5,268,674**	**121**

2.0 DETAILED CALCULATIONS

2.1 Construction Equipment and Commuting

Construction equipment will be required in order to construct facilities to support the proposed action. There will be emissions from the exhaust gases of this equipment. Additionally, there will be exhaust emissions from the privately owned vehicles (POVs) of the construction workers who commute to and from the post. Construction may be within one calendar year or spread out over more than one calendar year. Emissions for each year must be calculated separately.

The following sections detail the calculation of emissions from construction equipment and construction worker commuting.

2.1.1 Grading Equipment Emissions

Description: Emissions from combustion engine.

Equation: CO (tons/yr.) = 0.55 (lbs./acre/day) x ACRES x DPY_I / 2000

User-Input Variables:

ACRES = Number of gross acres to be graded during Phase I construction (but not more than 50 acres).

DPY_I = Number of days per year during Phase I construction, which is the grading phase.

Other Parameters:

2000 = Conversion factor from pounds to tons.
0.55 = Emission factors derived from references given at the end of Section 2.1.1, Appendix A.

Assumptions: Equipment consists of 1 Grader, 1 Wheeled and 1 Tracked Loader/Grader per 10 acres. All equipment is diesel powered. Equipment is operating 6 hours per day.

2.1.2 Construction Worker Emissions

Description: The number of employee trips during construction is calculated, which is a function of the number of facilities to be constructed and/or square feet of non-residential buildings.

Equation:

Office/Employment (trips/day) = 0.42 (trips/1000 sf/day) x Area of Office/ Employment Units (1000 sf)

Total Daily Trips (TRIPS) (trips/day) = Commercial Retail + Office/Employment

Once total daily trips are calculated, the following equations are applied to obtain emissions for CO. The equation is applied corresponding to the year closest to the year of construction:

Year 2000 and beyond: CO_E (lbs./day) = 0.262 x TRIPS

Once this value is obtained, convert from lbs/day to tons/yr.:

CO (tons/yr.) = CO_E x DPY_{II} / 2000

User-Input Variables:
Area of Office/Employment Units = Total square feet of office/employment units to be constructed in the given year of construction (1000 sf).

DPY_{II} = Number of days per year during phase II construction, which is the phase where actual building construction occurs.

Other Parameters:
2000 = Conversion factor from pounds to tons
All constants = Emission Factors obtained from references given at AFCEE (2005).

2.1.3 Stationary Construction Equipment Emissions

Description: Emissions from stationary equipment occurs when gasoline powered equipment (e.g. generators, saws, etc.) is used at the construction site.

Equation: CO_S (tons/yr.) = (RES + GRSQF) x 5.29 x DPY_{II} / 2000

User-Input Variables:
RES = Number of residential units to be constructed during Phase II (assumes 1 unit = 1,000 sf; see note below)

GRSQF = Gross square feet of non-residential units to be constructed (1000 sf) during Phase II (see note below)

DPY_{II} = Number of days per year during Phase II construction, which is the phase where actual building construction occurs.

Other Parameters:
2000 = Conversion factor from pounds to tons
5.29 = Emission factor derived from AFCEE, 2005

(lbs/day/1000 sf) which use the following assumptions: 2 pieces of gasoline powered equipment per 10 units or 10,000 square feet; equipment used 6 hours per day; and equipment average horsepower of 10 hp each.

NOTE: Strictly for purposes of the above calculations, the values of RES and GRSQF are hard limited by the model to 50 residential units and 50 - 1,000 sf (50,000 sf), respectively. This is based on the Sacramento Metropolitan Air Quality Management District reference assumption that construction activities, i.e., equipment generating emissions, occur over a maximum area on a per day basis due to construction occurring generally as a linear progression activity. Even if the true value of GRSQF is greater than 50,000 sf for large projects or RES is greater than 50, the daily rate of emissions will be limited by the 50 and 50,000 limits. Total annual emissions will then be driven by the number of days per year for Phase II construction. Note that these limits apply only to stationary and mobile equipment

emissions that occur during Phase II construction, but not to grading equipment during Phase I construction. Also, since it is reasonable to assume that diesel generators will be used on post, a correction outside the model will be made according to the following:

Adjust for using diesel engines. The CO emission factor used for gasoline engines in ACAM was 34.26 pounds per million British Thermal Units (MMBTUs) (AFCEE, 2005). The corresponding emission factor for CO from diesel engines is 0.75 pound per MMBTUs (AFCEE, 2005). Table A-3 shows the adjustment made to Phase II-Stationary Equipment engines. The grayed out area indicates the Phase II-Stationary Source-gasoline calculation made in ACAM which was then adjusted in the next row for diesel engines. The grayed out emissions, originally calculated for gasoline, are not included in the total emissions. Since ACAM emission factors for construction are hard-wired, an adjustment to the modeling results needs to be made. The resulting factor to be applied to the ACAM out put is:

Fort Carson CO Emissions = ACAM Result x 0.75/34.26

Adjust for altitude. The emission factors for worker trips associated with construction activities have been adjusted for altitude and oxygenated fuels without the I/M program (MacRae, 2006) to account for the elevation at Fort Carson of greater than 500 feet above sea level.

Fort Carson CO Emissions – ACAM Result x 1.035

CO emissions from construction activities are shown in Table A-3.

Table A-3. Summary of Construction Activity Emissions for CO from Federal Action at Fort Carson Cantonment Area (Tons/Year)

Construction Activity	2006	2007	2008	2009	2010	2011
Phase I –Grading Operations	0	0	0	0	0	-
Phase I- Grading Equipment	2.05	0.40	2.65	0.05	0.30	-
Phase II- Worker Trips[b]	1.14	2.60	6.80	5.67	2.17	2.92
Phase II- Stationary Equipment - gasoline engine	53.03	120.87	233.28	184.84	77.15	82.08
Phase II- Stationary Equipment[a] -diesel engine	1.16	2.65	5.11	4.05	1.69	1.80
Phase II – Mobile Equipment	7.82	17.82	34.40	27.25	11.38	12.10
Phase II- Acres Paved -Equipment	0	0	0	0	0	0
Phase II- Residential Architectural Coatings	0	0	0	0	0	0
Phase II – Non-Residential Architectural Coatings	0	0	0	0	0	0
TOTAL	**12.17**	**23.46**	**48.96**	**37.02**	**15.54**	**16.82**

[a] Adjustment for diesel engines for stationary equipment. (= ACAM result x .75/34.26)
[b] Adjustment for altitude elevation 500 ft above sea level (=ACAM result x 1.035)

2.1.4 Mobile Construction Equipment Emissions

Description: Mobile equipment includes forklifts, dump trucks, etc., used during Phase II construction.

Equation: CO_M (tons/yr.) = (RES + GRSQF) x 0.78 x DPY_{II} / 2000
User and Other Parameters: Identical to those for Stationary Equipment Emissions. Information from the NOTE in Section 2.3, Appendix A also applies for Mobile Construction Equipment Emissions.

0.78 = Emission factor derived from references listed below (lbs/day/1000 sf) which use the following assumptions: 2 pieces of diesel powered equipment per 10 units or 10,000 square feet; and equipment used 6 hours per.

References: SMAQMD, 1994 and SCAQMD, 1993.

2.2 Facility Demolition Emissions

Description: Emissions from demolition projects occur from large diesel equipment used at the demolition site.

Equation: CO_D (tons/year) = EF x (sf/1000) x DPY/2000

User-Input Variables: Time required to demolish facility = 20 days for 30,140 sf (1,507 sf per day). Two pieces of heavy diesel equipment are used 6 hours per day for every 10,000 sf of building area demolished.

DPY= Number of days per year of demolition occurs.

Other Parameters:

0.78 lbs per 1000 sf = Emissions Factor (derived from SCAQMD, 1993)

2000 = Conversion factor from pounds to tons.

Emissions were calculated separately for each building demolition project that occurred.

2.3 Miscellaneous Area Sources

Related Proposed Action Unit: Personnel

Description: A variety of miscellaneous air-pollutant-emitting activities occur on post. These activities are too small and/or too disaggregate to be calculated separately. Sources of this nature in ACAM include the following: refuse and hospital incineration, degreasing, surface coating, pesticides, and residential area sources such as lawn equipment. Any source with a New Source Review permit is excluded from conformity. Aggregate per employee or per capita factors were developed for these categories.

Emission Calculation:

$E_p = N \times F [(ONPOST \times 2.41 \times RESEF_p + DEGEF_p + INCIN_p + OTHER_p)/2000]$

User-Input Variables*:*

N = Number of personnel realigned.

F = Fraction of the year the personnel operate.
ONPOST = Fraction of personnel living on post.

Other Parameters:

$RESEF_p$ = Per capita emission factor for pollutant, p, from residential area sources, lb./person. Derived from USEPA's Graphical Aerometric Database System (EGADS) area source data and population statistics for Howard and Cass counties in Indiana. The factor is as follows: CO = 0.03

$DEGEF_p$ = Per employee emission factor for pollutant, p, from degreasing, lb./employee. Derived from the emission inventories for 41 Air Force bases. The only applicable pollutant is VOC and the factor is 2.52.

$SCEF_p$ = Per employee emission factor for pollutant, p, from surface coating, lb./employee. Derived from the emission inventories for 86 Air Force bases. The only applicable pollutant is VOC and the factor is 8.29.

$INCIN_p$ = Per employee emission factor for pollutant, p, from refuse and hospital incineration, lb./employee.

Derived from emission inventories for Reese, Sheppard, Elmendorf, and Travis Air Force Bases. The factor is as follows:

CO = 0.04

$OTHEF_p$ = Per employee emission factor for pollutant, p, from other miscellaneous area sources. These include pesticides/herbicides, sterilization, and abrasive blasting operations. Factors were derived from emission inventories for 35 to 47 Air Force base, depending on the pollutant. The factor is: CO = 8.69

2.41 = Number of base residents per on-base employee. Assumed 2.41 dependents per realigned personnel based on an average distribution of accompanied and unaccompanied personnel located on base under normal conditions.

2000 = Conversion factor from pounds to tons.

References: PES, Inc., 1993; U.S. Air Force, 1992a, 1992b, 1992c; 1993, 1994a, 1994b, 1994c; U.S. Department of Commerce, 1994; USEPA, 1993b.

Table A-4 shows the miscellaneous source emissions.

Table A-4. Summary of Miscellaneous Source Emissions for CO from Federal Action at Fort Carson Cantonment Area (Tons/Year)

Miscellaneous Area Source CO Emissions	2006	2007	2008	2009	2010	2011
Miscellaneous	-1.70	1.35	3.47	30.45	30.58	32.56

2.4 Mobile Emissions

Description: MOBILE6.2 is US EPA's software for estimating on-road mobile source emissions NO_x, CO, and VOCs. POV VMT emissions from privately owned vehicles used by post workers to commute and forth from the post. With the exception of construction worker commuting, only non-POV emissions are considered for conformity. On Road government (GOV) VMT refers to GOV fleets on-post. The additional VMTs from both POV and GOV are assumed proportional to additional post personnel. The emission factors for on-road vehicular sources have been adjusted for altitude and oxygenated fuels without the I/M program (MacRae, 2006) to account for the elevation at Fort Carson of greater than 500 feet above sea level.

The complete User's Guide to MOBILE6.2 (USEPA, 2002a) is available at ACAM Help. The terminology used in ACAM was kept consistent with the terminology used within MOBILE6.2.

The following sections detail the ACAM calculation of emissions from POV VMT and GOV VMT.

2.4.1 POV VMT

Emission Calculation:
$E_p = F \times 2 \times \{N \times COMDIST \times (1\text{-}ONPOST) \times WORKDAYS \times [EF_p/(454 \times 2000)]\}$

User-input Variables:
N = Number of personnel realigned.
F = Fraction of the year the personnel operate.
COMDIST = One-way commute distance, miles, for off-post personnel.
ONPOST = Fraction of personnel living on post.

Other Parameters:
WORKDAYS = Number of work days per year, assumed to be 264 (22 work days per month for 12 months a year).
EF_p = Emission factor for pollutant, p, grams/mile. These factors were determined from MOBILE6.2 for CO for the chosen fleet mix.

2 = Number of commutes per work day.
454 = Conversion factor from grams to pounds.
2000 = Conversion factor from pounds to tons.
ACAM Result x 1.035 = Conversion factor for elevation (500 ft or greater above sea level).

References: Jagielski, 1994; USEPA, 1991, 2000b. USDOT, 1994

2.4.2 GOV VMT

Emission Calculation:
$Ep = N \times F \times GOVVMT \times [EFp/(454 \times 2000)]$

User-input Variables:
N = Number of personnel realigned.

F = Fraction of the year the personnel operate.

GOVVMT = Per-employee VMT, miles/employee.

Other Parameters:
EF_p = Emission factor for pollutant, p, grams/mile. These factors were determined from MOBILE6.2 for total hydrocarbons (VOCs), CO, and NOx for the chosen fleet mix.

454 = Conversion factor from grams to pounds.

2000 = Conversion factor from pounds to tons.

Reference: PES, Inc., 1993; USEPA, 1991; US DOT, 1994.

Table A-5 shows the mobile source emissions results.

Table A-5. Summary of Mobile Source Emissions for CO from Federal Action at Fort Carson Cantonment Area (Tons/Year)

Year	Source Type	Source Category	CO Emissions (Tons/Year)	CO Emissions (Tons/Year) with adjustments for elevation (500ft above sea level)
2005	Mobile Sources	GOV VMT	0.00	**0.00**
		POV VMT	0.00	**0.00**
2006	Mobile Sources	GOV VMT	-2.05	**-2.12**
		POV VMT	-5.13	**-5.31**
2007	Mobile Sources	GOV VMT	1.52	**1.57**
		POV VMT	3.81	**3.94**
2008	Mobile Sources	GOV VMT	3.88	**4.02**
		POV VMT	9.78	**10.12**
2009	Mobile Sources	GOV VMT	39.99	**41.39**
		POV VMT	102.71	**106.30**
2010	Mobile Sources	GOV VMT	38.40	**39.74**
		POV VMT	99.72	**103.21**
2011	Mobile Sources	GOV VMT	38.80	**40.16**
		POV VMT	101.86	**105.43**

2.5 Stationary Sources

2.5.1 Space Heating

Related Proposed Action Unit*:* Personnel

Description: Emissions will occur from the use of space heating for realigned personnel.. All space heaters are assumed to burn natural gas.

2.5.2 Building Heating and Hot Water Heaters (Boilers)

Related Realignment Unit: Special Facilities

Description: Emissions will occur from the use of facility boilers at the installation. To calculate emissions prior knowledge of boiler size and fuel throughput is required.

Emission Calculation:

$E_p = B \times E_f \times H$

User-Input Variables: Facility heating was estimated to be 50 BTU/hr per every square foot of new building construction. The AP-42 emissions factor for CO emissions (AP-42, Table 1.4-1, 1998) was used to determine tons of CO emissions for each year. Note that emission factors are dependent on the size of the boiler (MMBTU/hr heat input capacity).

B= Boiler Heat Input Source (MMBTU)

E_f = AP-42 Emissions Factor (Table 1.4-1, 1998) = 84 ($lb/10^6$ standard cubic feet).

To convert from $lb/10^6$ scf to lb/MMBTU, divide by 1020.

H= Hours
The boilers were assumed to operate only 2190 hours based on past fuel usage.

2000 = Conversion factor from lbs to tons

Reference: USEPA, 1998.

Table A-6 shows the boiler emissions calculations.

Table A-6. Summary of Boiler Emissions for CO from Federal Action at Fort Carson Cantonment Area (Tons/Year)

Fiscal Year (FY) Project Funded	Building/Project No.	Size (sf)	Total Boiler Heat Input Sources (BTU/hr)[a]	Other Heat Input Sources (BTU/hr)[b]	CO Emissions (Tons/Year)
FY06	64755 Warehouse Storage Addition to Training Support Center	13,800	690,000	0	0.06
FY06	66696 Utilities Upgrade Phase I	0	0	0	0.00
FY06 SUBTOTAL				0	**0.06**
FY07	65330 Child Development Center	42,781	2,139,050	0	0.19
FY07	62832 Child Development Center	24,316	1,215,800	0	0.11
FY07 SUBTOTAL					**0.30**
FY08	13852 Battle Command Training Center	107,075	5,353,750	0	0.48
FY08	58129 Fiber Optics Cable	0	0	0	0.00
FY08	58139 Fitness Center	59,500	2,975,000	2,975,000	0.54
FY08	59631 43 ASG Vehicle Maintenance Facility	30,192	1,509,600	1,509,600	0.27
FY08	63500 13 ASOS Support Complex	74,000	3,700,000	0	0.33
FY08	64120 Hospital Addition	41,000	1,845,000	615,000	0.22
FY08	64121 Troop Medical Clinic	10,000	500,000	0	0.05
FY08	64123 Family Clinic	129,700	7,782,000	2,594,000	0.94
FY08	65335 Child Development Center	42,781	2,139,050	0	0.19
FY08	66706 Dining Facility	30257	1,512,850	1,512,850	0.27
FY08	67115 4th BCT Vehicle Maint.	1110571	0	0	0.0
FY08 SUBTOTAL		35290			**3.29**
FY09	65616 Rail Yard Alteration	2,500	125,000	0	0.01
FY09 SUBTOTAL					**0.01**
FY10	3676 RSTC Training Support Center	82,000	5,000,000	0	0.45
FY10	65602 71st OD Group Support Facility	20,000	3,703,500	0	0.33
FY10 SUBTOTAL					**0.78**
TOTAL (Cumulative Emissions for years of proposed action)					**4.45**

2.7.3 Emergency Generator Operations

Description: Emissions will occur from the use of facility electrical generators used for emergency back-up power at the installation. The emission calculation requires prior knowledge of generator size and fuel throughput.

User Input Variables:
Carbon Monoxide emissions from two emergency generators less than 600 hp based on a usage limit of 500 hours per generator per year and two emergency generators less than 600 hp based on a usage limit of 100 hours per generator per year were estimated using AP-42 emission factors (AP-42-Table 3.3-1, 1998). CO emissions from emergency generators greater than 600 hp based on a usage limit of 250 hours per generator per year were estimated using AP-42 emission factors (AP-42-Table 3.4-1, 1998). There are six new generators proposed and it was assumed they would all be operational in FY06 and will operate throughout the years of the proposed action. The total CO emissions for these proposed units are 2.66 tons per year (Table A-7).

Table A-7 shows the emergency generator emissions.

Table A-7. Summary of Proposed Emergency Generator (Diesel-Fired) Emissions for CO from Federal Action at Fort Carson Cantonment Area 2006-2011(Tons/Year)

Emergency Generator Size (hp)	Total Generator Operating Time (Hours/Year)[a]	CO Emissions (Tons/Year)[b]
67	100	.02
67	100	.02
1743	250	1.20
1341	250	0.92
200	500	0.17
100	500	0.33
TOTAL (Cumulative Emissions for years of proposed action)		**2.66**

[a]The calculation conservatively assumes generators run at maximum design rate, which overestimates emissions.
[b] Emission factors from AP-42 Fifth Edition, Section 3.3, October 1998, Table 3.3-1 for stationary diesel engines < 600 hp and AP-42 Fifth Edition, Section 3.3, October 1998, Table 3.4-1 for stationary diesel engines > 600 hp.

TIP -	Transportation Improvement Program
tpy -	tons per year
USACHPPM -	U.S. Army Center for Health Promotion and Preventive Medicine
USAEC -	U.S. Army Environmental Center
USAF -	U.S. Air Force
USARC -	U.S. Army Reserve Command
VMT -	vehicle miles traveled
VOC -	volatile organic compound

Appendix B - Acronyms

43d ASG -	43rd Area Support Group
4th ID -	4th Infantry Division
ACAM -	Air Conformity Applicability Model
ACR -	Armored Calvary Regiment
AMF -	Army Modular Force
APCD -	Air Pollution Control Division
APEN -	Air Pollutant Emission Notice
ARNG -	Army National Guard
AQCC -	Air Quality Control Commission
BCT -	Brigade Combat Team
BRAC -	Base Realignment and Closure
BTU -	British thermal units
CAA -	Clean Air Act
CAAA -	Clean Air Act Amendments of 1990
CDPHE -	Colorado Department of Public Health and Environment
CEQA -	California Environmental Quality Act
CO -	carbon monoxide
CY -	Calendar Year
DOC -	U.S. Department of Commerce
DoD -	U.S. Department of Defense
DOPAA -	Description of Proposed Action and Alternatives
DOT -	U.S. Department of Transportation
EGADS -	EPA's Graphical Aerometric Data System
EPA -	U.S. Environmental Protection Agency
FY-	Fiscal Year
GOV -	Government-owned vehicles
hp -	horsepower
HBCT -	Heavy brigade combat team
I/M -	Inspection/maintenance
ICBT -	Infantry brigade combat team
IGBPS -	Integrated Global Presence and Basing Strategy
MPO -	Metropolitan planning organization
NAAQS -	National Ambient Air Quality Standards
NO_2 -	Nitrogen dioxide
NSR -	New Source Review
O_3 –	Ozone
Pb -	Lead
PM_{10} -	Particulate matter with a diameter of less than 10 micrometers
$PM_{2.5}$ -	Particulate matter with a diameter of less than 2.5 micrometers
POV -	Privately-owned vehicles
PPACG -	Pikes Peak Area Council of Governments
RONA -	Record of Non-applicability
SCAQMD -	South Coast Air Management District
SIP -	State Implementation Plan
SMAQMD -	Sacramento Metropolitan Air Quality Management District
SO_2 -	sulfur dioxide
sf -	square feet

Appendix C - References

Air Force Center for Environmental Excellence (AFCEE), 2005; *U. S. Air Force Air Conformity Applicability Model (ACAM), Version 4.2—Technical Documentation*, Brooks Air Force Base, Texas, April 2005.

Air Pollution Control Division (APCD), Colorado Department of Pubic Health and Environment (CDPHE), 2003; *Carbon Monoxide Maintenance Plan for the Colorado Springs Attainment/Maintenance Area,* 2nd Revision, December 18, 2003.

Coda, Tom, 2006; Personal communication –email from Tom Coda, U.S. Environmental Protection Agency to Mark Bennett, CH2MHill, on exclusion of transportation emissions already conforming to the SIP; July 9, 2006

Colorado Air Quality Control Commission (CAQCC), Colorado Department of Pubic Health and Environment (CDPHE), 1998; *Criteria for Analysis of Conformity, Colorado Regulation No.10.,* Effective November 30, 1998.

Fort Carson Transformation Environmental Impact Statement, 2006.

"*Determining Conformity of General Federal Actions to State or Federal Implementation Plans, Final Rule*." Federal Register 58 (November 30, 1993): 63214.

Global Security.org, 2006. *Fort Carson* http://www.globalsecurity.org/military/facility/fort-carson.htm, accessed June 6, 2006.

Jagielski, K.D., 1994; *Calculation Methods for Criteria Air Pollutant Emission Inventories, Occupational and Environmental Health Directorate,* Air Force materiel Command, Brooks Air Force Base, San Antonio, Texas, May 1994.

Jones, Brad and Rejda, Gailen, 2006; Personal communication between Brad Jones and Gailen Rejda of U.S. Army Corps of Engineers – Omaha District and URS Corporation personnel regarding average boiler heat input values per square foot of construction; May 19, 2006 and August 16, 2006.

Kimes, Jeffrey, 2005; Personal communication--email from Jeffrey Kimes, U. S. Environmental Protection Agency, Region 8 to Sally Atkins, DECAM on additional thoughts on EPA's position on conformity, November 2, 2005.

MacRae, Barbara, 2006; Personal communication--email from Barbara MacRae, CDPHE to Warner Reeser, Booz Allen Hamilton regarding adjustment to MOBILE6.2 from low altitude to high altitude emissions, June 9, 2006.

Newsome, Jeff, 2006; Personal communication—email from Jeff Newsome to Sally Atkins, DECAM regarding percentage of personnel residing off-post and on-post, August 16, 2005.

Pacific Environmental Services, Inc. (PES),1993; *Air Mobility Command Air Emissions Survey, Volume II,* March Air Force Base.

Redmond, Christine, 2005; Personal communication--email from Christine Redmond, DECAM to Warner Reeser, Booz Allen Hamilton regarding commuting mileage at Fort Carson, November 17, 2005.

Sacramento Metropolitan Air Quality Management District (SMAQMD), 1994; *Air Quality Thresholds of Significance*, December, 1994.

South Coast Air Quality Management District (SCAQMD), 1993; *California Environmental Quality Act(CEQA) Guidelines*.

U.S. Army Center for Health Promotion and Preventive Medicine/ US Army Environmental Center (USACHPPM/USAEC), 2002; *Technical Guide for Compliance with the General Conformity Rule*, August 2002.

USACHPPM, 2004; *Technical Guide for Preparing a Record of Nonapplicability for the General Conformity Rule*, December, 2004.

U. S. Air Force (USAF), 1992a; Excerpts from *Sheppard Air Force Base 1991 Air Emissions Inventory*.

USAF, 1992b; Excerpts from *Vance Air Force Base 1991 Air Emissions Inventory*.

USAF, 1992c; Excerpts from *Randolph Air Force Base 1991 Air Emissions Inventory*.

USAF, 1993; Excerpts from *Travis Air Force Base 1992 Air Emissions Inventory*.

USAF, 1994a; *U. S. Air Force Almanac,* Air Force Association, Arlington, VA.

USAF, 1994b; Excerpts from *Reese Air Force Base 1991 Air Emissions Inventory*.

USAF, 1994c; Excerpts from *Draft Emissions Survey Report*, Elmendorf Air Force Base, Alaska.

U. S. Department of Commerce, 1994; *Regional Economic Information System* (REIS) CD-ROM, Economics and Statistics Administration, Bureau of Economic Analysis, Regional Economic Measurement Division.

U. S. Department of Transportation, 1994; *Commuting Alternatives in the US: Recent Trends and a Look to the Future.*

U. S. Environmental Protection Agency (USEPA), 1989; *Nonroad and Vehicle Emission Study-Report.*

USEPA, 1991; *AP-42 Draft Compilation of Air Pollutant Emission Factors for Aircraft*, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina.

USEPA, 1996; *AP-42* Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines, Table 3.3-1, Fifth Edition, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina,October 1996,

USEPA, 1993b; EPA's Graphical Aerometric Data System, Data Analysis Toll and Viewer, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina.

USEPA, 1998; *AP-42 or Compilation of Air Pollutant Emission Factors, Fifth Edition, Volume I: Stationary Point and Area Sources, including Supplements D and E*, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina.

USEPA, 2002; *National Emission Trends Inventory*, (Net 2002).

USEPA, 2001; *AP-42 Draft Compilation of Air Pollutant Emission Factors*, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina.

USEPA, 2002; *User's Guide to MOBILE6.1 and 6.2 Mobile Source Emission Factor Model*, EPA A420-R-02-028, October, 2002., Earth Technologies, Inc.

Woodbury, Brian, 2005; Personal communication--email from Brian Woodbury, Earth Technologies, Inc. to Warner Reeser, Booz Allen Hamilton, October 20, 2005. Information source cited was Sacramento Air Quality District, 1994; Air Quality Thresholds of Significance, December, 1994.

Woodbury, Brian, 2005; Personal communication—telephone conversation with Brian Woodbury, Earth Technologies, Inc, and Warner Reeser, Booz Allen Hamilton, November 3, 2005. Information source cited was Sacramento Metropolitan Air Quality District, 1994; Air Quality Thresholds of Significance, December, 1994.

Appendix D- Persons/Agencies Consulted

Fort Carson, Colorado

Earth Technologies, Inc.

Pikes Peak Area Council of Governments

U. S. Environmental Protection Agency, Region 8

Colorado Department of Public Health and Environment

Appendix E- List of Preparers

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PIKES PEAK AREA COUNCIL OF GOVERNMENTS

15 South 7th Street - Colorado Springs, CO 80905 Phone: (719) 471-7080 Fax: (719) 471-1226 Email: ppacg@ppacg.org www.ppacg.org

October 9, 2006

Department of the Army

[redacted]

1638 Elwell St., Bldg 6236
Fort Carson, CO 80913-4000

Dear [redacted]

The Pikes Peak Area Council of Governments (PPACG) has reviewed the September 18, 2006 Clean Air Act Draft General Conformity Analysis and Determination for Fort Carson, Colorado. PPACG serves as the Metropolitan Planning Organization (MPO) and is the lead air quality planning agency for the Colorado Springs Region. PPACG agrees with the findings of the report that Fort Carson will be able to demonstrate conformity and compliance with the Clean Air Act. Based on the information presented the project does conform to the Carbon Monoxide (CO) Maintenance Plan for Colorado Springs that was approved by the Colorado Air Quality Control Commission on September 18, 2003.

PPACG will incorporate the expected increase of 106 tons per year in CO emissions from privately-owned vehicles into the model update that will be completed as part of the 2009-2013 Transportation Improvement Program (TIP), which is expected to be approved prior to 2009. PPACG also agrees that the expected increase of 115.2 tons per year of CO from other sources will not exceed the emissions budget stated in the CO Maintenance Plan. The expected increase of 115 tpy equates to 0.32 tons per day, which is less then 1% of the total emissions inventory.

If you have any questions, or the need for additional information, please contact me at [redacted]

Sincerely,

[redacted]

Environmental Program Manager
Pikes Peak Area Council of Governments

Cc: [redacted]

for

U.S. Army, Fort Carson, Colorado



APPENDIX D

Noise Supporting Documentation

How is noise modeled?

The primary means of assessing military environmental noise is through computer modeling. Computer noise models require various operational data, such as types of operations/ weapons and number, location, and time of training. The output from the models is summarized on installation land use maps in the form of noise contours. This fact sheet presents information about the various computer models used to generate noise contour maps. *Note: Noise contours are not generated from actual noise measurements because the process would be too labor- and equipment-intensive, requiring months of monitoring at hundreds of measurement sites.*

Calculating Average Noise Levels

Department of Defense bases/installations use computer modeling programs to determine the average daily noise for aircraft operations generated over the period of one year. Generally, moments of quiet are averaged together with moments where loud noises can be heard. The models also add a 10-decibel penalty to nighttime noise (10 pm to 7 am) to account for higher annoyance usually associated with nighttime noise events. In California, a 5-decibel penalty is also included for evening noise events (7 pm to 10 pm).

High-Energy Impulsive Noise (abrupt, short-duration noise such as from explosions and artillery)

The noise simulation program used to assess large-caliber (20-millimeter and greater) weapons is BNOISE2. It models the noise from the muzzle blast, the explosive detonation at impact, and the bow shock caused by the round going down range. The effects of terrain on sound travel (propagation) are also included. The BNOISE2 program requires operational data concerning type of weapons fired from each range or firing point, including demolitions, the number and type of rounds fired from each weapon, the location of targets for each range or firing point, the amount of propellant used to reach the target and time of day.

Aircraft Noise

Noise contours for aircraft activity at an airfield are generated using the NOISEMAP computer program. The required inputs to the program are the location of the flight tracks, aircraft altitudes, the number of each type of aircraft using each flight track and time of day.

Rotary-wing noise, including helicopters and tilt-rotors, is modeled using the Rotorcraft Noise Model (RNM) originally developed by NASA. RNM includes sound hemispheres around the aircraft based on various performance parameters and propagates noise in the rotor plane. Thus, rotary wing noise can be described fore and aft of the aircraft as well as in front of and behind the advancing blade.

The noise zones for the helicopter Nap of the Earth (NOE) routes and low-altitude flight tracks are generated using the HELOSLICE computer program. HELOSLICE is a simplified version of the NOISEMAP computer program, developed to predict the noise from operations at remote landing areas, flight tracks, and NOE routes. The required inputs to this model include the number and type of helicopter using each area or route and the altitude of the helicopter at the point of interest.

ROUTEMAP is a model that calculates the noise levels on the ground along a military training route (MTR). The inputs to the model are the altitude, power setting, speed and number of operations by aircraft type for a one-month period.

Small Arms Noise

The Small Arms Range Noise Assessment Model (SARNAM) computer program is used to generate the noise contours for small arms (up to 50-caliber) ranges weapon systems. It includes an extensive selection of weapons in the source library and can incorporate information from multiple ranges of various types.

Predicting Noise and Annoyance from Infrequent Events

Average daily noise levels can sometimes understate the severity of an infrequent, single-noise event because annoying noise peaks can be "averaged out." So it is helpful to be able to measure specific noise levels from single events, such as artillery firings or explosive detonations. This information can be useful when predicting annoyance and potential complaints. The BNOISE2 and SARNAM computer models include the capability to predict the single-event levels. The following models are also used to predict single-event levels.

High-Energy Impulsive Noise

The single-event noise levels from impulsive activities are predicted using the SHOT computer model. The effect of topography features between the noise source and the receiver is included in the model. The inputs to this model are the explosive weight or weapon and propellant charge size, distance between the source and the receiver, burial depth or elevation height if applicable, and location and height of a barrier, berm or hill, if one exists, between the source and receiver.

PEAKEST is a computer model used to predict the peak levels from the demolition of standard engineering and named explosives. It is used when the noise levels from an explosive detonation are required for planning and siting of these activities and for National Environmental Policy Act (NEPA) documentation.

Other Aircraft Noise

MR_NMAP is a computer model used to calculate the subsonic noise impact from aircraft operations in a military operations area (MOA) and in special use airspaces. The model includes an operations input program that describes the aircraft flight operation in existing or new airspace.

PCBOOM3 is a program that computes single-event sonic boom footprints from any supersonic vehicle maneuver. The use specifies the aircraft, the maneuver, and the atmosphere. The primary output is the sonic boom footprint in terms of equal over pressure on the ground, relative to the aircraft's position.

For more information about the Army's noise management program contact:

Operational Noise Program
U.S. Army Center for Health Promotion and Preventive Medicine
MCHB-TS- EON
Aberdeen Proving Ground, MD 21010-5403
410-436-3829
http://chppm-www.apgea.army.mil/dehe/morenoise/

For more information on the Navy's Noise Management Program contact:

Special Assistant for AICUZ and Encroachment
Commander Navy Installations
Naval Facilities Engineering Command
Washington Navy Yard, Washington DC 20374
202-685-9181

For more information on the Air Force's Noise Management Program contact:

AICUZ/Noise Program Manager
Bases and Units Branch
HQ USAF/ILEPB
1260 Air Force Pentagon
Washington, D.C. 20330.
703-604-5277

For more information on the Marine Corp's Noise Management Program contact:

Community and Land Use Planner for AICUZ
Headquarter Marine Corps
Washington DC, 20380-1775
703-695-8240, ext 3350

This fact sheet is part of *Tri-Services Community and Environmental Noise Primer.* This guide, along with its companion CD, can help you educate and engage stakeholders on and off your installation, and generate support for noise management activities.

Insert local contact information here

NOISE ZONES DESCRIPTIONS AND LAND USE GUIDELINES

1. Day Night Level Descriptions.

(a) The Noise Zone III consists of the area around the source of the noise in which the level is greater than 70 decibels (dB), C-weighted day-night sound level (CDNL) for large caliber weapons, greater than 104 PK15(met) for small arms and greater than 75 dB, A-weighted day-night sound level (ADNL) for aircraft activity. The noise level within Noise Zone III is considered so severe that noise-sensitive land uses should not be considered therein.

(b) The Noise Zone II consists of an area where the day-night sound level is between 62 and 70 dB CDNL for large caliber weapons; 87 and 104 PK15(met) for small arms; and 65 and 75 dB ADNL for aircraft activity. Exposure to noise within this area is considered significant, and use of land within Noise Zone II should normally be limited to activities such as industrial, manufacturing, transportation, and resource production. However, if the community determines that land in Noise Zone II areas must be used for residential purposes, then noise level reduction features of 25 to 30 decibels should be incorporated into the design and construction of the buildings.

(c) The Noise Zone I include all areas around a noise source in which the day-night sound level is less than 62 dB CDNL for large caliber weapons, less than 87 PK15(met) for small arms and 65 dB ADNL for aircraft activity. This area is usually acceptable for all types of land use activities.

(d) The Land Use Planning Zone (LUPZ) DNL noise contours, 57 dB CDNL and 60 dB ADNL, represent an annual average that separates the Noise Zone II from the Noise Zone I. Taking all operations that occur over the year and dividing by the number of training days generates the contours. But, the noise environment varies daily and seasonally because operations are not consistent through all 365 days of the year. In addition, the Federal Interagency Committee on Urban Noise document states "Localities, when evaluating the application of these guidelines to specific situations, may have different concerns or goals to consider." For residential land uses, depending on attitudes and other factors, a 57 CDNL or 60 ADNL may be considered by the public as an impact on the community environment. In order to provide a planning tool that could be used to account for days of higher than average operations and possible annoyance, the LUPZ contour is being included on the noise contour maps.

(e) See Table 1 for land use guidelines.

Table 1. Land Use Planning Guidelines.

Noise Zones	Large-Caliber Weapons (CDNL)	Aircraft Activity (ADNL)	Small Arms PK15(met)
LUPZ	57 – 62	60-65	NA
I	< 62	<65	<87
II	62 - 70	65-75	87-104
III	> 70	>75	>104

Note:
LUPZ = Land Use Planning Zone
< = less than
> = greater than

2. PK15(met) Noise Contour Description.

(a) Community annoyance due to many types of transportation and industrial noise is typically and appropriately assessed based on average noise level over a protracted time period. The DNL is the primary descriptor used for this purpose in the United States. The DNL is the time weighted energy average sound level with a 10-dB penalty added to the nighttime levels (2200 to 0700 hours). The use of average noise level over a protracted time period generally does not adequately assess community noise impact and complaint potential due to relatively infrequent blast noise events or weapon firing. For example, for a small arms range at which hundreds of rounds are fired each year, resultant peak levels (PK) can easily exceed 104 dB in regions that annual DNL values indicate to be adequately quiet for housing.

(b) To account for statistical variation in received weapons noise level due to weather, it is recommended that the PK15(met) noise level be calculated. The peak contours show the expected level that one would get on a sound level meter when a weapon was fired. Since weather conditions can cause noise levels to vary significantly from day to day (even from hour to hour) the programs calculate a range of peak levels. This range is based on weather conditions that favor or hinder sound propagation. By plotting the PK15(met) contour, events would be expected to fall within the contours 85% of the time. This gives the installation and the community a more realistic means to consider the areas impacted by training noise without putting stipulations on land that would only receive high sound levels under infrequent weather conditions that favor sound propagation. This metric represents the best available scientific quantification for assessing the complaint risk of large and small caliber weapons ranges. The complaint risk areas for PK15(met) noise contours are defined as follows:

(1) The high risk of complaint area consists of the area around the source of the noise in which PK15(met) noise contour is greater than 130 dB for large caliber weapons.

(2) The moderate risk of complaint area consists of an area where the PK15(met) noise contour is between 115 dB and 130 dB for large caliber weapons.

(3) The low risk of complaint area includes all areas around a noise source in which the PK15(met) noise contour is less than 115 dB for large caliber weapons.

(c) See Table 2 for complaint risk guidelines.

Table 2. Complaint Risk Guidelines.

Risk of Complaints	**Large Caliber Weapons (20mm and greater)**
	PK15(met) dB Noise Contour
Low	< 115
Moderate	115 - 130
High	> 130

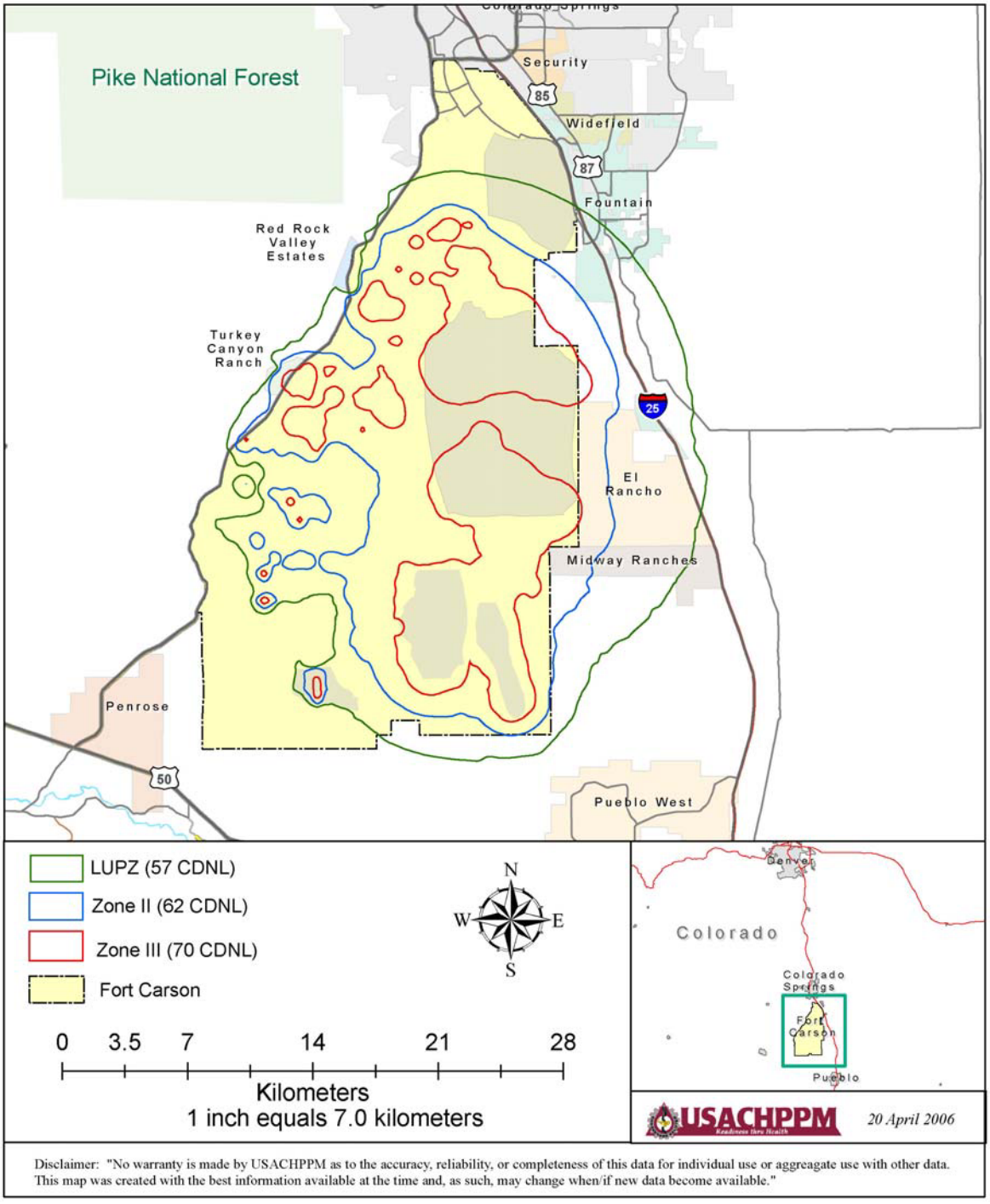


FIGURE D-2
Fort Carson Existing Large Caliber Operational Noise Contours

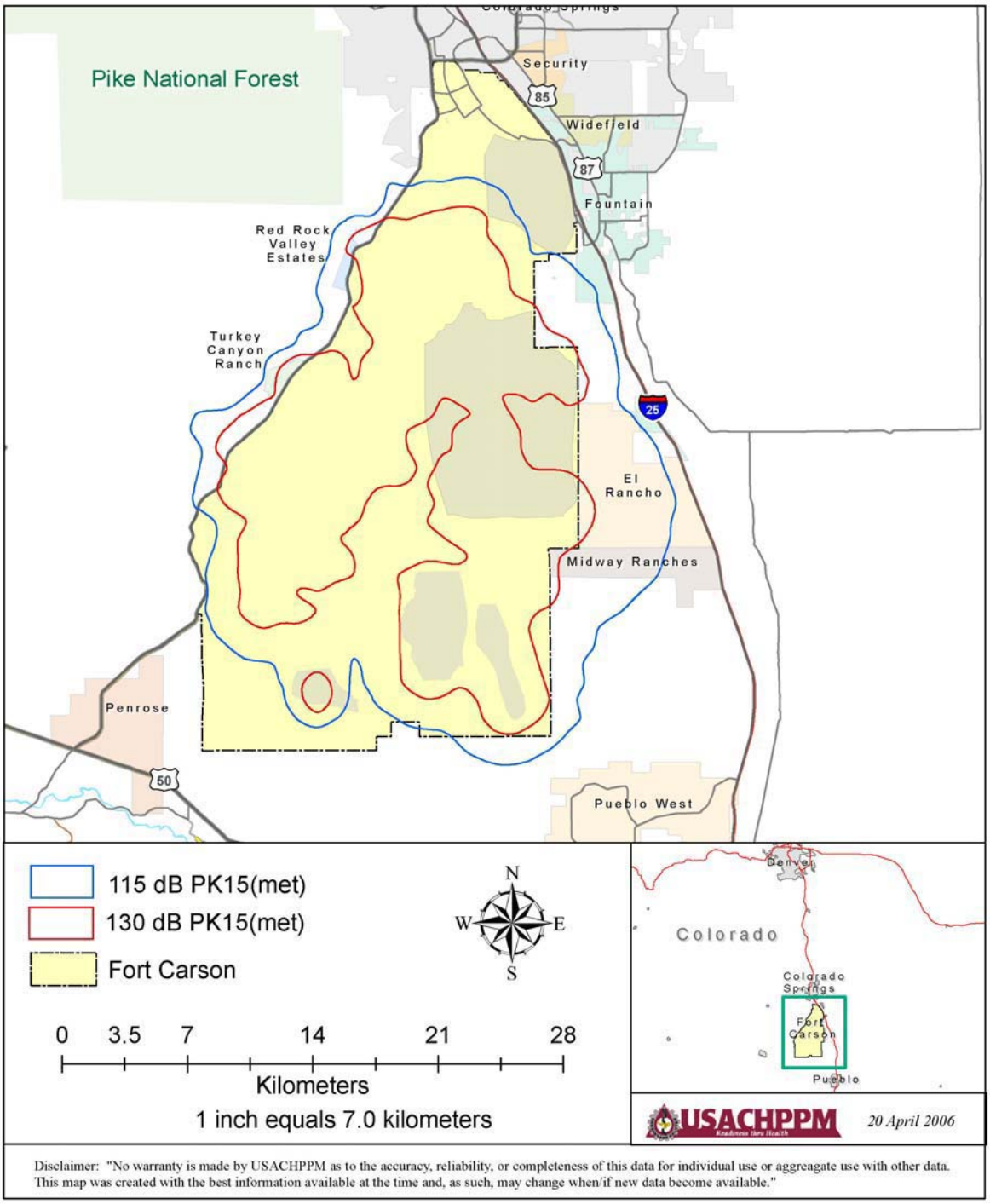


FIGURE D-3
Fort Carson Large Caliber Operational
PK15(met) Noise Contours

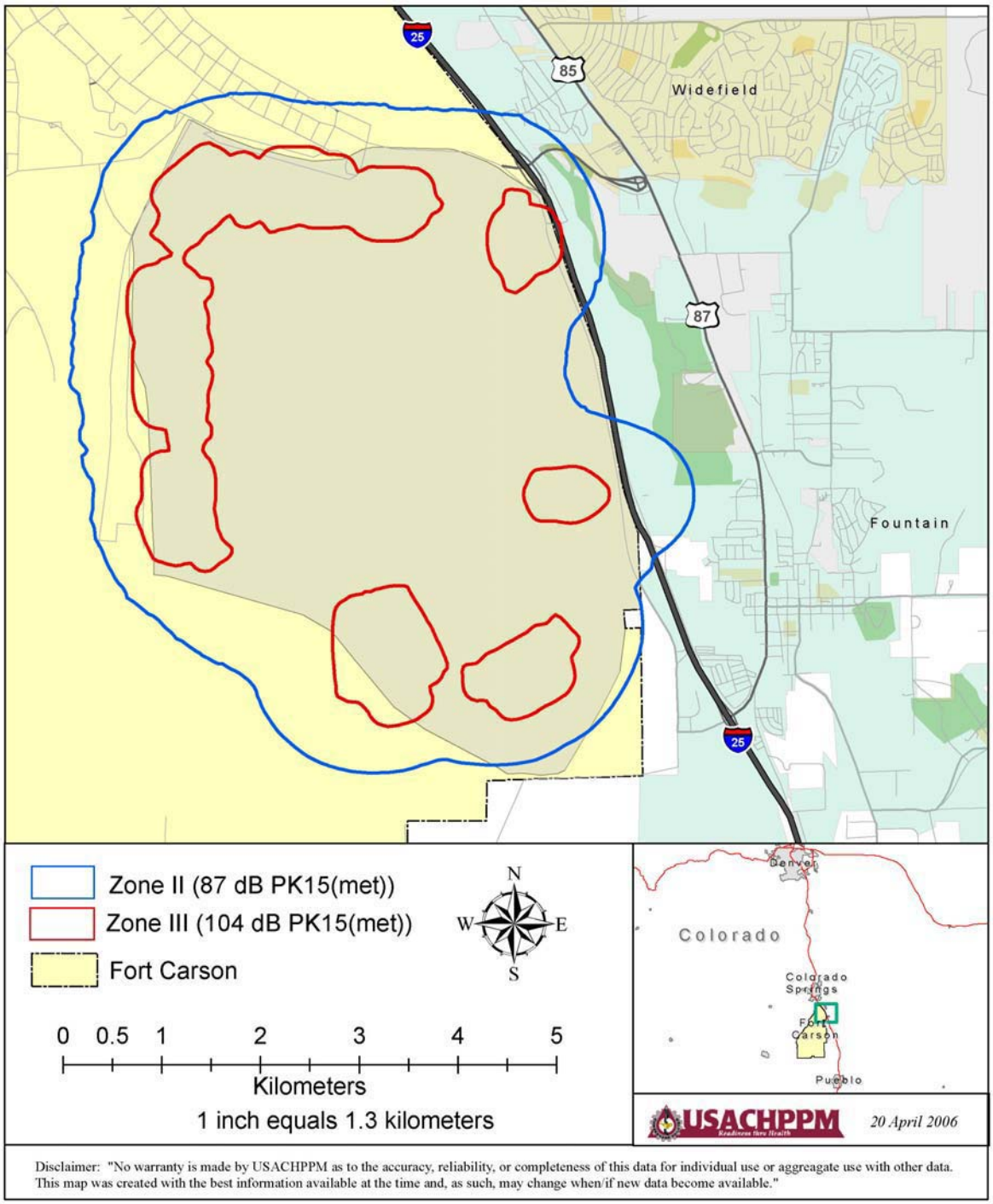


FIGURE D-4
Fort Carson Small Caliber Operational Noise Contours

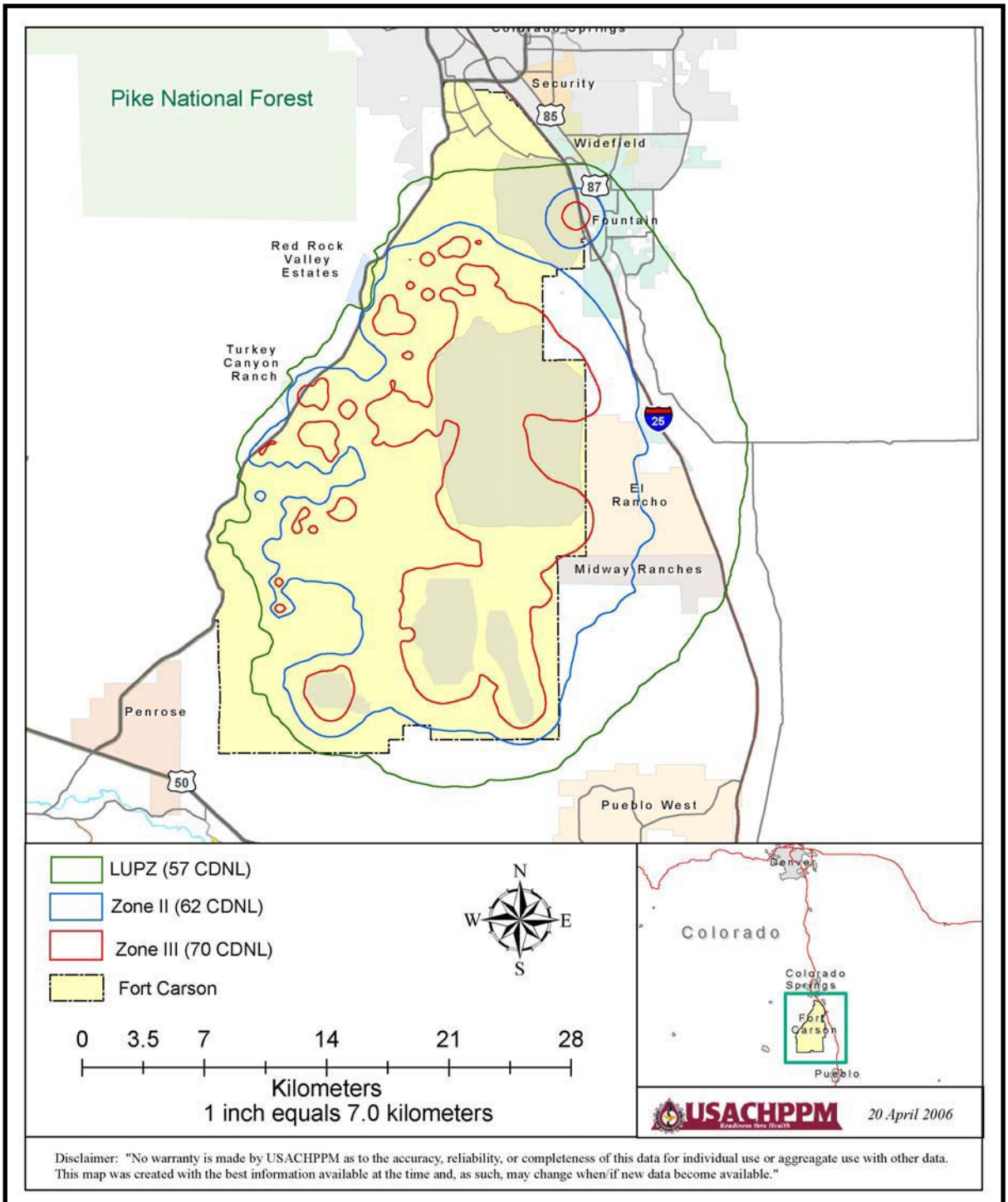


FIGURE D-5
Fort Carson Future Large Caliber Operational Noise Contours

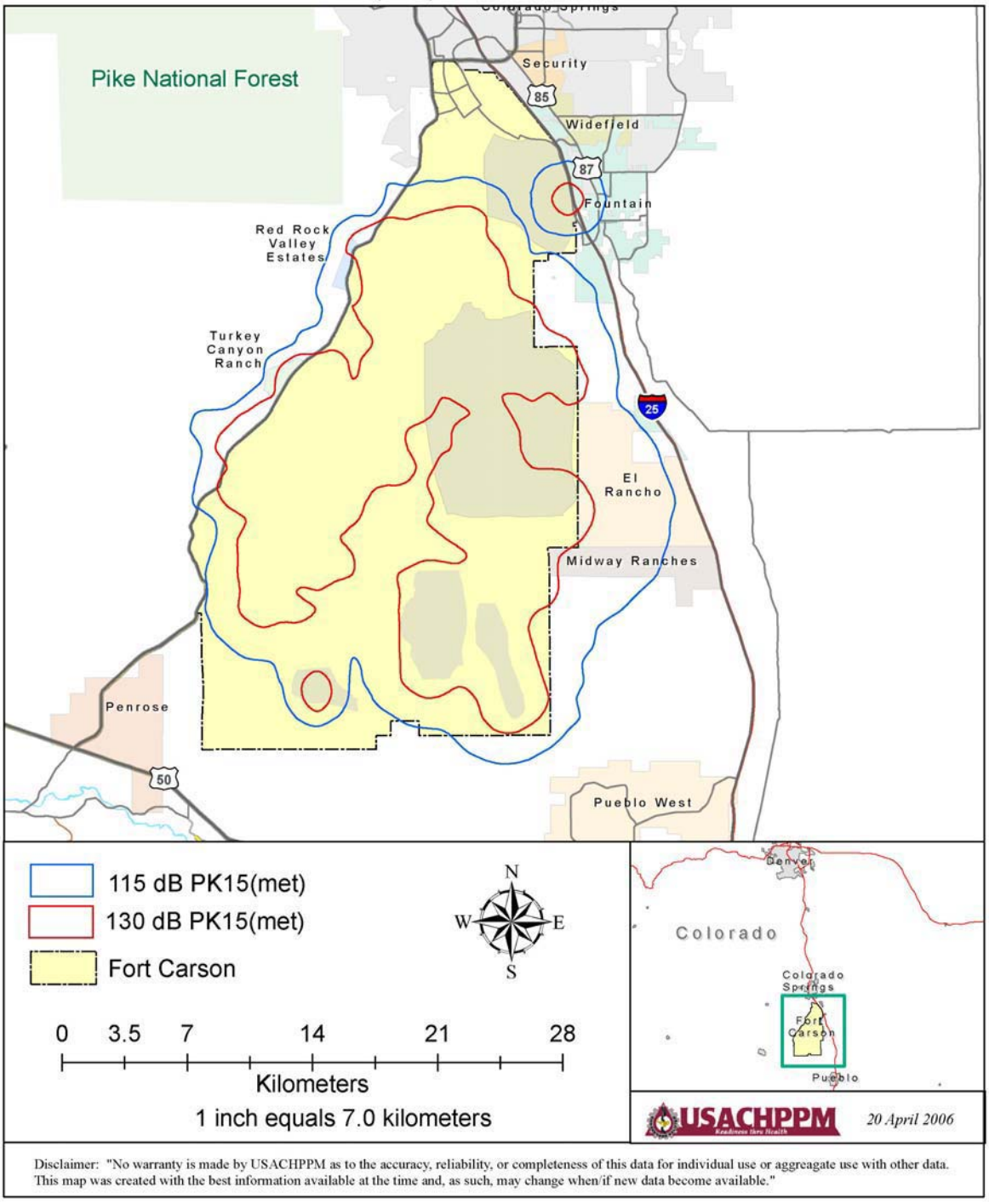


FIGURE D-6
Fort Carson Future Large Caliber Operational PK15(met) Noise Contours

APPENDIX E

Biological Resources Supporting Documentation

ATTACHMENT E.1

Plant Species Known to Occur at Fort Carson

ATTACHMENT E.1
Plant Species Known to Occur on Fort Carson

Scientific Name	Common Name	Life	Origin	Form	Season
Angiosperms (Flowering Plants)					
Aceraceae (Maple Family)					
Acer glabrum	Mountain maple	P	N	T	C
Negundo aceroides, ssp. *interius*	Box elder	P	N	T	C
Agavaceae (Agave Family)					
Yucca glauca	Small soapweed	P	N	F	C
Alliaceae (Onion Family)					
Allium cernuum	Wild onion	P	N	F	W
Allium textile	Textile onion	P	N	F	C
Alsinaceae (Chickweed Family)					
Cerastium fontanum	Common mouse-ear	P	N	F	C
Eremogone fendleri	Fendler's sandwort	P	N	F	W
Eremogone hookeri	Hooker's sandwort	P	N	F	W
Paronychia jamesii	James nailwort	P	N	F	W
Amaranthaceae (Amaranth Family)					
Amaranthus retroflexus	Redroot amaranth	A	N	F	W
Anacardiaceae (Sumac Family)					
Rhus aromatica, ssp. *tribolata*	Skunkbrush, Lemonade bush	P	N	S	C
Toxicodendron rydbergii	Poison ivy	P	N	S	W
Apiaceae (Carrot Family)					
Berula erecta	Water parsnip	P	N	F	C
Conium maculatum	Poison hemlock	B	I	F	C
Cymopterus montanus	Mountain spring parsley	P	N	F	C
Heracleum sphondylium, ssp. *montanum*	Cow parsnip	P	N	F	C
Ligusticum porteri	Osha, Lovage	P	N	F	C
Lomatium orientale	Northern Idaho biscuitroot	P	N	F	C
Apocynaceae (Dogbane Family)					
Apocynum cannabinum	Indian hemp	P	N	F	W
Asclepiadaceae (Milkweed Family)					
Asclepias asperula	Spider milkweed	P	N	F	C
Asclepias engelmanniana	Englemann's milkweed	P	N	F	W
Asclepias incarnata	Swamp milkweed	P	N	F	W
Asclepias pumilla	Plains milkweed	P	N	F	W
Asclepias speciosa	Showy milkweed	P	N	F	C
Asclepias subverticillata	Whorled milkweed	P	N	F	W
Asclepias tuberose, ssp. *terminalis*	Butterflyweed	P	N	F	W
**Asclepias uncialis*	Dwarf milkweed	P	N	F	C
Asclepias viridiflora	Green milkweed	P	N	F	W
Asparagaceae (Asparagus Family)					
Asparagus officinalis	Garden asparagus	P	I	F	C

ATTACHMENT E.1
Plant Species Known to Occur on Fort Carson

Scientific Name	Common Name	Life	Origin	Form	Season
Asteraceae (Daisy Family)					
Acosta diffusa	Diffuse knapweed, White knapweed	B	I	F	W
Acosta maculosa	Spotted knapweed	B/P	I	F	W
Acroptilon repens	Russian knapweed	P	I	F	W
Ambrosia psilostachya, var. *coronopifolia*	Western ragweed	P	N	F	W
Ambrosia trifida	Giant ragweed	A	I	F	W
Antennaria parvifolia	Littleleaf pussytoes	P	N	F	C
Antennaria rosea	Pink pussytoes	P	N	F	C
Arctium minus	Common burdock	P	I	F	W
Artemisia bigelovii	Bigelow's sagebrush	P	N	F	W
Artemisia frigida	Silver sagebrush	P	N	F	W
Artemisia ludoviciana	Louisiana sagebrush	P	N	F	W
Aster integrifolius	Thickstem aster	P	N	F	W
Aster porteri	Porter's aster	P	N	F	W
Baccharis wrightii	Wright's baccharis	P	N	F	W
Bahia dissecta	Ragleaf bahia	P	N	F	W
**Bolophyta tetraneuris*	Arkansas feverfew	P	N	F	W
Breea arvensis	Canada thistle	P	I	F	W
Brickellia californica	California brickellbush	P	N	F	W
Brickellia eupatorioides	False prairie boneset	P	N	F	W
Brickellia grandiflora	Tasselflower brickellbush	P	N	F	W
Brickellia rosmarinifolia, ssp. *chlorolepis*	Boneset	P	N	F	W
Carduus nutans, ssp. *macrolepis*	Musk thistle, Nodding plumeless thistle	P	I	F	W
Chrysothamnus nauseosus, ssp. *graveolens*	Rabbitbrush	P	N	S	W
Chrysothamnus parryi, ssp. *howardii*	Rabbitbrush	P	N	S	W
Cirsium undulatum	Wavyleaf thistle	P	N	F	W
Cirsium vulgare	Bull thistle	P	I	F	W
Conyza canadensis	Canadian horseweed	A	N	F	W
Coreopsis lanceolata	Lanceleaf tickseed	P	I	F	W
Coreopsis tinctoria	Plains coreopsis, Golden tickseed	A	N	F	W
Cyclachaena xanthifolia	Marsh-elder	A	N	F	C
Dyssodia aurea	Dogweed	A	N	F	W
Dyssodia papposa	Fetid marigold	A	N	F	W
Erigeron divergens	Spreading fleabane	P	N	F	W
Erigeron engelmannii	Engelmann's fleabane	P	N	F	W
Erigeron flagellaris	Trailing fleabane	P	N	F	W
Erigeron pumilus	Low fleabane	P	N	F	C
Erigeron subtrinervis	Threenerved fleabane	P	N	F	W
Gaillardia pinnatifida	Blanket flower	P	N	F	C
Grindelia revoluta	Rolled gumweed	B	N	F	W
Grindelia squarrosa	Curlycup gumweed	B	N	F	W
Gutierrezia sarothrae	Broom snakeweed	P	N	F	W

ATTACHMENT E.1
Plant Species Known to Occur on Fort Carson

Scientific Name	Common Name	Life	Origin	Form	Season
Helianthus annuus	Annual sunflower	A	N	F	W
Helianthus petiolaris	Prairie sunflower	A	N	F	W
Heliomeris multiflora	Showy goldeneye	P	N	F	W
Heterotheca villosa	Shinners, Hairy goldaster	P	N	F	W
Hymenopappus filifolius	Fineleaf hymenopappus	P	N	F	C
Lactuca ludoviciana	Western wild lettuce	P	N	F	W
Lactuca serriola	Prickly lettuce	P	I	F	W
Lactuca tatarica, ssp. *pulchella*	Chicory lettuce	P	N	F	W
Leucanthemum vulgare	Ox-eye daisy	P	I	F	C
Leucelene ericoides	Sand aster	P	N	F	C
Liatris punctata	Dotted gayfeather	P	N	F	W
Lygodesmia juncea	Rush skeletonweed	P	N	F	W
Machaeranthera pinnatifida	Lacy tansyaster	P	N	F	C
Machaeranthera tanacetifolia	Tansyleaf aster	A	N	F	W
Melampodium leucanthum	Plains blackfoot daisy	P	N	F	C
Oligosporus caudatus	Sagewort wormwood	P	N	F	W
Oligosporus dracunculus, ssp. *glaucus*	Wild tarragon	P	N	F	W
Oligosporus filifolius	Sand sagebrush	P	N	S	W
Onopordum acanthium	Scotch thistle	B	I	F	W
* *Oonopsis foliosa*	Fremont goldenweed	P	N	F	W
Packera fendleri	Fendler groundsel	P	N	F	C
Packera neomexicana, ssp. *mutabilis*	Groundsel	P	N	F	C
Packera tridenticulata	Groundsel	P	N	F	C
Pectis angustifolia	Narrow-leaf pectis	P	N	F	W
Picradeniopsis oppositifolia	Plains bahia	P	N	F	W
Ratibida columnifera	Prairie coneflower	P	N	F	W
Rudbeckia lanciniata, var. *ampla*	Goldenglow	P	N	F	W
Senecio flaccidus, ssp. *douglasii*	Douglas groundsel	P	N	F	W
Senecio integerrimus	Lambstongue groundsel	P	N	F	W
Senecio spartioides	Broom groundsel	P	N	F	W
Solidago canadensis	Canada goldenrod	P	N	F	W
Solidago missouriensis	Prairie goldenrod	P	N	F	W
Solidago mollis	Velvety goldenrod	P	N	F	W
Solidago nana	Low goldenrod	P	N	F	W
Solidago velutina	Three-nerved goldenrod	P	N	F	W
Sonchus asper	Prickly sow thistle	A	I	F	C
Stephanomeria pauciflora	Desert wirelettuce	P	N	F	W
Taraxacum officinale	Common dandelion	P	I	F	C
Tetraneuris acaulis	Stemless hymenoxys	P	N	F	C
Thelesperma filifolium	Stiff greenthread	A	N	F	W
Thelesperma megapotamicum	Hopi-tea greenthread	P	N	F	C
Thelesperma subnudum	Navajo-tea greenthread	P	N	F	W

ATTACHMENT E.1
Plant Species Known to Occur on Fort Carson

Scientific Name	Common Name	Life	Origin	Form	Season
Townsendia exscapa	Stemless townsendia	P	N	F	C
Townsendia grandiflora	Largeflower townsendia daisy	P	N	F	C
Tragopogon dubius, ssp. *major*	Western salsify	P	I	F	C
Virgulus ericoides	White aster	P	N	F	W
Virgulus falcatus	Aster	P	N	F	W
Virgulus fendleri	Fendler's aster	P	N	F	W
Ximenesia encelioides	Golden crownbeard	A	N	F	W
Zinnia grandiflora	Rocky Mountain zinnia	P	N	F	C
Betulaceae (Birch Family)					
Alnus incana, ssp. *tenuifolia*	Speckled alder	P	N	S	C
Boraginaceae (Borage Family)					
Cryptantha minima	Little catseye	A	N	F	C
Cynoglossum offinicale	Hound's tongue	P	N	F	C
Hackelia floribunda	Large-flowered stickseed	P	N	F	W
Lappula redowskii	Blueburr stickseed	A	N	F	C
Lithospernum incisum	Narrowleaf gromwell	P	N	F	C
Mertensia lanceolata	Lanceleaf bluebells	P	N	F	C
Onosmodium molle, var. *occidentale*	Western marbleseed	P	N	F	C
Oreocarya suffruticosa	James cryptantha	P	N	F	C
Oreocarya thyrsiflora	Cluster cryptantha	P	N	F	C
Brassicaceae (Mustard Family)					
Barbarea vulgaris	Winter cress	P	I	F	C
Camelina microcarpa	Littlepod falseflax	A	I	F	C
Cardaria draba	Pepperweed whitetop	P	N	F	C
Descurania incisa	Tansey mustard	A	N	F	C
Descurainia sophia	Flimweed tanseymustard	A	I	F	C
Erysimum asperum	Western wallflower	P	N	F	C
Erysimum capitatum	Western wallflower	P	N	F	C
Lepidium alyssoides	Mesa pepperwort	P	N	F	C
Lepidium densiflorum	Common pepperweed	A	N	F	C
Lesquerella fendleri	Fendler's bladderpod	P	N	F	C
Lesquerella ludoviciana	Foothill bladderpod	P	N	F	C
Lesquirella montana	Mountain bladderpod	P	N	F	C
Nasturtium officinale	Watercress	P	N	F	C
Schoenocrambe linearifolia	Slimleaf plains mustard	P	N	F	C
Schoenocrambe linifolia	Skeleton mustard	P	N	F	C
Sinapsis arvensis	Charlock	A	I	F	C
Sisymbrium altissimum	Jim Hill mustard	A	I	F	C
Stanleya pinnata	Prince's plume	P	N	F	C
Thlaspi arvense	Field pennycress	A	I	F	C
Cactaceae (Cactus Family)					
Coryphantha vivipara	Nipple cactus	P	N	F	C

ATTACHMENT E.1
Plant Species Known to Occur on Fort Carson

Scientific Name	Common Name	Life	Origin	Form	Season
Cylindropuntia imbricata	Candelabra cactus	P	N	S	C
Echinocereus reichenbachii, var. *perbellus*	Claret cup	P	N	F	C
Echinocereus triglochidiatus	Claret cup	P	N	F	C
Echinocereus viridiflorus	Hens-and-chickens	P	N	F	C
Opuntia macrorhiza	Twisted spine prickly pear	P	N	F	C
Opuntia phaeacantha	New Mexican prickly-pear	P	N	F	C
Opuntia polyacantha	Plains prickly-pear	P	N	F	C
Pediocactus simpsonii, var. *minor*	Ball cactus	P	N	F	C
Calochortaceae (Mariposa Family)					
Calochortus gunnisonii	Sego lily, Mariposa lily	P	N	F	W
Cannabaceae (Hops Family)					
Humulus lupulus, ssp. *americanus*	Wild hops	P	N	V	W
Capparidaceae (Caper Family)					
Cleome serrulata	Rocky Mountain beeplant	A	N	F	W
Polanisia dodecandra	Roughseed clammyweed	P	N	F	C
Caprifoliaceae (Honeysuckle Family)					
Symphoricarpos albus	White coralberry	P	N	F	C
Symphoricarpos occidentalis	Western snowberry	P	N	F	C
Symphoricarpos oreophilus	Mountain snowberry	P	N	F	C
Caryophyllaceae (Pink Family)					
Melandrium dioicum	White campion	P	I	F	W
Chenopodiaceae (Goosefoot Family)					
Atriplex argenta	Tumbling saltbush	A	N	F	W
Atriplex canescens	Fourwing saltbush	P	N	S	C
Atriplex confertifolia	Shadscale saltbush	P	N	S	W
Atriplex patula	Spear saltbush	P	N	F	W
Bassia sieversiana	Ironweed	A	I	F	W
Chenopodium album	Lambsquarters	A	I	F	W
Chenopodium desiccatum	Desert goosefoot	A	N	F	W
Chenopodium fremontii	Fremont goosefoot	A	N	F	W
Chenopodium incanum	Mealy goosefoot	A	N	F	W
Chenopodium leptophyllum	Slimleaf goosefoot	A	N	F	W
Krascheninnikovia lanata	Common winterfat	P	N	F	C
Salsola australis	Russian thistle,Tumbleweed	A	I	F	W
Sarcobatus vermiculatus	Black greasewood	P	N	S	C
Suaeda calceoliformis	Sea-blite	P	N	F	C
Commelinaceae (Spiderwort Family)					
Commelina dianthifolia	Birdbill dayflower	P	N	F	W
Commelina erecta, var. *angustifolia*	Whitemouth dayflower	P	N	F	W
Tradescantia occidentalis	Prairie spiderwort	P	N	F	C
Convallariaceae (Mayflower Family)					
Maianthemum stellatum	False Solomon's seal	P	N	F	C

ATTACHMENT E.1
Plant Species Known to Occur on Fort Carson

Scientific Name	Common Name	Life	Origin	Form	Season
Convolvulaceae (Morningglory Family)					
Convolvulus arvensis	Creeping jenny	P	I	F	W
Convolvulus equitans	Texas bindweed	P	N	F	C
Evolvulus nuttalianus	Arizona evolvulus	P	N	F	C
Ipomoea leptophylla	Bush morningglory	P	N	F	C
Cornaceae (Dogwood Family)					
Swida sericea	Red osier dogwood	P	N	T	C
Cucurbitaceae (Gourd Family)					
Cucurbita foetidissima	Buffalo gourd	P	N	F	W
Cyperaceae (Sedge Family)					
Carex emoryi	Emory's sedge	P	N	G	C
Carex hystericina	Bottlebrush sedge	P	N	G	C
Carex occidentalis	Western sedge	P	N	G	C
Carex pensylvanica, ssp. *heliophila*	Sun sedge	P	N	G	C
Carex stenophylla, ssp. *eleocharis*	Needleleaf sedge	P	N	G	C
Eleocharis palustris	Common spikerush	P	N	G	C
Mariscus fendlerianus	Fendlers flatsedge	P	N	G	W
Schoenoplectus lacustris, ssp. *acutis*	Tule bulrush	P	N	G	C
Schoenoplectus lacustris, ssp. *creber*	Hardstem bulrush	P	N	G	C
Schoenoplectus pungens	Bulrush	P	N	G	W
Scirpus pallidus	Cloaked bulrush				
Dipsacaceae (Teasel Family)					
Dipsacus fullonum	Fuller's teasel	B	I	F	W
Elaeagnaceae (Oleaster Family)					
Elaeagnus angustifolia	Russian olive	P	I	T	C
Ericaceae (Heath Family)					
Arctostaphylos uva-ursi	Bearberry	P	N	S	W
Euphorbiaceae (Spurge Family)					
Agaloma marginata	Snow-on-the-mountain	A	N	F	C
Chamaesyce fendleri	Sandmat	P	N	F	C
Chamaesyce glyptosperma	Small, Ribseed sandmat	A	N	F	C
Chamaesyce missurica	Prairie sandmat	A	N	F	W
Chamaesyce serpyllifolia	Thymeleaf sandmat	A	N	F	W
Chamaesyce stictospora	Slimseed sandmat	A	N	F	W
Poinsettia dentata	Toothed spurge	A	N	F	C
Tragia ramosa	Noseburn	P	N	F	C
Fabaceae (Pea Family)					
Amorpha fruticosa, var. *angustifolia*	False indigo	P	N	S	C
Astragalus adsurgens, var. *robustior*	Prairie milk-vetch	P	N	F	W
Astragalus bisulcatus	Two-grooved vetch	P	N	F	W
Astragalus drummondii	Drummond's milk-vetch	P	N	F	C
Astragalus missouriensis	Missouri milk-vetch	P	N	F	C

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Plant Species Known to Occur on Fort Carson

Scientific Name	Common Name	Life	Origin	Form	Season
Astragalus racemosus	Alkali milk-vetch	P	N	F	C
Astragalus tenellus	Looseflower milk-vetch	P	N	F	C
Caragana arborescens	Siberian pea-shrub	P	I	S	C
Dalea aurea	Silktop dalea	P	N	F	W
Dalea candida, var. *oligophylla*	White prairie clover	P	N	F	C
Dalea jamesii	James dalea	P	N	F	C
Dalea purpurea	Purple prairie clover	P	N	F	C
Glycyrrhiza lepidota	American licorice	P	N	F	C
Hoffmanseggia drepanocarpa	Sicklepod rushpea	P	N	F	C
Lathyrus eucosmus	Bush peavine	P	N	F	C
Lathrus latifolius	Perenial sweetpea	P	I	F	C
Medicago lupulina	Black medic	P	I	F	C
Medicago sativa	Alfalfa	P	I	F	C
Melilotus albus	White sweet clover	P	I	F	C
Melilotus officinalis	Yellow sweet clover	P	I	F	C
Oxytropis lambertii	Lambert crazyweed	P	N	F	C
Psoralidium tenuiflorum	Slimflower scurfpea	P	N	F	C
Robina neomexicana	New Mexico locust	P	N	T	C
Thermopsis divaricarpa	Golden banner	P	N	F	C
Trifolium pratense	Red clover	P	I	F	C
Vexibia nuttalliana	White loco	P	N	F	C
Vicia Americana, ssp. *americana*	American vetch	P	N	F	C
Fagaceae (Oak Family)					
Quercus gambelii	Gambel's oak	P	N	S	C
Quercus turbinella	Shrub live oak	P	N	S	C
Quercus undulata	Wavyleaf oak	P	N	S	C
Frankeniaceae (Frankenia Family)					
Frankenia jamesii	James frankenia	P	N	F	C
Geraniaceae (Geranium Family)					
Erodium cicutarium	Filaree	A	I	F	C
Geranium caespitosum, ssp. *caespitosum*	Parry geranium	P	N	F	C
Geranium richardsonii	Richardson's cranebill	P	N	F	C
Grossulariaceae (Currant or Gooseberry Family)					
Ribes aurem	Golden currant	P	N	S	C
Ribes cereum	Wax currant	P	N	S	C
Ribes leptanthum	Trumpet gooseberry	P	N	S	C
Helleboraceae (Hellebore Family)					
Delphinium carolinianum, ssp. *virescens*	Prairie larkspur	P	N	F	C
Delphinium nuttallianum	Nuttals's larkspur	P	N	F	C
Hypericaceae (St. Johnswort Family)					
Hypericum perforatum	St. John's wort	P	I	F	W

ATTACHMENT E.1
Plant Species Known to Occur on Fort Carson

Scientific Name	Common Name	Life	Origin	Form	Season
Iridaceae (Iris Family)					
Iris missouriensis	Rocky Mountain iris	P	N	G	C
Sisyrinchium montanum	Blue-eyed grass	P	N	G	C
Juncaceae (Rush Family)					
Juncus arcticus, ssp. *ater*	Arctic rush	P	N	G	C
Juncus dudleyi	Path rush	P	N	G	C
Juncus gerardii	Inland rush	P	N	G	W
Juncus interior	Inland rush	P	N	G	C
Juncus nodosus	Jointed rush	P	N	G	W
Juncus torreyi	Torrey's rush	P	N	G	W
Juncaginaceae (Arrowgrass Family)					
Triglochin maritima	Seaside arrowgrass	P	I	G	C
Lamiaceae (Mint Family)					
Hedeoma drummondii	Drummond's false pennyroyal	P	N	F	C
Lycopus americanus	American bugleweed	P	N	F	W
Marrubium vulgare	Horehound	P	I	F	C
Mentha arvensis	Field mint	P	N	F	W
Nepeta cataria	Catnip	P	I	F	W
Prunella vulgaris	Common self-heal	P	N	F	W
Salvia reflexa	Lanceleaf sage	A	N	F	W
Teucrium laciniatum	Cutleaf germander	P	N	F	C
Lemnaceae (Duckweed Family)					
Lemna minor	Duckweed	A	N	F	W
Linaceae (Flax Family)					
Adenolinum lewisii	Wild blue flax	P	N	F	C
Mesynium puberulum	Plains flax	A	N	F	C
Loasaceae (Loasa Family)					
* *Nuttallia chrysantha*	Golden blazing star	P	N	F	C
Nuttallia multiflora	Manyflowered mentzelia	P	N	F	C
Malvaceae (Mallow Family)					
Sphaeralcea angustifolia, var. *cuspidata*	Narrowleaf globemallow	P	N	F	C
Sphaeralcea coccinea	Scarlet globemallow	P	N	F	C
Nyctaginaceae (Four-O'clock Family)					
Mirabilis multiflora	Colorado four-o'clock	P	N	F	C
Mirabilis oxybaphoides	Spreading four-o'clock	P	N	F	W
Oxybaphus linearis	Narrowleaf umbrellawort	P	N	F	C
Oxybaphus nyctagineus	Wild four-o'clock	P	N	F	C
**Oxybaphus rotundifolius*	Roundleaf four-o'clock	P	N	F	C

ATTACHMENT E.1
Plant Species Known to Occur on Fort Carson

Scientific Name	Common Name	Life	Origin	Form	Season
Oleaceae (Olive Family)					
Fraxinus pensylvanica, var. *lanceolata*	Sargent, Green ash	P	N	T	C
Menodora scabra	Rough menodora	P	N	F	C
Onagraceae (Evening-Primrose Family)					
Calylophus lavandulifolius	Lavenderleaf evening primrose	P	N	F	C
Calylophus serrulatus	Plains yellow primrose	P	N	F	C
Epilobium ciliatum	Hairy willowherb	P	N	F	W
Gaura coccinea	Scarlet gaura	P	N	F	C
Gaura mollis	Smallflower gaura	P	N	F	C
Oenothera albicaulis	Prairie evening primrose	A	N	F	C
Oenothera coronopifolia	Crownleaf evening primrose	P	N	F	C
**Oenothera harringtonii*	Arkansas valley primrose	P	N	F	C
Oenothera villosa	Common evening primrose	P	N	F	W
Orobanchaceae (Broom-Rape Family)					
Aphyllon fasciculatum	Broomrape	P	N	T	W
Papaveraceae (Poppy Family)					
Argemone hispida	Hedgehog pricklypoppy	P	N	F	W
Plantaginaceae (Plantain Family)					
Plantago lanceolata	Narrowleaf plantain	P	N	F	C
Plantago major	Common plantain	P	N	F	C
Plantago patagonica	Woolly plantain	A	N	F	C
Poaceae (Grass Family)					
Achnatherum hymenoides	Indian ricegrass	P	N	G	C
Achnatherum robustum	Sleepygrass	P	N	G	C
Achnatherum scribneri	Scribner's needlegrass	P	N	G	C
Agropyron cristatum, ssp. *Cristatum*	Crested wheatgrass	P	I	G	W
Agropyron cristatum, ssp. *desertorum*	Crested wheatgrass	P	N	G	W
Agrostis stolonifera	Redtop bentgrass	P	I	G	W
Alopecurus aequalis	Short-awn foxtail	P	N	G	W
Andropogon gerardii	Big bluestem	P	N	G	W
Anisantha tectorum	Cheatgrass	A	I	G	C
Aristida divaricata	Poverty threeawn	P	N	G	W
Aristida purpurea	Purple threeawn	P	N	G	W
Avena fatua	Wild oat	A	I	G	C
Beckmannia syzigache, ssp. *baicalensis*	Sloughgrass	P	I	G	W
Bothriochloa bladhii	Australian bluestem	P	I	G	W
Bothriochloa laguroides, ssp. *torriana*	Silver bluestem	P	N	G	W
Bouteloua curtipendula	Sideoats grama	P	N	G	W
Bromopsis inermis	Smooth brome	P	I	G	C
Bromus japonicus	Japanese brome	A	I	G	C
Buchloe dactyloides	Buffalograss	P	N	G	W
Calamovilfa longifolia	Prairie sandreed	P	N	G	W

ATTACHMENT E.1
Plant Species Known to Occur on Fort Carson

Scientific Name	Common Name	Life	Origin	Form	Season
Cenchrus longispinus	Sandbur	P	I	G	W
Chloris verticillata	Windmill grass	P	N	G	C
Chondrosum gracile	Blue grama	P	N	G	W
Chondrosum hirsutum	Hairy grama	P	N	G	W
Chondrosum prostratum	Mat grama	A	N	G	W
Critesion jubatum	Foxtail barley	P	N	G	W
Critesion pusillum	Little barley	A	N	G	C
Dactylis glomerata	Orchardgrass	P	I	G	C
Diplachne fascicularis	Sprangletop	P	N	G	W
Distichlis stricta	Inland saltgrass	P	N	G	W
Echinochloa crus-galli	Barnyardgrass	A	I	G	W
Elymus canadensis	Canada wildrye	P	N	G	W
Elymus elymoides	Bottlebrush squirreltail	P	N	G	C
Elymus lanceolatus	Streambank wheatgrass	P	N	G	W
Elymus trachycaulus	Slender wheatgrass	P	N	G	W
Eragrostis cilianensis	Stinkgrass	A	N	G	W
Eragrostis pilosa	Carolina lovegrass	A	N	G	W
Erioneuron pilosum	Hairy false tridens	P	N	G	C
Festuca arundinacea	Tall fescue	P	I	G	C
Festuca pratensis	Meadow fescue	P	I	G	C
Hesperostipa comata	Needle and thread	P	N	G	C
Hesperostipa neomexicana	New Mexico feathergrass	P	N	G	C
Hilaria jamesii	Galleta	P	N	G	C
Koeleria macrantha	Junegrass	P	N	G	C
Leymus ambiguus	Colorado wild rye	P	N	G	C
Leymus cinereus	Basin wild rye	P	N	G	C
Lycurus setosus	Common wolftail	P	N	G	W
Monroa squarrosa	False buffalograss	A	N	G	W
Muhlenbergia arenacea	Ear muhly	P	N	G	W
Muhlenbergia arenicola	Sand muhly	P	N	G	W
Muhlenbergia asperifolia	Alkali muhly	P	N	G	W
Muhlenbergia capillaris	Hairgrass	P	N	G	W
Muhlenbergia cuspidata	Plains muhly	P	N	G	W
Muhlenbergia montana	Mountain muhly	P	N	G	W
Muhlenbergia racemosa	Green muhly	P	N	G	W
Muhlenbergia torreyi	Ring muhly	P	N	G	W
Muhlenbergia wrightii	Wright's muhly	P	N	G	W
Nassella viridula	Green needlegrass	P	N	G	C
Oryzopsis pungens	Mountain ricegrass	P	N	G	C
Panicum capillare	Common witchgrass	A	N	G	W
Panicum obtusum	Vine mesquite	P	N	G	C
Panicum virgatum	Switchgrass	P	N	G	W

ATTACHMENT E.1
Plant Species Known to Occur on Fort Carson

Scientific Name	Common Name	Life	Origin	Form	Season
Pascopyrum smithii	Western wheatgrass	P	N	G	C
Phleum pratense	Timothy	P	I	G	C
Phragmites australis	Common reed	P	N	G	W
Piptatherum micranthum	Littleseed ricegrass	P	N	G	W
Poa compressa	Canada bluegrass	P	N	G	W
Poa fendleriana	Muttongrass	P	N	G	C
Poa juncifolia	Alkali bluegrass	P	N	G	C
Poa palustris	Fowl bluegrass	P	I	G	W
Poa pratensis	Kentucky bluegrass	P	I	G	C
Polypogon monspeliensis	Rabbitfoot grass	A	I	G	C
Psathyrostachys juncea	Russian wild rye	A	I	G	C
Schedonnardus paniculatus	Tumblegrass	P	N	G	C
Schizachyrium scoparium	Little bluestem	P	N	G	W
Scleropogon brevifolius	Burro grass	P	N	G	W
Setaria viridis	Green foxtail	A	I	G	W
Sorgastrum avenaceum	Indian grass	P	N	G	W
Spartina gracilis	Alkali cordgrass	P	N	G	W
Spartina pectinata	Prairie cordgrass	P	N	G	W
Sphenopholus obtusata	Wedgegrass	P	N	G	C
Sporobolus airoides	Alkali sacaton	P	N	G	W
Sporobolus asper	Rough dropseed	P	N	G	W
Sporobolus cryptandrus	Sand dropseed	P	N	G	W
Thinopyrum intermedium	Intermediate wheatgrass	P	N	G	W
Tridens muticus, var. *elongatus*	Green tridens	P	N	G	W
Triticum aestivum	Wheat	A	I	G	C
Vulpia octoflora	Sixweeks fescue	A	N	G	C
Polemoniaceae (Phlox Family)					
Ipomopsis laxiflora	Iron skyrocket	P	N	F	C
Ipomopsis longiflora	Flaxflowered gilia	A	N	F	C
Ipomopsis spicata	Spike gilia	P	N	F	C
Leptodactylon pungens	Granite prickly gilia	P	N	F	C
Polygonaceae (Knotweed Family)					
Acetosella vulgaris	Sheep sorrel	P	I	F	C
Eriogonum effusum	Spreading buckwheat	P	N	F	W
Eriogonium fendlerianum	Small, Buckwheat	P	N	F	W
Eriogonum jamesii	James' buckwheat	P	N	F	W
Eriogonum tenellum	Matted wild buckwheat	P	N	F	W
Eriogonum umbellatum	Sulfur eriogonum	P	N	F	W
Persicaria maculata	Lady's thumb	A	I	F	W
Persicaria pennsylvanica	Pinkweed	A	N	F	W
Polygonum ramosissimum	Bushy knotweed	A	N	F	W
Pterogonum alatum	Winged buckwheat	P	N	F	W

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Plant Species Known to Occur on Fort Carson

Scientific Name	Common Name	Life	Origin	Form	Season
Rumex altissimus	Pale dock	P	N	F	C
Rumex crispus	Curly dock	P	I	F	C
Portulacaceae (Purslane Family)					
Portulaca oleracea	Common purslane	A	I	F	C
Potamogetonaceae (Pondweed Family)					
Potamogeton foliosus	Leafy pondweed	P	N	F	W
Potamogeton nodosus	Longleaf pondweed	P	N	F	W
Potomogeton pectinatus	Sago pondweed	P	N	F	W
Ranunculaceae (Buttercup Family)					
Batrachium longirostre	Water crowfoot	P	N	F	C
Clematis ligusticifolia	Western virginsbower	P	N	F	W
Coriflora hirsutissima	Sugarbowls	P	N	F	W
Halerpestes cymbalaria, ssp. *saximontana*	Alkali crowfoot	P	N	F	C
Resedaceae (Mignonette Family)					
Reseda lutea	Wild mignonette	P	I	F	C
Rhamnaceae (Buckthorn Family)					
Ceanothus herbaceus	New Jersey tea	P	N	F	C
Rosaceae (Rose Family)					
Agrimonia striata	Agrimony	P	N	F	W
Cerasus pumila, ssp. *besseyi*	Sand cherry	P	N	T	C
Cercocarpus montanus	Mountain mahogany	P	N	S	C
Crataegus erythropoda	Fleshy hawthorn	P	N	S	C
Crataegus succulenta	Fleshy hawthorn	P	N	S	C
Geum aleppicum	Yellow avens	P	I	F	W
Oreobatus deliciosus	Boulder raspberry	P	N	S	C
Padus virginiana, ssp. *melanocarpa*	Chokecherry	P	N	T	C
Physocarpus monogynus	Mountain ninebark	P	N	S	C
Potentilla pensylvanica	Pennsylvania cinquefoil	P	N	F	C
Potentilla supine, ssp. *paradoxa*	Bushy cinquefoil	P	N	F	W
Prunus americana	American plum	P	N	T	C
Rosa woodsii	Wood's rose	P	N	F	C
Rubus idaeus, var. *melanolasius*	Red raspberry	P	N	F	W
Sanguisorba minor	Small burnet	P	I	F	C
Rubiaceae (Madder Family)					
Galium spp.	Bedstraw	P	N	F	W
Rutaceae (Citrus Family)					
Ptelea trifoliata	Common hoptree	P	N	T	C
Salicaceae (Willow Family)					
Populus angustifolia	Narrowleaf cottonwood	P	N	T	C
Populus deltoids, spp. *monolifera*	Plains cottonwood	P	N	T	C
Populus x acuminata	Lanceleaf cottonwood	P	N	T	C
Salix amygdaloides	Peach-leaved willow	P	N	S	C

ATTACHMENT E.1
Plant Species Known to Occur on Fort Carson

Scientific Name	Common Name	Life	Origin	Form	Season
Salix exigua	Coyote willow	P	N	S	C
Salix interior	Sandbar willow	P	N	S	C
Salix irrorata	Bluestem willow	P	N	S	C
Santalaceae (Sandlewood Family)					
Comandra umbellata	Bastard toadflax	P	N	F	C
Scrophulariaceae (Figwort Family)					
Castilleja integra	Indian paintbrush	P	N	F	W
Penstemon angustifolius	Broadbeard beard-tongue	P	N	F	C
Penstemon auriberbis	Colorado beard-tongue	P	N	F	C
Penstemon secundiflorus	Sidebells penstemon	P	N	F	C
Penstemon versicolor	Penstemon	P	N	F	C
Penstemon virens	Front Range beard-tongue	P	N	F	C
Penstemon virgatus, ssp. *asa-grayi*	Beard-tongue	P	N	F	C
Verbascum thapsus	Great mullein	P	I	F	C
Veronica americana	American brooklime	P	N	F	W
Veronica anagallis-aquatica	Water speedwell	P	I	F	W
Veronica catenata	Speedwell	P	I	F	W
Smilacaceae (Simlax Family)					
Smilax lasioneuron	Carrionflower	P	N	F	C
Solanaceae (Nightshade Family)					
Chamaesaracha coronopus	Green false nightshade	P	N	F	C
Physalis hederifolia, var. *cordifolia*	Clammy groundcherry	P	N	F	W
Physalis virginiana	Virginia groundcherry	P	N	F	C
Quincula lobata	Chinese lantern	P	N	F	C
Solanum rostratum	Buffalo bur	A	N	F	C
Tamaricaceae (Tamarisk Family)					
Tamarix ramosissima	Tamarisk	P	I	S	C
Thalictraceae (Meadow Rue Family)					
Thalictrum fendleri	Fendler's meadowrue	P	N	F	C
Typhaceae (Cattail Family)					
Typha angustifolia	Narrow-leaved cattail	P	N	G	C
Typha latifolia	Broad-leaved cattail	P	N	G	C
Ulmaceae (Elm Family)					
Celtis reticulata	Netleaf hackberry	P	N	T	C
Verbenaceae (Vervain Family)					
Glandularia bipinnatifida	Showy vervain	P	N	F	C
Verbena bracteata	Prostrate vervain	P	N	F	C
Verbena hastata	Blue vervain	P	N	F	W
Violaceae (Violet Family)					
Viola nuttallii	Nuttall's violet	P	N	F	C
Viscaceae (Mistletoe Family)					
Arceuthobium spp.	Dwarf mistletoe	P	N	F	W

ATTACHMENT E.1
Plant Species Known to Occur on Fort Carson

Scientific Name	Common Name	Life	Origin	Form	Season
Vitaceae (Grape Family)					
Parthenocissus vitaceae	Thicket creeper	P	N	F	C
Vitis ripara	Riverbank grapes	P	N	F	C
Zygophyllaceae (Caltrop Family)					
Tribulus terrestris	Puncturevine	P	N	F	W
Gymnosperms ("Naked-Seed" Plants)					
Cupressaceae (Cypress Family)					
Sabina monosperma	One-seed juniper	P	N	T	C
Sabina scopulorum	Rocky Mountain juniper	P	N	T	C
Pinaceae (Pine Family)					
Abies concolor	White fir	P	N	T	C
Picea pungens	Colorado blue spruce	P	N	T	C
Pinus edulis	Pinyon pine	P	N	T	C
Pinus ponderosa, ssp. *scopulorum*	Ponderosa pine	P	N	T	C
Pseudotsuga menziesii	Douglas fir	P	N	T	C
Ferns and Fern Allies					
Equisetaceae (Horsetail Family)					
Hippochaete laevigata	Smooth horsetail	P	N	G	C
Selaginellaceae (Little Club-Moss Family)					
Selaginella densa	Little club moss	P	N	F	C
Selaginella mutica	Little club moss	P	N	F	C
Sinopteridaceae (Lipfern Family)					
Argyrochosma fendleri	Fendler's falsecloak fern				
Cheilanthes eatonii	Eaton's lipfern	P	N	F	C
Cheilanthes fendleri	Fendler's lipfern	P	N	F	C
Woodsiaceae (Woodsia Family)					
Woodsia oregano, ssp. *cathcartiana*	Oregon woodsia	P	N	F	W
Addendum to the Fort Carson Species List					
Horticultural Species					
Aceraceae (Maple Family)					
Acer saccharinum	Silver maple	P	I	T	C
Fabaceae (Pea Family)					
Gleditsia triacanthos	Honey locust	P	I	T	C
Robina pseudoacacia	Black locust	P	I	T	C
Iridaceae (Iris Family)					
Iris spp.	Common iris	P	I	G	W
Juglandaceae (Walnut Family)					
Juglans nigra	Black walnut	P	I	T	W
Oleaceae (Olive Family)					
Syringia vulgaris	Common lilac	P	I	S	C

ATTACHMENT E.1
Plant Species Known to Occur on Fort Carson

Scientific Name	Common Name	Life	Origin	Form	Season
Rosaceae (Rose Family)					
Malus ioensis, var. *ionesis*	Crab apple	P	I	T	C
Malus pumila	Apple	P	I	T	C
Prunus persica, var. *persica*	Peach	P	I	T	W
Pyrus communis	Pear	P	I	T	W
Ulmaceae (Elm Family)					
Ulmus americana	American elm	P	I	T	C
Ulmus pumila	Siberian elm	P	I	T	C

Life Form: A = Annual, B = Biennial, P = Perennial;

Origin: N = Native, I = Introduced

Form: F = Forb, G = Grass, V = Vine, S = Shrub, T = Tree

Season: W = Warm Season, C = Cool Season

Source: DECAM, 2002.

ATTACHMENT E.2

Vertebrate Species Known to Occur at Fort Carson

ATTACHMENT E.2
Vertebrate Species Known to Occur on Fort Carson

Scientific Name	Class	Common Name	Federal	State
Campostoma anomalum	Osteichthyes	Stoneroller		
Ctenopharyngodon idella	Osteichthyes	Grass Carp		
Culaea inconstans	Osteichthyes	Brook Stickleback		
Cyprinus carpio	Osteichthyes	Carp		
Etheostoma cragini	Osteichthyes	Arkansas Darter	Candidate	Threatened
Fundulus zebrinus	Osteichthyes	Plains Killifish		
Gambusia affinis	Osteichthyes	Mosquitofish		
Ictalurus punctatus	Osteichthyes	Channel Catfish		
Lepomis cyanellus	Osteichthyes	Green Sunfish		
Lepomis macrochirus	Osteichthyes	Bluegill		
Notemigonus crysoleucas	Osteichthyes	Golden shiner		
Oncorhynchus clarki stomias	Osteichthyes	Greenback Cutthroat Trout	Threatened	Threatened
Phoxinus erythrogaster	Osteichthyes	Southern Redbelly Dace		Endangered
Pimephales promelas	Osteichthyes	Fathead Minnow		
Pomoxis nigromaculatus	Osteichthyes	Black crappie		
Rhinichthys cataractae	Osteichthyes	Longnose Dace		
Salmo clarki	Osteichthyes	Snake River Cutthroat trout		
Salmo gairdneri	Osteichthyes	Rainbow trout		
Salvelinus fontinalis	Osteichthyes	Brook Trout		
Semotilus atromaculatus	Osteichthyes	Creek Chub		
Ambystoma tigrinum	Amphibia	Tiger Salamander		
Spea bombifrons	Amphibia	Plains Spadefoot Toad		
Spea multiplicatus	Amphibia	New Mexico Spadefoot		
Bufo punctatus	Amphibia	Red-spotted Toad		
Bufo woodhousii	Amphibia	Woodhouse's Toad		
Pseudacris triseriata	Amphibia	Western chorus frog		
Rana blairi	Amphibia	Plains Leopard Frog		Special Concern
Rana catesbeiana	Amphibia	Bullfrog		
Rana pipiens	Amphibia	Northern Leopard Frog		Special Concern
Coluber constrictor flaviventris	Reptilia	Racer		
Heterodon nasicus nasicus	Reptilia	Western Hognose Snake		
Lampropeltis triangulum	Reptilia	Milk Snake		
Masticophis flagellum testaceus	Reptilia	Western Coachwhip		
Pituophis melanoleucus sayi	Reptilia	Bullsnake		
Thamnophis elegans	Reptilia	Western Terrestrial Garter Snake		
Chrysemys picta bellii	Reptilia	Painted Turtle		Special Concern
Holbrookia maculata	Reptilia	Lesser Earless Lizard		
Phrynosoma douglassi	Reptilia	Short-horned Lizard		
Sceloporus undulatus erythrocheilus	Reptilia	Orange-lipped Plateau Lizard		
Eumeces multivirgatus	Reptilia	Many-lined Skink		
Cnemidophorus neotesselatus	Reptilia	Triploid Checkered Whiptail		Special Concern
Cnemidophorus sexlineatus viridis	Reptilia	Six-lined Racerunner		
Crotalus viridis	Reptilia	Western Rattlesnake		
Anser albifrons	Aves	Greater White-fronted Goose		
Chen caerulescens	Aves	Snow Goose		
Branta hutchinsii	Aves	Cackling Goose		
Branta canadensis	Aves	Canada Goose		
Cygnus columbianus	Aves	Tundra Swan		
Aix sponsa	Aves	Wood Duck		
Anas strepera	Aves	Gadwall		
Anas americana	Aves	American Wigeon		
Anas platyrhynchos	Aves	Mallard		
Anas discors	Aves	Blue-winged Teal		
Anas cyanoptera	Aves	Cinnamon Teal		
Anas clypeata	Aves	Northern Shoveler		
Anas acuta	Aves	Northern Pintail		
Anas crecca	Aves	Green-winged Teal		
Aythya valisineria	Aves	Canvasback		
Aythya americana	Aves	Redhead		
Aythya collaris	Aves	Ring-necked Duck		

ATTACHMENT E.2
Vertebrate Species Known to Occur on Fort Carson

Scientific Name	Class	Common Name	Federal	State
Aythya marila	Aves	Greater Scaup		
Aythya affinis	Aves	Lesser Scaup		
Melanitta fusca	Aves	White-winged Scoter		
Bucephala albeola	Aves	Bufflehead		
Bucephala clangula	Aves	Common Goldeneye		
Lophodytes cucullatus	Aves	Hooded Merganser		
Mergus merganser	Aves	Common Merganser		
Mergus serrator	Aves	Red-breasted Merganser		
Oxyura jamaicensis	Aves	Ruddy Duck		
Alectoris chukar	Aves	Chukar		
Phasianus colchicus	Aves	Ring-necked Pheasant		
Meleagris gallopavo	Aves	Wild Turkey		
Colinus virginianus	Aves	Northern Bobwhite		
Callipepla squamata	Aves	Scaled Quail		
Gavia immer	Aves	Common Loon		
Podilymbus podiceps	Aves	Pied-billed Grebe		
Podiceps auritus	Aves	Horned Grebe		
Podiceps nigricollis	Aves	Eared Grebe		
Aechmophorus occidentalis	Aves	Western Grebe		
Aechmophorus clarkii	Aves	Clark's Grebe		
Pelecanus erythrorhynchos	Aves	American White Pelican		
Phalacrocorax auritus	Aves	Double-crested Cormorant		
Botaurus lentiginosus	Aves	American Bittern		
Ardea herodias	Aves	Great Blue Heron		
Ardea alba	Aves	Great Egret		
Egretta thula	Aves	Snowy Egret		
Bubulcus ibis	Aves	Cattle Egret		
Nycticorax nycticorax	Aves	Black-crowned Night-Heron		
Plegadis chihi	Aves	White-faced Ibis		
Cathartes aura	Aves	Turkey Vulture		
Pandion haliaetus	Aves	Osprey		
Ictinia misisippiensis	Aves	Mississippi Kite		
Haliaeetus leucocephalus	Aves	Bald Eagle	Threatened	Threatened
Circus cyaneus	Aves	Northern Harrier		
Accipiter striatus	Aves	Sharp-shinned Hawk		
Accipiter cooperii	Aves	Cooper's Hawk		
Accipiter gentilis	Aves	Northern Goshawk		
Buteo platypterus	Aves	Broad-winged Hawk		
Buteo swainsoni	Aves	Swainson's Hawk		
Buteo jamaicensis	Aves	Red-tailed Hawk		
Buteo regalis	Aves	Ferruginous Hawk		Special Concern
Buteo lagopus	Aves	Rough-legged Hawk		
Aquila chrysaetos	Aves	Golden Eagle		
Falco sparverius	Aves	American Kestrel		
Falco columbarius	Aves	Merlin		
Falco peregrinus	Aves	Peregrine Falcon		Special Concern
Falco mexicanus	Aves	Prairie Falcon		
Laterallus jamaicensis	Aves	Black Rail		
Rallus limicola	Aves	Virginia Rail		
Porzana carolina	Aves	Sora		
Fulica americana	Aves	American Coot		
Grus canadensis	Aves	Sandhill Crane		
Charadrius semipalmatus	Aves	Semipalmated Plover		
Charadrius vociferus	Aves	Killdeer		
Charadrius montanus	Aves	Mountain Plover		Special Concern
Himantopus mexicanus	Aves	Black-necked Stilt		
Recurvirostra americana	Aves	American Avocet		
Actitis macularia	Aves	Spotted Sandpiper		
Tringa solitaria	Aves	Solitary Sandpiper		
Tringa melanoleuca	Aves	Greater Yellowlegs		

ATTACHMENT E.2
Vertebrate Species Known to Occur on Fort Carson

Scientific Name	Class	Common Name	Federal	State
Catoptrophorus semipalmatus	Aves	Willet		
Tringa flavipes	Aves	Lesser Yellowlegs		
Bartramia longicauda	Aves	Upland Sandpiper		
Numenius americanus	Aves	Long-billed Curlew		Special Concern
Limosa fedoa	Aves	Marbled Godwit		
Calidris alba	Aves	Sanderling		
Calidris pusilla	Aves	Semipalmated Sandpiper		
Calidris mauri	Aves	Western Sandpiper		
Calidris minutilla	Aves	Least Sandpiper		
Calidris bairdii	Aves	Baird's Sandpiper		
Calidris melanotos	Aves	Pectoral Sandpiper		
Calisdris himantopus	Aves	Stilt Sandpiper		
Limnodromus scolopaceus	Aves	Long-billed Dowitcher		
Gallinago delicata	Aves	Wilson's Snipe		
Scolopax minor	Aves	American Woodcock		
Phalaropus tricolor	Aves	Wilson's Phalarope		
Larus pipixcan	Aves	Franklin's Gull		
Larus philadelphia	Aves	Bonaparte's Gull		
Larus delawarensis	Aves	Ring-billed Gull		
Larus californicus	Aves	California Gull		
Larus argentatus	Aves	Herring Gull		
Chilidonias niger	Aves	Black Tern		
Sterna forsteri	Aves	Forster's Tern		
Columba livia	Aves	Rock Pigeon		
Patagioenas fasciata	Aves	Band-tailed Pigeon		
Streptopelia decaocto	Aves	Eurasian Collared-Dove		
Zenaida asiatica	Aves	White-winged Dove		
Zenaidura macroura	Aves	Mourning Dove		
Coccyzus americanus	Aves	Yellow-billed Cuckoo		
Geococcyx californianus	Aves	Greater Roadrunner		
Tyto alba	Aves	Barn Owl		
Megascops kennicottii	Aves	Western Screech-Owl		
Bubo virginianus	Aves	Great Horned Owl		
Glaucidium gnoma	Aves	Northern Pygmy-Owl		
Athene cunicularia	Aves	Burrowing Owl		Threatened
Strix occidentalis	Aves	Spotted Owl		
Strix occidentalis lucida	Aves	Mexican Spotted Owl	Threatened	Threatened
Asio otus	Aves	Long-eared Owl		
Asio flammeus	Aves	Short-eared Owl		
Aegolius acadicus	Aves	Northern Saw-whet Owl		
Chordeiles minor	Aves	Common Nighthawk		
Phalaenoptilus nuttalii	Aves	Common Poorwill		
Cypseloides niger	Aves	Black Swift		
Chaetura pelagica	Aves	Chimney Swift		
Aeronautes saxatalis	Aves	White-throated Swift		
Eugenes fulgens	Aves	Magnificent Hummingbird		
Archilochus colubris	Aves	Ruby-throated Hummingbird		
Archilochus alexandri	Aves	Black-chinned Hummingbird		
Stellula calliope	Aves	Calliope Hummingbird		
Selasphorus platycercus	Aves	Broad-tailed Hummingbird		
Selasphorus rufus	Aves	Rufous Hummingbird		
Ceryle alcyon	Aves	Belted Kingfisher		
Melanerpes lewis	Aves	Lewis's Woodpecker		
Melanerpes erythrocephalus	Aves	Red-headed Woodpecker		
Melanerpes formicivorus	Aves	Acorn Woodpecker		
Sphyrapicus thyroideus	Aves	Williamson's Sapsucker		
Sphyrapicus varius	Aves	Yellow-bellied Sapsucker		
Sphyrapicus nuchalis	Aves	Red-naped Sapsucker		
Picoides scalaris	Aves	Ladder-backed Woodpecker		
Picoides pubescens	Aves	Downy Woodpecker		

ATTACHMENT E.2
Vertebrate Species Known to Occur on Fort Carson

Scientific Name	Class	Common Name	Federal	State
Picoides villosus	Aves	Hairy Woodpecker		
Colaptes auratus	Aves	Northern Flicker		
Contopus cooperii	Aves	Olive-sided Flycatcher		
Contopus sordidulus	Aves	Western Wood-Pewee		
Empidonax traillii	Aves	Willow Flycatcher		
Empidonax minimus	Aves	Least Flycatcher		
Empidonax hammondii	Aves	Hammond's Flycatcher		
Empidonax wrightii	Aves	Gray Flycatcher		
Empidonax oberholseri	Aves	Dusky Flycatcher		
Empidonax occidentalis	Aves	Cordilleran Flycatcher		
Sayornis phoebe	Aves	Eastern Phoebe		
Sayornis saya	Aves	Say's Phoebe		
Myriarchus cinerascens	Aves	Ash-throated Flycatcher		
Tyrannus vociferans	Aves	Cassin's Kingbird		
Tyrannus verticalis	Aves	Western Kingbird		
Tyrannus tyrannus	Aves	Eastern Kingbird		
Tyrannus forticatus	Aves	Scissor-tailed Flycatcher		
Lanius ludovicianus	Aves	Loggerhead Shrike		
Lanius excubitor	Aves	Northern Shrike		
Vireo griseus	Aves	White-eyed Vireo		
Vireo plumbeus	Aves	Plumbeous Vireo		
Vireo cassinii	Aves	Cassin's Vireo		
Vireo solitarius	Aves	Blue-headed Vireo		
Vireo gilvus	Aves	Warbling Vireo		
Vireo olivaceus	Aves	Red-eyed Vireo		
Cyanocitta stellerii	Aves	Steller's Jay		
Cyanocitta cristata	Aves	Blue Jay		
Aphelocoma californica	Aves	Western Scrub-Jay		
Gymnorhinus cyanocephalus	Aves	Pinyon Jay		
Nucifraga columbiana	Aves	Clark's Nutcracker		
Pica hodsonia	Aves	Black-billed Magpie		
Corvus brachyrhynchos	Aves	American Crow		
Corvus cryptoleucus	Aves	Chihuahuan Raven		
Corvus corax	Aves	Common Raven		
Eremophila alpestris	Aves	Horned Lark		
Tachycineta bicolor	Aves	Tree Swallow		
Tachycineta thalassina	Aves	Violet-green Swallow		
Stelgidopteryx serripennis	Aves	Northern Rough-winged Swallow		
Riparia riparia	Aves	Bank Swallow		
Petrochelidon pyrrhonota	Aves	Cliff Swallow		
Hirundo rustica	Aves	Barn Swallow		
Poecile atricapilla	Aves	Black-capped Chickadee		
Poecile gambeli	Aves	Mountain Chickadee		
Baeolophus ridgwayi	Aves	Juniper Titmouse		
Psaltriparus minimus	Aves	Bushtit		
Sitta canadensis	Aves	Red-breasted Nuthatch		
Sitta carolinensis	Aves	White-breasted Nuthatch		
Sitta pygmaea	Aves	Pygmy Nuthatch		
Certhia americana	Aves	Brown Creeper		
Salpinctes obsoletus	Aves	Rock Wren		
Catherpes mexicanus	Aves	Canyon Wren		
Thyrothorus ludovicianus	Aves	Carolina Wren		
Thyromanes bewickii	Aves	Bewick's Wren		
Troglodytes aedon	Aves	House Wren		
Cistothorus palustris	Aves	Marsh Wren		
Cinclus mexicanus	Aves	American Dipper		
Regulus satrapa	Aves	Golden-crowned Kinglet		
Regulus calendula	Aves	Ruby-crowned Kinglet		
Polioptila caerulea	Aves	Blue-gray Gnatcatcher		
Sialia sialis	Aves	Eastern Bluebird		

ATTACHMENT E.2
Vertebrate Species Known to Occur on Fort Carson

Scientific Name	Class	Common Name	Federal	State
Sialia mexicana	Aves	Western Bluebird		
Sialia currucoides	Aves	Mountain Bluebird		
Myadestes townsendi	Aves	Townsend's Solitaire		
Catharus fuscescens	Aves	Veery		
Catharus ustulatus	Aves	Swainson's Thrush		
Catharus guttatus	Aves	Hermit Thrush		
Turdus migratorius	Aves	American Robin		
Dumetella carolinensis	Aves	Gray Catbird		
Mimus polyglottos	Aves	Northern Mockingbird		
Oreoscoptes montanus	Aves	Sage Thrasher		
Toxostoma rufum	Aves	Brown Thrasher		
Toxostoma curvirostre	Aves	Curve-billed Thrasher		
Sturnus vulgaris	Aves	European Starling		
Anthus rubescens	Aves	American Pipit		
Bombycilla garralus	Aves	Bohemian Waxwing		
Bombycilla cedrorum	Aves	Cedar Waxwing		
Vermivora pinus	Aves	Blue-winged Warbler		
Vermivora chrysoptera	Aves	Golden-winged Warbler		
Vermivora peregrina	Aves	Tennessee Warbler		
Vermivora celata	Aves	Orange-crowned Warbler		
Vermivora ruficapilla	Aves	Nashville Warbler		
Vermivora virginiae	Aves	Virginia's Warbler		
Parula americana	Aves	Northern Parula		
Dendroica petechia	Aves	Yellow Warbler		
Dendroica pensylvanica	Aves	Chestnut-sided Warbler		
Dendroica coronata	Aves	Yellow-rumped Warbler		
Dendroica nigrescens	Aves	Black-throated Gray Warbler		
Dendroica virens	Aves	Black-throated Green Warbler		
Dendroica townsendi	Aves	Townsend's Warbler		
Dendroica palmarum	Aves	Palm Warbler		
Dendroica striata	Aves	Blackpoll Warbler		
Mniotilta varia	Aves	Black-and-white Warbler		
Setophaga ruticilla	Aves	American Redstart		
Helmitheros vermivorus	Aves	Worm-eating Warbler		
Seiurus aurocapillus	Aves	Ovenbird		
Seiurus noveboracensis	Aves	Northern Waterthrush		
Oporornis tolmiei	Aves	MacGillivray's Warbler		
Geothlypis trichas	Aves	Common Yellowthroat		
Wilsonia citrina	Aves	Hooded Warbler		
Wilsonia pusilla	Aves	Wilson's Warbler		
Icteria virens	Aves	Yellow-breasted Chat		
Piranga flava	Aves	Hepatic Tanager		
Piranga rubra	Aves	Summer Tanager		
Piranga ludoviciana	Aves	Western Tanager		
Pipilo chlorurus	Aves	Green-tailed Towhee		
Pipilo maculatus	Aves	Spotted Towhee		
Pipilo fuscus	Aves	Canyon Towhee		
Aimophila cassini	Aves	Cassin's Sparrow		
Aimophila ruficeps	Aves	Rufous-crowned Sparrow		
Spizella arborea	Aves	American Tree Sparrow		
Spizella passerina	Aves	Chipping Sparrow		
Spizella pallida	Aves	Clay-colored Sparrow		
Spizella breweri	Aves	Brewer's Sparrow		
Spizella pusilla	Aves	Field Sparrow		
Pooecetes gramineus	Aves	Vesper Sparrow		
Chondestes grammacus	Aves	Lark Sparrow		
Amphispiza bilineata	Aves	Black-throated Sparrow		
Calamospiza melanocorys	Aves	Lark Bunting		
Passerculus sandwichensis	Aves	Savannah Sparrow		
Ammodramus savannarum	Aves	Grasshopper Sparrow		

ATTACHMENT E.2
Vertebrate Species Known to Occur on Fort Carson

Scientific Name	Class	Common Name	Federal	State
Passerella iliaca	Aves	Fox Sparrow		
Melospiza melodia	Aves	Song Sparrow		
Melospiza lincolnii	Aves	Lincoln's Sparrow		
Melospiza georgiana	Aves	Swamp Sparrow		
Zonotrichia albicollis	Aves	White-throated Sparrow		
Zonotrichia querula	Aves	Harris's Sparrow		
Zonotrichia leucophrys	Aves	White-crowned Sparrow		
Junco hyemalis	Aves	Dark-eyed Junco		
Calcarius mccownii	Aves	McCown's Longspur		
Calcarius lapponicus	Aves	Lapland Longspur		
Calcarius ornatus	Aves	Chestnut-collared Longspur		
Pheucticus ludovicianus	Aves	Rose-breasted Grosbeak		
Pheucticus melanocephalus	Aves	Black-headed Grosbeak		
Passerina caerulea	Aves	Blue Grosbeak		
Passerina amoena	Aves	Lazuli Bunting		
Passerina cyanea	Aves	Indigo Bunting		
Spiza americana	Aves	Dickcissel		
Dolichonyx oryzivorus	Aves	Bobolink		
Agelaius phoeniceus	Aves	Red-winged Blackbird		
Sturnella neglecta	Aves	Western Meadowlark		
Xanthocephalus xanthocephalus	Aves	Yellow-headed Blackbird		
Euphagus cyanocephalus	Aves	Brewer's Blackbird		
Quiscalus quiscula	Aves	Common Grackle		
Quiscalus mexicanus	Aves	Great-tailed Grackle		
Molothrus ater	Aves	Brown-headed Cowbird		
Icterus spurius	Aves	Orchard Oriole		
Icterus bullockii	Aves	Bullock's Oriole		
Leucosticte tephrocotia	Aves	Gray-crowned Rosy-Finch		
Leucosticte australis	Aves	Brown-capped Rosy-Finch		
Carpodacus cassinii	Aves	Cassin's Finch		
Carpodacus mexicanus	Aves	House Finch		
Loxia curvirostra	Aves	Red Crossbill		
Coccothraustes vespertinus	Aves	Evening Grosbeak		
Carduelis pinus	Aves	Pine Siskin		
Carduelis psaltria	Aves	Lesser Goldfinch		
Carduelis tristis	Aves	American Goldfinch		
Passer domesticus	Aves	House Sparrow		
Antilocapra americana	Mammalia	Pronghorn		
Ovis canadensis	Mammalia	Bighorn sheep		
Canis latrans	Mammalia	Coyote		
Urocyon cinereoargenteus	Mammalia	Gray fox		
Vulpes vulpes	Mammalia	Red fox		
Castor canadensis	Mammalia	Beaver		
Cervus elaphus	Mammalia	Wapiti (Elk)		
Odocoileus hemionus	Mammalia	Mule Deer		
Odocoileus virginianus	Mammalia	White-tailed deer		
Microtus longicaudus	Mammalia	Long-tailed vole		
Microtus ochrogaster	Mammalia	Prairie vole		
Microtus pennsylvanicus	Mammalia	Meadow vole		
Neotoma cinerea	Mammalia	Bushy-tailed woodrat		
Neotoma floridana	Mammalia	Eastern woodrat		
Neotoma mexicana	Mammalia	Mexican woodrat		
Ondatra zibethicus	Mammalia	Muskrat		
Onychomys leucogaster	Mammalia	Northern grasshopper mouse		
Peromyscus boylii	Mammalia	Brush mouse		
Peromyscus difficilis	Mammalia	Northern Rock Mouse		
Peromyscus leucopus	Mammalia	White-footed mouse		
Peromyscus maniculatus	Mammalia	Deer mouse		
Peromyscus truei	Mammalia	Pinon mouse		
Reithrodontomys megalotis	Mammalia	Western harvest mouse		

ATTACHMENT E.2
Vertebrate Species Known to Occur on Fort Carson

Scientific Name	Class	Common Name	Federal	State
Reithrodontomys montanus	Mammalia	Plains harvest mouse		
Erethizon dorsatum	Mammalia	Porcupine		
Felis concolor	Mammalia	Mountain lion		
Lynx rufus	Mammalia	Bobcat		
Chaetodipus hispidus	Mammalia	Hispid pocket mouse		
Dipodomys ordii	Mammalia	Ord's kangaroo rat		
Perognathus flavescens	Mammalia	Plains pocket mouse		
Perognathus flavus	Mammalia	Silky pocket mouse		
Lepus californicus	Mammalia	Black-tailed jack rabbit		
Sylvilagus audubonii	Mammalia	Desert cottontail		
Nyctinomops macrotis	Mammalia	Big free-tailed bat		
Tadarida brasiliensis	Mammalia	Brazilian free-tailed bat		
Mus musculus	Mammalia	House mouse		
Mephitis mephitis	Mammalia	Striped skunk		
Mustela erminea	Mammalia	Ermine		
Mustela frenata	Mammalia	Long-tailed weasel		
Spilogale gracilis	Mammalia	Western Spotted Skunk		
Taxidea taxus	Mammalia	Badger		
Bassariscus astutus	Mammalia	Ringtail		
Procyon lotor	Mammalia	Raccoon		
Cynomys ludovicianus	Mammalia	Black-tailed prairie dog		Special Concern
Sciurus aberti	Mammalia	Abert's squirrel		
Sciurus niger	Mammalia	Fox squirrel		
Spermophilus spilosoma	Mammalia	Spotted ground squirrel		
Spermophilus tridecemlineatus	Mammalia	Thirteen-lined ground squirrel		
Spermophilus variegatus	Mammalia	Rock squirrel		
Spermphilus spilosoma	Mammalia	Spotted ground squirrel		
Tamias minimus	Mammalia	Least chipmunk		
Tamias quadrivittatus	Mammalia	Colorado chipmunk		
Tamiasciurus hudsonicus	Mammalia	Red squirrel		
Ursus americanus	Mammalia	Black bear		
Antrozous pallidus	Mammalia	Pallid bat		
Eptesicus fuscus	Mammalia	Big brown bat		
Lasiurus cinereus	Mammalia	Hoary bat		
Myotis yumanensis	Mammalia	Yuma myotis		

Source: DECAM, 2002a (Updated by DECAM in 2007)

ATTACHMENT E.3

Management Plan for Wintering Bald Eagles at Fort Carson and the Pinon Canyon Maneuver Site

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Acronyms and Abbreviations

BGEPA	Bald and Golden Eagle Protection Act
CDOW	Colorado Division of Wildlife
DDT	dichlorodiphenyl tricholorethane
DECAM	Directorate of Environmental Compliance and Management
ESA	Endangered Species Act
FR	Federal Regulation
ft	feet
Guidelines	Draft National Bald Eagle Management Guidelines
kg	kilograms
km^2	square kilometers
lbs	pounds
m	meters
MBTA	Migratory Bird Treaty Act
mi^2	square miles
PCMS	Pinon Canyon Maneuver Site
USFWS	U.S. Fish and Wildlife Service

1.0 Introduction

1.1 Purpose

The purpose of this Technical Memorandum is to provide a conservation assessment and conservation goals for wintering bald eagles on Fort Carson and the Pinon Canyon Maneuver Site (PCMS). Elements of the memorandum include threats to bald eagles on Fort Carson and the PCMS, and specific management actions to mitigate negative effects on the bald eagle.

1.2 Project Overview

This plan is organized into four parts.

Section 1.0 **Introduction:** A brief overview of the purpose of this Technical Memorandum.

Section 2.0 **Conservation Assessment:** Current knowledge on bald eagle population status, ecology, and habitat requirements on Fort Carson, the PCMS, and regionally, including known and potential threats to the bald eagle on the installations.

Section 3.0 **Conservation Goal:** Specific management prescriptions for the bald eagle on Fort Carson and the PCMS.

Section 4.0 **References:** References cited in the preparation of the plan.

2.0 Conservation Assessment

2.1 Species Description

The bald eagle is a diurnal bird of prey. Adult bald eagles are readily identified by their white head and tail, dark brown body, and large yellow bill. Bald eagles weigh 3.6 to 6.4 kilograms (kg) (8 to 14 pounds [lbs]) and have wingspans of 1.7 to 2.4 meters (m) (5.5 to 8 feet [ft]). Northern bald eagles (Alaska and Canada) are significantly larger than their southern relatives, and females are larger than males. Juveniles are mottled brown and white and generally attain adult plumage by 5 years of age (U.S. Fish and Wildlife Service [USFWS], 2006a).





(Pictures from Birds of North America Online)

Juvenile Bald Eagle Adult Bald Eagle

2.2 Species Distribution

2.2.1 General

The bald eagle is a North American species that has historically occurred throughout the contiguous United States and Alaska (USFWS, 2006a). Bald eagles nest in areas with forested shorelines or cliffs along aquatic habitats, including coastal areas, rivers, lakes, and reservoirs (Buehler, 2000). In winter, bald eagles may also occur in semi-deserts and grasslands, especially near prairie dog towns (Andrews and Righter, 1992).

2.2.2 Regional

Historically, the number of bald eagle pairs nesting in Colorado is unknown, but records indicate several mountain sites and one plains site. Bald eagles now nest across Colorado in large, mature cottonwoods or pines (Kingery et al., 1998). The Colorado population of bald eagles increases during the winter, and the bald eagle is a common local winter resident in western valleys, mountain parks, and on the eastern plains (Andrews and Righter, 1992).

2.2.3 Fort Carson

Most bald eagle records for Fort Carson are from the northern region (Figure E.3-1), most likely due to the presence of prairie dog colonies. Bald eagles do not nest on Fort Carson or within its region of influence, and no bald eagles have been seen on Fort Carson during the breeding season. Most records of bald eagles on Fort Carson are from October to March, with the majority of sightings from November to January (Bunn, 2006). Bald eagle density likely increases during the big game hunting season on Fort Carson as bald eagles scavenge viscera left by hunters (Directorate of Environmental Compliance and Management [DECAM], 2002).

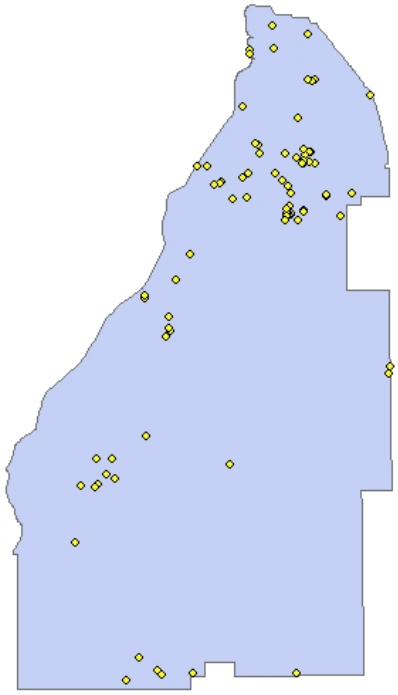


FIGURE E.3-1
Bald Eagle Sightings on Fort Carson

2.2.4 Pinon Canyon Maneuver Site

Bald eagles are winter residents and migrants on the PCMS, especially in the southwestern grassland area (Figure E.3-2). No evidence of active eyries has been found. As is the case at Fort Carson, bald eagle density probably increases during big game hunting season on the PCMS as bald eagles scavenge viscera left by hunters (DECAM, 2002). A bald eagle winter roost exists along County Road 54, off site of the PCMS (Klavetter, 2006).

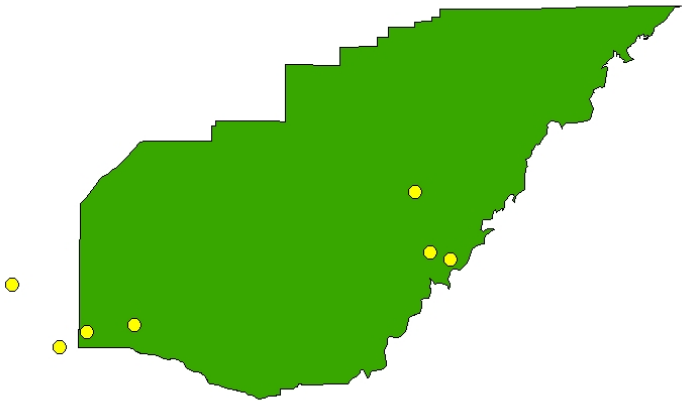


FIGURE E.3-2
Bald Eagle Sightings on the PCMS and Surrounding Area

2.3 Habitat Requirements

2.3.1 General

Bald eagles winter primarily in the temperate zone, generally below 500 m (1,640 ft) elevation. In Colorado, however, wintering areas may reach 2,500 m (8,200 ft) elevation. Bald eagle winter habitat is generally defined by food availability, presence of roost sites that provide protection from inclement weather, and absence of human disturbance. The majority of wintering bald eagles are associated with aquatic areas with some open water for foraging (Buehler, 2000). In some areas, however, bald eagles use habitats in winter with little or no open water if other food sources (e.g., small mammals or carrion) are readily available (NatureServe, 2006). Type of food consumed (avian, mammalian, or fish) and means of availability (live or carrion) vary greatly across wintering range. Winter perching habitat is characterized by the presence of tall trees located less than 50 m (164 ft) from foraging areas (Buehler, 2000).

Bald eagles have shown high site fidelity to wintering grounds (Buehler, 2000). In Colorado, 10 of 36 immatures and adults repeatedly returned to the same area to winter, and one individual wintered in the same area for 10 years (Harmata and Stahlecker, 1993).

Bald eagle winter ranges, especially those of non-breeding birds, can be very large (NatureServe, 2006). An immature bald eagle wintered in Arizona over an area of more than 40,000 square kilometers (km^2) (15,444 square miles [mi^2]) and spent the summer in the Northwest Territories on a summer range of more than 55,000 km^2 (21,235 mi^2) (Grubb et al., 1994). During February to April, the mean minimum winter home range of four immature bald eagles in Arizona averaged 400 km^2 (154 mi^2)(Grubb et al., 1989), and in Montana, adults and immatures had winter ranges from 102 to 3,925 km^2 (39 to 1,515 mi^2) (McClelland et al., 1996). Winter home ranges in Colorado averaged 311 km^2 (120 mi^2); ranges for mated birds were less than for unmated birds (128 km^2 and 546 km^2, respectively) (49 mi^2 and 211 mi^2, respectively) (Harmata, 1984).

2.3.2 Fort Carson and the PCMS

Due to large winter home ranges and various migration routes, wintering and migrating bald eagles may be found throughout Fort Carson and the PCMS. However, bald eagles are generally found near prairie dog towns on both installations. Prairie dogs, other small mammals, and animal remnants left by hunters provide food for bald eagles on Fort Carson and the PCMS.

2.4 Life History

2.4.1 Reproduction and Mortality

Bald eagle nest-building activity and egg-laying timing vary throughout the United States depending on latitude (Buehler, 2000). In the northern United States, including Colorado, bald eagles begin building nests between December and mid-March, and eggs are laid from February through April. Bald eagles lay from one to four eggs, with one or two eggs being most common. Only one egg is laid per day, and eggs are not always laid on successive days. Incubation begins after the first egg is laid, and hatching of young occurs on different days, resulting in chicks of unequal size occupying the same nest. Incubation typically lasts 33 to 35 days but can be as long as 45 days. Egg hatching and young rearing take place from March to June and by mid-May to August, the young are fledging. At 10 to 12 weeks after hatching, eaglets make their first flights, and they fledge within a few days after that first flight. After fledging, young birds usually remain in the vicinity of the nest for several weeks. Young are almost completely dependent on their parents for food until approximately 6 weeks later, when they disperse from the nesting territory. Overall, the national fledging rate is approximately one chick per nest per year (USFWS, 2006a).

Bald eagles exhibit high nest fidelity and nesting territories are often used year after year. Generally, nests are found near coastlines, rivers, lakes, or streams that support an adequate food supply. Nests are located in mature or old-growth trees, snags, cliffs, rock promontories, but rarely on the ground and, with increasing frequency, on human-made structures, including power poles and communication towers (USFWS, 2006a). In suitable forested areas, nest trees are generally the largest trees with accessible limbs capable of holding a nest that can weigh more than 455 kg (1,000 lbs) (USFWS, 2006a; Buehler, 2000). Nests are constructed from large sticks and may be lined with moss, grass, plant stalks, lichen, seaweed, or sod. Bald eagle nests are typically 1.2 to 1.8 m (4 to 6 ft) in diameter and 0.9 m (3 ft) deep (USFWS, 2006a). Nest sites generally include at least one perch with good visibility of the surrounding area (USFWS, 2006a; Buehler, 2000).

Humans represent the single greatest cause of bald eagle mortality, including mortality from direct human actions (shooting, trapping, poisoning) and mortality related to indirect human development activities (power lines and other structures). Environmental contaminants are also a significant source of mortality. These include ingestion of lead from waterfowl, deer, and other game species' carcasses, and secondary poisoning through consumption of prey killed by pesticides or euthanasia (sodium pentobarbital). Bald eagles are also susceptible to motor vehicle-impact injuries while scavenging carcasses off highways (USFWS, 2006a; Buehler, 2000).

2.4.2 Movement and Behavior

Bald eagles have a complex pattern of migration that is dependent on age of the individual (immature or adult), location of breeding site (north versus south, interior versus coastal), severity of climate (especially during winter, but also possibly during summer), and year-round food availability. Adult bald eagles migrate as needed when food becomes unavailable. Bald eagles usually migrate alone but occasionally join other migrants. Concentrations of migrants may be found at communal feeding or roosting sites. Immature bald eagles migrate and move nomadically, presumably because they are not tied to a nest site (Buehler, 2000).

Bald eagles migrate widely over most of North America. Northward migration may be more rapid than the return trip south to wintering grounds because early arrival on breeding grounds provides advantages in competing for nest sites and mates. Migration southward may occur at a slower rate as birds respond to foraging opportunities along the way (Buehler, 2000).

2.4.3 Foraging and Diet

Bald eagles are opportunistic feeders, and fish make up most of their diet. Bald eagles also eat waterfowl, shorebirds/colonial water birds, small mammals, reptiles, amphibians, and carrion (USFWS, 2006a; Buehler, 2000). Bald eagles are visual hunters and usually locate their prey from a conspicuous perch or from soaring flight, then swoop down and strike. Large numbers of bald eagles often congregate in winter to feed on spawning salmon and other fish species or in areas below reservoirs (especially hydropower dams) where fish are abundant. In winter, bald eagles take birds from rafts of ducks on reservoirs and rivers, and congregate on melting ice sheets to scavenge dead fish. Bald eagles also eat roadkill and euthanized animal carcasses at landfills and feedlots. In addition, young eagles will often congregate to feed on easily acquired food such as carrion and fish found in abundance at the mouths of streams and shallow bays, and at landfills (USFWS, 2006a).

2.4.4 Population Status

The bald eagle has been extensively surveyed on breeding and wintering grounds throughout their range. In the 1980s, population estimates were from 70,000 to 80,000 birds, and populations in the 1990s undoubtedly increased (Buehler, 2000). In 1999, the entire bald eagle population was estimated to be around 100,000 individuals with the greatest numbers found in Alaska and British Columbia (Buehler, 2000).

In 1963, it was estimated that the lower 48 states had less than 500 pairs of nesting bald eagles, and USFWS-coordinated surveys in 1973-1974 estimated 1,000 pairs. In 2000, the USFWS recorded more than 6,471 occupied breeding areas. The 2001 estimate for breeding pairs in Colorado was 45 (USFWS, 2006b).

The estimated total wintering population of bald eagles in the continental United States was over 20,000 by 2000 (Buehler, 2000).

2.5 Species Status

The bald eagle was first listed under the Endangered Species Act (ESA) as endangered on March 11, 1967, (32 Federal Regulation [FR] 4001) and was downlisted to threatened in July 1995 (60 FR 35999 36010). Primary agents that contributed to listing the bald eagle are habitat loss and contaminants (USFWS, 2006b).

Due to population rebounds, the USFWS in 1999 proposed to remove the bald eagle from the threatened and endangered species list (64 FR 36454). The public comment period for the proposal to delist the bald eagle closed on June 19, 2006 (71 FR 8238). Banning dichlorodiphenyl tricholorethane (DDT) and other harmful organochlorines from use in the United States and promulgation of the ESA with the subsequent listing of the bald eagle were the two major actions contributing to the recovery of the bald eagle. Impacts from contaminants have also been reduced through elimination of lead shot for waterfowl hunting and restrictions on other harmful pesticides. Vigorous law enforcement efforts also added to the recovery by reducing the shooting of bald eagles (USFWS, 2006b).

Bald eagles are also protected by the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). Bald eagles are a Colorado state-listed threatened species.

2.6 Conservation Measures

The USFWS has developed and is implementing the Northern States Bald Eagle Recovery Plan, which includes Colorado (USFWS, 1983). The plan includes four basic elements:

- Determine current population and habitat status.
- Determine minimum population and habitat needed to achieve recovery.
- Protect, enhance, and increase bald eagle populations and habitats.
- Establish and implement a coordination system for information and communication.

In the event the bald eagle is removed from the Federal List of Endangered and Threatened Wildlife and Plants and does not have protection under the ESA, Draft National Bald Eagle Management Guidelines (Guidelines) have been established to promote the continued conservation of the bald eagle (USFWS, 2006a). The Guidelines are intended to:

- Publicize the provisions of the BGEPA that continue to protect bald eagles in order to reduce the possibility that people will violate the law.
- Advise landowners, land managers, and the general public of the potential for various human activities to disturb bald eagles.
- Encourage land management practices that benefit bald eagles and their habitat.

2.7 Conservation Issues on Fort Carson and the Pinon Canyon Maneuver Site

This section outlines potential natural and human-related threats to the bald eagle and its habitat on Fort Carson and the PCMS.

2.7.1 Natural Threats

Predators

Bald eagles will defend their nests against other avian species, especially ravens and other raptors. Bald eagle eggs, nestlings, and fledglings are the most vulnerable to predation. Black-billed magpies, gulls, ravens, crows, black bears, and raccoons have been reported to prey on eggs in nests. Black bears, raccoons, hawks, owls, crows, ravens, bobcats, and wolverines have been reported to kill nestlings, although there is little actual documentation. Fledglings on the ground are vulnerable to mammalian predators. Few non-human species are capable of or likely to prey on immature or adult bald eagles. Starving, injured, or diseased immatures and adults may be vulnerable to mammalian predation (Buehler, 2000).

Disease

Of 1,428 bald eagles examined during a 20-year period, only 2 percent died directly from disease. Diseases reported as leading to death included peritonitis, pneumonia, enteritis, septicemia, avian cholera, aspergillosis, hepatic necrosis, and myocardial infarction. Avian pox has been reported in a few cases, including one case involving mortality of two bald eagles (Buehler, 2000).

Parasites

Few data on parasites exist, and no parasites have been reported to cause death of an individual bald eagle. Parasites appear to be common on nestling bald eagles (Buehler, 2000).

Exposure

Although little mortality is attributed to exposure, extreme weather conditions that lead to food shortages may cause death. Bald eagles can tolerate extreme cold, wind, and snow as long as food is available (Buehler, 2000).

Black-Tailed Prairie Dog Plague Outbreaks

Black-tailed prairie dogs are an important food source for wintering bald eagles. If natural prairie dog plague outbreaks cause significant localized loss of prairie dog colonies, bald eagles may not use the area for foraging.

2.7.2 Human Threats

Bald eagles are sensitive to human disturbance, especially during the nesting season. During migration and winter, bald eagles often concentrate in large numbers, from hundreds to thousands of individuals, for feeding and sheltering. Bald eagles rely on established roost

sites because of their proximity to sufficient food sources. Human activities near or within roost sites may prevent bald eagles from feeding or taking shelter, especially if other undisturbed or productive areas are not available. Feeding may be disrupted if there are disturbance activities in the flight path of important foraging areas. Activities that permanently alter bald eagle habitat may altogether eliminate factors essential for foraging bald eagles (USWFS, 2006a).

Military Training

There are no training restrictions or buffer zones at Fort Carson and the PCMS associated with the management of the bald eagle. Military training occurs in many forms throughout areas in which bald eagles have been found on Fort Carson and the PCMS. The most likely military training to affect bald eagles would be training that may cause prairie dog populations to decline on Fort Carson and the PCMS.

Military Training Effects on Prairie Dogs

Military training activities within prairie dog colonies, including mine plows, large-caliber weapon firing, construction of trench obstacles, live small-arms-caliber munitions, equipment drops, and offroad vehicles, would have a direct impact on prairie dogs. Except in the smallest colonies, damage associated with this type of training would not be substantial. These activities would have a short-term adverse effect on prairie dogs and a negligible effect on the long-term viability of a colony.

Non-Military Activities

Infrastructure Construction

Construction of infrastructure, especially on Fort Carson, could have the greatest impact on existing colonies of black-tailed prairie dogs on the installations. Prairie dog burrowing activities near infrastructure may lead to human/wildlife conflicts (i.e., gnawing of electrical wiring causing malfunctions in equipment), and in these cases, prairie dogs may be controlled according to practices outlined in the *Biological Assessment and Management Plan for the Black-Tailed Prairie Dog on Fort Carson and the Pinon Canyon Maneuver Site* (DECAM, 2004). Loss of prairie dog populations could result in bald eagles foraging outside of the installations.

Recreation

Hunting is permitted on both Fort Carson and the PCMS. The Colorado Division of Wildlife (CDOW) sets hunting seasons, but Fort Carson and the PCMS may place additional restrictions if warranted. There is a permanent moratorium on all black-tailed prairie dog hunting on both installations. Bald eagles scavenge animal remains left by hunters, and hunting most likely increases the availability of food for bald eagles on the installations. Therefore, hunting restrictions are not warranted.

Pest Control

The *Biological Assessment and Management Plan for the Black-Tailed Prairie Dog on Fort Carson and the Pinon Canyon Maneuver Site* outlines approved prairie dog population-control methods. Lethal control of prairie dogs occurs on Fort Carson at sites where prairie dogs present a public health threat, threaten the safety of sanctioned Army activities, damage or threaten to damage Army property, or where their presence is incompatible with current land-use practices or management goals. No prairie dogs have ever been poisoned on the

PCMS, but lethal removal of prairie dogs could be employed on the PCMS in the future under the circumstances outlined above for Fort Carson (DECAM, 2004).

Aluminum phosphide (trade name Phostoxin) is the chemical agent used to control prairie dogs. Phostoxin use is restricted to times when soil temperatures are greater than 55 degrees Fahrenheit for 72 hours and acceptable soil moisture is present. Under proper conditions, Phostoxin combines with moisture in the soil to emit carbon dioxide. Phostoxin is lethal to all other wildlife species and is not used on sites where burrowing owls or mountain plovers are present (DECAM, 2004).

Bald eagles are susceptible to secondary poisoning in prairie dog colonies. The prairie dog is an important food source for bald eagles on Fort Carson and the PCMS, especially in winter. The application of any pesticide must consider the risk of secondary poisoning to bald eagles.

Power Lines

Bald eagles are susceptible to electrocution by power lines and power poles, as demonstrated by the electrocution deaths of golden eagles along Route 1 and Route 8 on Fort Carson (DECAM, 2002). Eagle electrocutions on power lines have been documented in several states, especially in the west. Problem lines are those with wires so close together that an eagle is apt to simultaneously touch two wires while attempting to land on a power pole. The problem seems to be most severe in terrestrial habitats where few suitable natural hunting perches are available (USFWS, 1983).

3.0 Conservation Goal

3.1 Goal

The goal of bald eagle management on Fort Carson and the PCMS is to protect and enhance bald eagle populations in accordance with the ESA, BGEPA, and MBTA. The primary conservation objective is to protect wintering bald eagles while on Fort Carson and the PCMS. Described below are specific management recommendations to protect bald eagles on Fort Carson and the PCMS.

3.1.1 Manage for Sustainable Black-Tailed Prairie Dog Populations

Restrict aboveground poisoning of black-tailed prairie dogs, especially in winter. Restricted use of pesticides would reduce the potential for ingestion of contaminated prey that could result in the death of bald eagles. By coordination, exclusion devices, and use of pesticides that are not poisonous or available to raptors, ensure that pest management programs do not inadvertently affect bald eagles on Fort Carson and the PCMS (DECAM, 2002). Black-tailed prairie dog recreational shooting is banned on Fort Carson and the PCMS, which may reduce the added risk of lead poisoning to eagles from scavenging prairie dog carcasses from hunters.

3.1.2 Implement Measures to Prevent Bald Eagles from Being Electrocuted on Towers, Poles, and Power Lines

Reduce accidental power line electrocution of bald eagles through identification of lines currently causing electrocution, modification of existing problem lines, and construction of new lines in accordance with recommended standards (USFWS, 1983). Recommendations for reducing impacts of power lines on raptors can be found in *Suggested Practices for Raptor Protection on Power Lines: the State of the Art in 1996*, by Edison Electric Institute and Raptor Research Foundation.

Power lines will be inventoried to identify existing problem lines that should be modified. The DECAM will continue to monitor incidental take by electrocutions and will provide recommendations to the Directorate of Public Works regarding power lines that are known to kill raptors. Implementation of this objective includes gathering data on raptor electrocutions on the installations to identify raptor-killing lines and investigating methods to reduce the number of electrocutions on the installations (DECAM, 2002). The DECAM will provide technical assistance to ensure that wire/pole modifications to power lines do not accidentally electrocute bald eagles (or other large raptors). The DECAM will also notify the USFWS in the event of any bald eagle electrocution on Fort Carson or the PCMS.

In 2002, an independent survey by San Isabel Electric Company (Beth Dillion) was conducted for the potential for electrocution sites on all power lines within the PCMS. No locations were found on site that did not meet current guidelines/standards to avoid raptor electrocution (Klavetter, 2006).

3.1.3 Follow Applicable USFWS Guidelines for Protecting Bald Eagles

The USFWS describes management practices that land owners and planners can use to benefit bald eagles. Many of the recommendations are designed to protect bald eagle habitat and ensure against illegal take under the BGEPA (USFWS, 2006a). These recommendations include:

- Protect and preserve communal roost sites, potential nest sites, and important foraging areas. Retain mature trees and old-growth stands wherever possible, particularly within one-half mile of water.
- Avoid potentially disruptive activities and development in the eagles' direct flight path between their nest sites, roost sites, and important foraging areas.
- Locate long-term and permanent water-dependent facilities away from important eagle foraging areas.
- Avoid recreational and commercial boating and fishing near eagle foraging areas during peak feeding times (usually early to mid-morning and late afternoon), except where eagles have demonstrated tolerance to such activity.
- Do not use explosives within one-half mile (or within 1 mile in open areas) of communal roosts when eagles are congregating, without prior coordination with the USFWS and CDOW.
- Locate aircraft corridors no closer than 1,000 feet vertical or horizontal distance from communal roost sites.
- Only use pesticides, herbicides, fertilizers, and other chemicals in accordance with federal and state laws and labeled instructions for their use.
- Identify and monitor contaminants associated with hazardous waste sites (legal or illegal) and permitted releases, especially within watersheds where eagles have shown poor reproduction or where bio-accumulating contaminants have been documented. These factors present a risk of contamination to eagles and their food sources.
- Where feasible, site wind turbines, communication towers, and high-voltage transmission power lines away from bald eagle communal roost sites to avoid collisions. Bury utility lines along forested shorelines and roadways in new development projects.
- Employ industry-accepted measures to prevent birds from being electrocuted on towers and poles.
- Immediately cover carcasses of euthanized animals at landfills to protect eagles from being poisoned.
- Do not intentionally feed bald eagles. Artificially feeding bald eagles can disrupt their essential behavioral patterns and put them at increased risk from power lines, collisions with windows and cars, and other mortality factors.
- Avoid excessive groundwater pumping and river diversion that can lead to destruction of nest trees, roosts, and foraging areas.

- Use an approved non-toxic shot when hunting waterfowl. Eagles can be poisoned by elevated levels of lead after feeding on fish and waterfowl that have ingested lead shot or carrion killed with lead shot.

4.0 References

Andrews, R. and R. Righter, 1992. *Colorado Birds: A reference to their habitat and distribution*. Denver Museum of Natural History, Denver, Colorado.

Avian Power Line Interaction Committee, 1996. *Suggested Practices for Raptor Protection on Power Lines: the State of the Art in 1996*. Edison Electric Institute/Raptor Research Foundation, Washington, D.C., 125 pp.

Buehler, D.A., 2000. "Bald eagle (Haliaeetus leucocephalus)." In *The Birds of North America*, No. 506 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, Pennsylvania.

Bunn, Rick, 2006. Personal communication. June 12.

Directorate of Environmental Compliance and Management (DECAM), 2002. *7th Infantry Division and Fort Carson Integrated Natural Resources Management Plan and Environmental Assessment for Fort Carson and Pinon Canyon Maneuver Site*.

Grubb, T.G., W.W. Bowerman, and P.H. Howey, 1994. "Tracking local and seasonal movements of wintering Bald Eagles Haliaeetus leucocephalus from Arizona and Michigan with satellite telemetry." In *Raptor Conservation Today*, pages 247-358. B.U. Meyburg and R.D. Chancellor, Eds. Pica Press, Moose Jaw, Saskatchewan.

Grubb, T.G., S.J. Nagiller, W.L. Eakle, G.A. Goodwin, 1989. "Winter roosting patterns of Bald Eagles (Haliaeetus leucocephalus) in north-central Arizona." *Southwestern Naturalist* 34: 453–459.

Harmata, A.R., 1984. *Bald Eagles of the San Luis Valley, Colorado: their winter ecology and spring migration*. Ph.D. dissertation, Montana State University, Bozeman.

Harmata, A.R. and D.W. Stahlecker, 1993. "Fidelity of migrant bald eagles to wintering grounds in southern Colorado and northern New Mexico." *Journal of Field Ornithology*, Vol. 64, No. 2, Spring, pages 129-134.

Kingery, H.E. (ed), 1998. *Colorado Breeding Bird Atlas*. Colorado Bird Atlas Project and Colorado Division of Wildlife, Publishers.

Klavetter, Mead, 2006. Personal communication. August 16.

McClelland, B.R., P.T. McClelland, R.E. Yates, E.L. Caton, M.E. McFadden, 1996. "Fledging and migration of juvenile Bald Eagles from Glacier National Park, Montana." *Journal of Raptor Research* 30: 79–89.

NatureServe, 2006. NatureServe Explorer: *An online encyclopedia of life* [web application]. Version 4.7. Nature Serve, Arlington, Virginia. http://www.natureserve.org/explorer. (Accessed July 10, 2006).

U.S. Fish and Wildlife Service (USFWS), 1983. *Northern States Bald Eagle Recovery Plan*.

USFWS, 2006a, *Draft National Bald Eagle Management Guidelines*. Public review draft. February.

USFWS, 2006b. *Bald eagle: An American success story*. Region 3 Midwest. http://www.fws.gov/midwest/eagle/index.html (Accessed July 17, 2006).

APPENDIX F

Cultural Resources Supporting Documentation

Provided by

Fort Carson Directorate of
Environmental Compliance and Management,
Cultural Resources Program

ATTACHMENT F.1

Prehistoric and Historic Cultural Sequences at Fort Carson

PREHISTORIC AND HISTORIC CULTURAL SEQUENCES FOR FORT CARSON

Prehistoric Cultural Sequence

Three general stages of prehistory have been delineated for southeastern Colorado: the Paleoindian, Archaic, and Late Prehistoric. An earlier stage, the Pre-Clovis, has been proposed, but direct evidence of this stage in the region is lacking. The Paleoindian, Archaic, and Late Prehistoric stages in southeastern Colorado are each subdivided into three periods. These periods represent specific changes or innovations in the material culture of prehistoric peoples that suggest broader changes in environmental conditions and/or political and socio-economic structure. These periods span from approximately 11,500 B.P. to 225 B.P.

The following description of the prehistoric cultural chronology is taken from the cultural synthesis for Fort Carson provided in Zier et al. (1997), and the southeastern Colorado overviews found in Piper et al. (2006) and Zier and Kalasz (1999).

Pre-Clovis

The most noteworthy and generally widely accepted Pre-Clovis site is Monte Verde (Dillehay 1989; Meltzer et al. 1997) in southern Chile. In North America, a Pre-Clovis stage has been proposed by some archeologists based on the early radiocarbon dates found at sites like Cactus Hill site in southeastern Virginia (Adovasio 2002), Topper site in South Carolina (Goodyear 2002), and Meadowcroft rockshelter in Pennsylvania (Adovasio and Carlisle 1988).

Some sites in Colorado have Pre-Clovis age materials; however, radiocarbon dates at these locations have yet to be definitively associated with actual human activity (Zier and Kalasz 1999:75). Two northeastern Colorado sites, Dutton and Selby, produced bones of extinct megafauna that exhibit spiral fracturing and flake scars suggesting human modification. At the Lamb Spring site southwest of Denver, a possible Pre-Clovis component contained the remains of 23 mammoths, some of which appeared to have been left in piles, and bone flakes possibly resulting from the production of bone tools. Dates from the Dutton, Selby, and Lamb Spring sites range from 13,140 B.P. to 11,710 B.P.

Paleoindian 11,500-7,800 B.P.

The Paleoindian (11,500-7,800 B.P.) represents the earliest stage of cultural evolution in the archeological record of southeastern Colorado. This stage in southeastern Colorado is commonly divided into three periods based on diagnostic projectile points.

Clovis Period (11,500-10,950 B.P.)

The Clovis Period (11,500-10,950 B.P.), the earliest Paleoindian manifestation, has been delineated based on findings of large, fluted lanceolate spear points and prismatic blades, blade cores, and blade tools (Collins and Kay 1999:45-71). The latter were most likely used as knives, scrapers, and core/choppers. These characteristic artifacts have been found in association with the remains of mammoth, horse, and other Pleistocene fauna suggesting economies were

hunting-focused. Clovis sites in eastern Colorado include the Dent, Dutton, and Lamb Spring sites. The Drake cache in northeastern Colorado contained 13 large Clovis points and may represent a human interment (Frison 1991).

Other Clovis sites within the region include the Domebo site in southwestern Oklahoma and the Blackwater Draw site in east-central New Mexico. The Hahn site represents the only site of this age in southeastern Colorado (McDonald 1992), though surface Clovis points have been reported near Aguilar (Bair 1975:8), in Black Mesa State Park in the northwestern Oklahoma panhandle, and at several locations in western Kansas (Anderson 1990). Campbell (1969:360) identified a Clovis point in northern Las Animas County.

Folsom Period (10,950-10,250 B.P.)

The Folsom Period (10,950-10,250 B.P.) has been delineated based on fluted points found in association with extinct *Bison bison antiquitus*, as well as pronghorn, hare, wolf, fox, coyote, and turtle. The period coincided with early Holocene warming that saw the extinction of many large Pleistocene mammals. Besides fluted points, other Folsom period tools included knives, gravers, spokeshaves, scrapers, cores, drills, burin-like implements, choppers, abrading stones, awls, beads, and needles (Zier and Kalasz 1999:86-87). There is some evidence for the processing of vegetal products and for the grinding of pigments (Anderson 1990). Folsom sites in the region include the "type" site in northeastern New Mexico (35 miles south of the PCMS), the Lindenmeier, Fowler-Parrish, Powars, and Johnson sites in north-central Colorado (Zier and Kalasz 1999:85), and the Stewart's Cattle Guard, Zapata, and Linger sites in the San Luis Valley (Dawson and Stanford 1975; Jodry and Stanford 1992).

Though no Folsom sites have been reported in southeastern Colorado, surface projectile points have been reported in the Canon City area, Red Top Ranch, the Flank Field Storage Area, the Cimarron River basin (Zier and Kalasz 1999:87), near Fowler (Lotrich 1938), and on the Chaquaqua Plateau (Anderson 1975). Three Folsom point fragments have been recovered from PCMS sites, but two appear to have been brought there by later occupants. The other is of a local material and was broken during the fluting process (Owens and Loendorf 2005:581).

Plano Period (10,250-7,800 B.P.)

The Plano Period (10,250-7,800 B.P.) comprises several complexes characterized by different flake styles of lanceolate projectile points. Complexes include Midland, Agate Basin, Hell Gap, Alberta, Cody, Frederick, and Lusk (Gunnerson 1987; Wiesend and Frison (1998); Zier and Kalasz 1999:91-92). These complexes are thought to reflect a cultural continuum with adaptive modifications resulting in tool variability. An increasingly complex lifestyle is indicated by the presence of more varied tool kits, including a variety of stone and bone tools (Knell 1999). The presence of milling stones indicates a greater emphasis on processing plants. A great variety of kill, processing, and camp sites also occur, some with evidence suggestive of religious practices (Anderson 1990).

Evidence of Plano occupation in southeastern Colorado is plentiful; recorded sites of note include Olsen-Chubbock (Wheat 1972) and Runberg (Black 1986). On Fort Carson, two Cody complex projectile points and two unidentified Plano projectile points fragments have been recorded as surface finds. On the PCMS, Hell Gap points are quite common and have been

found on eight sites and as isolates twice. Recently, PCMS archaeologists (Owens and Swan 2006) identified an Agate Basin site with four diagnostic projectile points and highly patinated debitage and chipped-stone tools.

Archaic 7,800-1,850 B.P.

The beginning of the Archaic Stage (7,800-1,850 B.P.) marks another turning point in the natural environment with the onset of the Altithermal climatic episode, a prolonged early Holocene period of general warming and drying in western North America (Benedict 1979). The Archaic Stage represents a shift from economies geared toward big game hunting to more generalized hunting and gathering. More importance was placed on wild plant foods like *Chenoams*, and the procurement of game became more diversified, with large and small mammals like rabbits and gophers represented (Piper et al. 1996). Ground stone implements became common and are the predominant artifact class at many Archaic sites. Lithic tool assemblages exhibit more variability, and many artifacts reflect specialized local adaptation (Zier and Kalasz 1999).

Based on changes in projectile point morphology, the Archaic stage has been divided into Early, Middle, and Late periods. Archaic projectile points are nearly all stemmed and are not as delicately flaked as those of the earlier Paleoindian stage. Generally, Archaic complexes in the region have been poorly defined (Anderson 1990; Zier and Kalasz 1999:100).

Early Archaic Period (7,800-5,000 B.P.)

The Early Archaic Period (7,800-5,000 B.P.) reflects human adaptations to a hotter and drier climate. In response to this drastic climate change, southeastern Colorado may have become partially depopulated (Owens and Loendorf 2005:661), with some groups possibly relocating to the relatively cooler and wetter foothill and mountain regions (Benedict 1979; Brunswig 1992; Feiler 1994:16).

Early Archaic projectile points in eastern Colorado tend to be large, with either corner-notching or shallow side-notching (Zier and Kalasz 1999:105). Tool kits have not been thoroughly described, though Cassels (1997:95) indicates that expedient ground stone first appears regularly at this time.

In southeastern Colorado, Early Archaic projectile points have been reported from nine sites in the Apishapa highlands and from one site in the John Martin Reservoir area (Zier and Kalasz 1999:102-104). On Fort Carson, a component of the Gooseberry Shelter site has been radiocarbon-dated to the Early Archaic (Kalasz et al. 1993). No Early Archaic archeological sites have been found at Pinon Canyon and only a few projectile point isolates have been identified (Owens and Loendorf 2005). The lack of Early Archaic remains results from either a cultural hiatus, brought on by drought, or poor site preservation resulting from natural geologic processes (Zier et al 1989:15).

Middle Archaic Period (5,000-3,000 B.P.)

The Middle Archaic Period (5,000-3,000 B.P.) witnessed a widespread reversion to more mesic climatic conditions following the Altithermal event. Middle Archaic sites indicate broad-spectrum adaptations by hunter-gatherers to plains, basin/valley, foothills, and montane

environments (Gunnerson 1987:31-36). Sites display evidence of diverse resource procurement. Remains of large and small mammals, birds, reptiles, and shellfish occur, as do seeds of numerous wild plants (Zier and Kalasz 1999:121). Hearths are common and spaced-stone circles also appear. Characteristic projectile points of this period include large, basally concave or indented points such as McKean, Duncan, Hanna, and Mallory types (Gunnerson 1987:31-32). Other artifacts include formalized manos and grinding slabs, bifaces, scrapers, drills, spokeshaves, bone awls, and hammerstones (Anderson 1990).

In southeastern Colorado, one Middle Archaic site, Draper Cave in Custer County, has been excavated revealing mixed levels of Duncan, McKean, and Hanna projectile points. On Fort Carson, components of the Recon John Shelter site, the Gooseberry Shelter, and the Two Deer Shelter have been radiocarbon-dated to the Middle Archaic (Zier and Kalsaz 1999:115). Though isolated Middle archaic projectile points are quite common, only one PCMS site can be attributed to the McKean Complex (Piper et al. 2006:3-4). Middle Archaic age rock art, in the form of Pecked Curvilinear and Pecked Rectilinear elements, is quite common on the PCMS.

Late Archaic Period (3,000-1,850 B.P.)

The Late Archaic Period (3,500-1,800 B.P.) saw the continued specialization in subsistence practices, and maize probably first spread into the region at this time (Zier and Kalasz 1999:137). Evidence of communal bison procurement is abundant for this period and suggests the development of complex intergroup cooperation in conjunction with population growth (Piper et al. 2006:3-6). In southeastern Colorado, Late Archaic sites are much more common than Middle Archaic sites. Diagnostic projectile points of the period include basal corner-notched types like Ellis, Garza, Marcos, Shumla, Williams, Palmillas, Ensor, Edgewood, and Yarbrough (Anderson 1990).

On Fort Carson, Late Archaic components have been discovered at many locations, including a number with Middle Archaic components, such as the Recon John Shelter, the Gooseberry Shelter , and the Two Deer Shelter (Zier and Kalasz 1999:128-129). Pinon Canyon contains many surface sites of this time period; those excavated indicate that communal plant collecting and processing were dominant activities (Piper et al. 2006:3-6 – 3-7). In the area around Pinon Canyon, Late Archaic remains are plentiful, especially in the canyons (Campbell 1969; Hand and Jepson 1996; Reed and Horn 1995).

Late Prehistoric 1,850-225 B.P.

The Late Prehistoric Stage (1,850-225 BP) observed important changes in subsistence patterns, artifact complexes, and demographics on the southern Plains. The beginning of the stage coincides with innovations like the bow and arrow, ceramics, and permanent or semi-permanent houses (Piper et al. 2006:3-7). The use of cultigens reached a significant level during this time, though few pollen or macrobotanical samples attest to this change in southeastern Colorado. Recently, however, excavations along the Purgatoire River have produced significant maize pollen (Scott-Cummings and Varney 2002) at the Developmental Period/Diversification Period boundary.

The final centuries of the Late Prehistoric Stage reflect the effects of European incursions, including both direct intrusions by Europeans and diffusion and spread of material goods of European origin by indigenous groups (Secoy 1953; Zier and Kalasz 1999).

Developmental Period (1,850-900 B.P.)

The Developmental Period (1,850-900 B.P.) corresponds with what has traditionally been referred to by archeologists as the Plains Woodland Period (Winter 1988) or the Early Ceramic Period (Eighmy 1984). At this time, cordmarked and plain pottery, small corner-notched arrow points (Scallorn, Reed, Bonham, Alba, Washita, Fresno, Chaquaqua types), circular slab masonry architecture and some agriculture first appeared.

Ground stone tools are more common than chipped stone in this period. This suggests that vegetal materials, possibly including maize, and other cultigens probably constituted larger portions of the human diet (Piper et al. 2006:3-8). Faunal remains from excavated sites indicate that animals like deer and antelope were exploited, as well as small animals like cottontail rabbits and prairie dogs (Zier and Kalasz 1999:178). Aquatic species like fish, frogs, and fresh water mussels were also consumed (Sanders 1983; Zier and Kalasz 1999:178).

Developmental Period sites are much more numerous in the region than those of earlier periods. It has been noted that this increase in the number of recorded sites could be the result of improved site visibility due to the presence of architectural features (Zier et al. 1997). Observed site types include circular masonry architecture, rock shelters, brush and hide shelters with circular rock foundations, and open camps (Zier and Kalasz 1999:174-175)

Diversification Period (900-500 B.P.)

The Diversification Period (900-500 B.P.), also termed the Middle Ceramic (Eighmy 1984), marks the local variant of the Plains Village tradition. It is subdivided into the Sopris (900 to 750 B.P.) and Apishapa Phases (900 to 500 B.P.) in southeastern Colorado. The Sopris occurs in the area around Trinidad, Colorado, and relates to the Pueblo Indian occupation of New Mexico. Sites of this phase have never been found at the PCMS or Fort Carson and will receive little discussion here.

Based on the appearance of “fortified” sites on areas of high terrain, and massive architectural features, Withers (1954) proposed the concept of the Apishapa focus. More recently, Lintz (1984) proposed the concept of the Upper Canark regional variant for cultures of Plains Village age that occur along the western margin of the southern and central Plains. Within the Upper Canark regional variant, he recognized the Antelope Creek Phase of the Texas and Oklahoma Panhandles and northeastern New Mexico, and the Apishapa Phase of southeastern Colorado. Lintz’s dates for the Upper Carnark regional variant were approximately 900-500 B.P. (Zier et al. 1997).

There is little doubt that subsistence practices during the Diversification Period were geared more toward horticulture than those of the Developmental Period. However, floral and faunal evidence from Diversification sites still indicates that hunting and gathering predominated and that horticulture was supplemental. The degree to which architectural developments are reflective of permanent habitation is also uncertain. Where surface architecture is common

(particularly along the canyons of the upper Arkansas River drainage basin), it is difficult to envision permanent habitation and a horticultural subsistence base, due to the marked absence of substantial middens (Zier et al. 1997).

Cultigens have been recovered from excavations on Diversification Period sites. Maize has been recovered from many rockshelters in the region including Medina Rockshelter, Pyeatt Rockshelter, Upper Plum Canyon Rockshelter, Gimmie Shelter, and Trinchera Cave (Zier and Kalasz 1999:217). Maize pollen has been recovered from open architectural sites along the major rivers of southeast Colorado (Gardner 2005; Gunnerson 1989). At Umbart Cave in the upper Arkansas River drainage basin, Campbell (1969:180) recovered beans in subsurface context. The presence of cultigens in the drainage basins of the Arkansas River indicates that horticulture was being practiced, or that these peoples were actively trading with the horticulturists of the Antelope Creek Phase.

Deer and antelope remains are common on Apishapa Phase sites, but bison bones are rarely encountered. Communal hunting of ungulates is portrayed in rock art of this time period with human figures portrayed herding or chasing quadrupeds (Piper et al. 2006:3-10).

Technologically, the most distinctive lithic characteristic of the period is the small triangular projectile point, either unnotched Fresno or side-notched Washita. Ceramics are also varied, but generally consist of cord-marked, globular, or conoidal jars. Bone artifacts are common and include awls, fleshers, wrenches, and beads. Ground stone includes manos, metates, and shaft abraders (Zier et al. 1997).

Many Diversification Period sites are found on the Army controlled lands in Colorado. The canyon settings of the PCMS exhibit defensive sites on every isolated high ridge point surrounded by a steep slope. At the Sorenson Site or Jason's Pillar, for example, Apishapa village sites were found on isolated canyon edges where their occupants could monitor the movement of adversaries during what was likely a raid or siege warfare event.

Protohistoric Period (500-225 B.P.)

The Protohistoric Period (500-225 B.P) extends from roughly 1450 A.D. to 1725 A.D. The earliest European incursions into the region occurred during the first half of the sixteenth century, and the material cultures of indigenous populations were altered significantly over the course of the ensuing three centuries. Three principal indigenous groups entered southeastern Colorado during this period. In chronological order of appearance, they are the Apache, Comanche, and Cheyenne-Arapaho (Zier et al. 1997). In addition, southeastern Colorado was on the margin of Ute territory throughout protohistoric times.

The Protohistoric Period marks the start of the Plains Nomad Tradition (Gunnerson 1969, 1984). Material remains include metal artifacts, micaceous pottery, Pueblo pottery, chipped glass artifacts, and side-notched points. Most sites from this period are tipi encampments found along canyon heads though some earth ovens have been found (Winter 1988:77-78). Spanish expeditions onto the southern Plains reported groups of nomadic bison hunters that also subsisted on corn, other large and small game, native plant seeds, greens and tubers, mussels and fish.

In eastern Colorado, the Dismal River Aspect has been proposed for the remains recovered for the time period between A.D. 1675 and A.D. 1725. The Dismal River Aspect has been associated with Plains Apachean peoples (Anderson 1990; Gunnerson 1960) based on the previously mentioned Spanish accounts. Recently, Gulley (2000:7) has called into question the validity of these accounts and has determined that sites attributed to Dismal River actually represent a local manifestation of a Plains life way, rather than a definitive Apachean presence.

Tipi rings sites are common throughout the southern Plains, but only a few of them can be attributed to the Protohistoric. Sites on the Carrizo Ranches near the Colorado/New Mexico border have tipi rings and diagnostic pottery (Kingsbury and Gabel 1983). Protohistoric ceramics have also been found at two sites on the PCMS (Loendorf and Kuehn 1991).

Historic Cultural Sequence

Within southern Colorado, the initial European contact occurred mid 16th century. The Late Prehistoric aboriginal way of life probably changed little until the Spanish began settling in the region. Following Zier and Kalasz (1999), the transition between the Protohistoric to the Historic begins around A.D. 1725. Though there is a paucity of ethnographic and historical data for the region, records document aboriginal/European contact beginning with Fray Marcos DeNiza's expedition of 1539.

Archaeologically, the recognition of Historic Indian sites in the region has been rare (Church 2002; Stoffle et al. 1984). Because of this, only the European cultural history will be discussed. The following description of the historic cultural chronology is largely taken from Clark (2003), Mehls and Carter (1984), Jones et al. (1998), Zier and Kalasz (1999), and Zier et al. (1997), though other, less known sources are also consulted.

Spanish Period (A.D. 1540 – A.D. 1822)

Initial European exploration into southeastern Colorado was associated with Spanish colonialism. In 1539, Viceroy Medoza sent Fray Marcos DeNiza to investigate the "Seven Cities of Cibola" described by Cabeza DeVaca (Carson 1998:5). In 1540, Francisco Coronado led another large expedition in search of the Seven Cities as far north as south-central Kansas. Though neither of these expeditions actually crossed into Colorado, the entire region became part of the territory claimed by Spain in the New World (Mehls and Carter II-1; Zier et al.. 1997).

Through the late 16th century, there were other Spanish expeditions into the southern Plains. In 1598, Don Juan Onate sent Vincente de Zaldivar into southern Colorado and the Juan de Archuleta made the first documented trip into Colorado around 1664 when retrieving Taos Indians from El Cuartelejo (Freidman 1988; Mehls and Carter II-1-3). The Purgatoire River is said to have received its name because Spanish soldiers had died here and did not receive last rites. Perhaps members of the Bonilla and Humana expedition of 1594 (Taylor 1963) were the servicemen mentioned in this account. The river's Spanish name, "Rio de las Animas", means river of souls, to which was later added "Perdidas en Purgatorio," or lost in Purgatory. Records indicate that Gutierez de Humana killed Captain Fransisco Leyva de Bonilla along the Arkansas River in Kansas, however, while retuning to Pecos Pueblo the rest of the group was attacked by Indians and most of the Spanish Soldiers were killed (Murray 1979). The majority of scholars

(Friedman 1989; Thomas 1924) confirm that the Humana expedition went into Kansas and not Colorado, but a skeleton in Spanish armor found in a canyon near La Junta (Jeancon 1925) and chain mail found in the area (Church and Cowen 2003) collaborate nicely with the legend.

The migration of the Utes and Comanches was part of a broader pattern of rapidly shifting tribal territories, a pattern which had begun before the Spaniards reached the region and continued into the late-nineteenth century (Kenner 1969). The Uto-Aztecan speaking Ute Indians may have been the first historic tribe to enter Colorado when they migrated southeastward from the Great Basin (Zier et al. 1997). Following herds of bison, and because of ameliorating climatic conditions, Apaches entered the area from the north by the beginning of the 16th century (Piper et al. 2006). Other Athabaskans, Navajos, migrated to extreme southern Colorado and northern New Mexico at this time (Zier et al.. 1997). The Navajos and Apaches conducted both trade and warfare with the older pueblo groups further to the south. By the 1660s, the Apaches had become a mounted military threat to the Pueblos and the Spanish in what Secoy (1953) calls the Post-Horse-Pre-gun pattern. The Utes also had horses in the 1700s and they too began to raid New Mexico villages.

The first documentation of mounted Indians with armor occurred around the time of the 1680 Pueblo Revolt (Secoy 1953). The revolt had little direct impact north of New Mexico, though Spanish exploration into the area ceased as both soldiers and settlers retreated into Mexico (Mehls and Carter 1984). Within a few years, the Spanish regained control of the Rio Grande area and exploration into territories to the north resumed.

In the 1700s, French traders operating on the northern Plains and along the Mississippi River began to trade goods and arms to the various Indian groups including members of the Pawnee family and the Comanche (Secoy 1953). These enemies of the Apache pushed back across the southern Plains, and along with the Ute's who had guns at this time, established military dominance. This is because the semi-sedentary Apache were tied to crops on a seasonal basis and their more mobile, and better equipped, adversaries could pattern their locations and dominate calvary warfare.

In 1704, the Comanches began to raid Spanish settlements in New Mexico and used the Purgatoire River area as a staging point for their trips (Stoffle et al. 1984). Competition between Comanches and Utes for the upper Arkansas River basin eventually led to general warfare between those former allies, with the remaining Apaches allied with the Utes (Zier et al. 1997).

The Spanish military pattern at this time was one of infantry and calvary and expeditions into the southern Plains a show of force. To control the Indians of the southern Plains, and to assess French influence in the area, Spanish leaders dispatched a party lead by Antonio de Valverde in 1717 and Pedro de Villasur in 1729 (Mehls and Carter 1984; Murray 1979). On the Platte River of Nebraska, Villasur's party was attacked by the Pawnee and was the last Spanish expedition across eastern Colorado until 1779.

The French Canadian brothers, Paul and Peter Mallet, are credited with the first expedition up the Arkansas and Purgatory River valleys while traveling to Santa Fe in 1739 to establish a trade route (Taylor 1959). On the journey, they apparently found stones bearing Spanish inscriptions

on the banks of the Arkansas River (Folmer 1939). Although their exact route is not known, they may have followed the prehistoric Indian trade route, which would later become known as the Santa Fe Trail (Church and Cowen 2003).

In the 1770s, Comanche and Apache raiding parties terrorized the edge of the Spanish frontier. To combat these attacks, Governor Juan Bautista de Anza led an army of 600 solders, militiamen, and Indian allies against the Comanche (Murray 1979). They ambushed a large Comanche camp on the north side of the Wet Mountains in south central Colorado, then traveled south to near the present town of Rye where routed another Comanche force led by Cuerno Verde (Stoffle et al. 1984).

This Spanish victory initiated lasting peace with the Comanche in 1786. This new alliance led not only to the demise of the Apache on the Plains, but began the *Comanchero* period (1786 to 1860) where the Spanish, New Mexicans, and Comanche came together for trading on the southern plains (Kenner 1969). At the same time, New Mexican buffalo hunters known as *ciboleros,* hunted throughout the region (Carrillo 1990).

The French threat to the Spanish in the southern Plains disappeared in 1763. Napoleon, in the early 1800s, needed money to support the French Empire elsewhere, and came to an agreement with Spain to return the former French colony of Louisiana to France (Murray 1979). In 1803, in one of the greatest land deals of its time, France sold the recently secured Louisiana to the United States (Ubbelohde et al. 2001). The boundaries of the Louisiana, largely disputed by Spain, but claimed by the United States included the land extending west from the Mississippi River to the Rocky Mountains and the Rio Grande. It was not until 1819 that the Adams-Onis Treaty would established the Arkansas River as the northern boundary of Spanish New Mexico (Stout 2002; Zier et al. 1997).

President Jefferson did not waste any time in procuring federal funding for scientific expeditions to explore the natural resources, and to gain knowledge of the Indians, and the transportation routes of this uncharted territory. One of the first explorations, the renowned Lewis and Clark Expedition (1803-1806), explored the area along the Missouri River and the Northwest region. Two later expeditions that followed are directly associated with the Fort Carson area. The expedition of Captain Zebulon Pike (1806) explored the geography, natural history, and topography of the lands in the southwest portion of the newly acquired territory, leading Pike up the Arkansas River Valley into Colorado. The entourage of twenty-two men split into two groups, one to seek the headwaters of the Red River, and the other along the Arkansas River. During this expedition Pike would observe the mountain peak that bears his name today. Pike and three other men continued northwest in an attempt to climb the peak looming on the horizon, an attempt that proved unsuccessful. This venture possibly led him to the area of Little Fountain Creek, and on his return journey to the mouth of Fountain Creek the group possibly went by way of Turkey Creek. A winter camp described by Pike believed to have been located east of Colorado Highway 115 between Turkey Creek and Little Turkey Creek within the Fort Carson area has not been archaeologically verified (Zier et al. 1997).

After the official boundaries of Louisiana were established, Long's expedition (1820) would explore the western mountains in search of the source of the Platte River, returning by way of the

Arkansas and Red Rivers. Three of the men in Long's expedition would be the first Americans to climb what Long referred to as James' Peak, but would forever be referred to by the public as Pike's Peak (Ubbelohde et al. 2001). Long's expedition skirted the eastern boundary of Fort Carson (Stout 2002; Zier et al. 1997).

Fur trappers and traders were among the first Euro-Americans to venture forth in this unknown land, exploring the region in the process of economic enterprise. Trading and trapping networks had been in place by the early 19th century, and while private parties of New Mexico traders were encouraged by Spanish authorities to travel north and east to trade with the Indians, American traders were not always welcomed to trade in Santa Fe. When American traders did venture to Santa Fe, the Spaniards confiscated their goods and detained them, some for as long as a decade. James Purcell explained to the captured Pike in 1807 that after coming from Missouri and traveling up the South Platte to South Park he and two French-American traders turned southward to trade their furs in Santa Fe. Upon arriving there, Spanish authorities appropriated their goods, and did not allow them to leave (Stout 2002; Zier et al. 1997).

The Missouri Fur Company, in 1809-1812, did not intend to have its trappers detained in New Mexico and sent parties of trappers into the Rocky Mountains. Jean Baptiste Champlain led one party up the South Platte River bringing news back to St. Louis of a thriving beaver population and Arapaho Indians eager to trade. He returned to the South Platte area in 1811, and his party of trappers dispersed into different areas where they learned of the hostilities of the northern Plains Indians towards Americans resulting from British incitement during the War of 1812 (Weber 1971). In 1821, the Mexicans overthrew the Spanish during the Mexican Revolution.

Mexican Period (A.D. 1822 – A.D. 1848)

The Mexican Period coincides with much of the early American presence in the Colorado territory. In the spring of 1821, Spain granted Mexico independence as addressed in General Agustin de Iturbide's publication of the *Plan of Iguala*. While the news of independence spreads quickly through Mexico, it was not until September that Santa Fe learned of freedom from Spanish rule. New Mexico officials quickly endorsed independence, with no show of opposition. After the long imposed monopoly on the price of merchandise shipped to New Mexico by Chihuahua merchants, Santa Fe was eager to reverse Spanish policy against transactions with foreign merchants. Aware of the advantages that trading with the United States could bring, New Mexico eagerly sought the business of American traders from the northern frontier (Weber 1971).

Upon learning of the new opportunities in Mexico, William Becknell, who had set out in 1821 from Missouri to trade with the Comanches, traveled on to Santa Fe. His route across the plains and over Raton Pass became the Mountain Branch of the Santa Fe Trail (Taylor 1971). The Santa Fe Trail provided a trade route that linked Independence, Missouri with Santa Fe, New Mexico (Stout 2002; Zier et al. 1997). The Mountain Branch of the Santa Fe Trail more or less runs along State Highway 350 and the Timpas Creek drainage on the south side of Pinon Canyon. Shortly thereafter, many other traders made their way to sell merchandise to the New Mexico market. Establishment of a viable fur trade in the region brought about exploration of previous sections of unknown territory, thus expanding geographical knowledge of the mountain west (Alexander et al. 1982).

As the door opened for trade in New Mexico, the price of furs was rising in the United States, which brought with it a renewed interest in the fur trade. American fur traders ventured into New Mexico to hunt the plentiful beaver found in the streams of the Pecos and Rio Grande Rivers. In 1823, Mexican soldiers warned trappers of Baird and Company working the drainage of the Colorado River Basin that there were laws against foreigners trapping beavers in Mexican waters. When officials in Mexico City learned in 1824 that an American trapping network had developed in New Mexico, they ordered the government to prevent trapping of furs by foreigners in Mexican territory. American trappers, however, continued to trap New Mexico's waters by obtaining licenses granted to them in the names of Mexican citizens by Governors Baca and Narbona, provided a group of Mexicans joins the trappers to learn the fur trade. Due to pressures from Mexico City in 1826, Narbona revoked licenses and confiscated furs. American trappers did not easily give up the rich trapping areas in New Mexico, and many found ways around the law like smuggling furs by alternative routes, or by obtaining Mexican citizenship. Many American trappers, however, moved on, as early as 1827, into the Rocky Mountains to work the mountain streams for beaver. The "golden era of beaver trapping" dates between 1828 and 1833. The demand for beaver fur fell from favor in the early 1830s, replaced by the demand for the hide of the American bison, which lasted close to three decades (Weber 1971).

The success of the fur trade brought about the construction of many trading posts inside the United States territory north of New Mexico. Entrepreneurs such as William and Charles Bent and John Gantt established trading posts along the Upper Arkansas River between 1821 and 1835 (Lecompte 1964; Alexander et al. 1982). The most successful trading post, and strongest competitor of Taos, was Bent's Fort, established in the early 1830s by the Bent, St. Vrain and Company on the north side of the Arkansas River (Weber 1971). The location of the fort increased usage of the Mountain Branch of the Santa Fe Trail, and encouraged initial attempts of the first permanent settlements in the region (Stout 2002; Zier et al. 1997).

As the fur trade waned in the late 1830s, many trading posts continued to serve as supply stops along established trails and trade routes (Alexander et al. 1982). Agricultural settlement of the region coincided in conjunction with fur trading activities. Small farming communities settled at Pueblo and other locations along the Arkansas River and its north-flowing tributaries in the 1830s and 1840s. Corn and other produce of these farms found a ready market at the fur trading posts, and most farms were located close to at least one of the various segments of the Santa Fe and Taos Trails (Zier et al. 1997). As the fur trade became less lucrative many fur traders gave up their roaming lives and some with Spanish or Indian wives settled down to farm (Hafen and Hafen 1943). Food demands of Bent's Fort encouraged Mexican traders (*comancheros*) in 1839 to establish the first Mexican settlement, Fort El Pueblo, five miles upstream of Bent's Fort (Carrillo 1990; Stout 2002; Zier et al. 1997), where they raised grain, vegetables, horses and mules (Hafen and Hafen 1943). Around 1842, trappers and mountaineers started a settlement at the site of present day Pueblo where they farmed and traded with the Indians. A similar settlement started about the same time near the mouth of Hardscrabble Creek, near present day Florence (Hafen and Hafen 1943).

Sites associated with the fur trade are lacking within the boundaries of Fort Carson Military Reservation. The absence of well-traveled waterways or an overland route necessary for the

existence of a fur trading post indicates little promise that anything other than ephemeral interactions with the area existed. Archival evidence does not indicate the existence of fur trading posts in the area. One site, 5PE64, was erroneously identified as an 1820s-1830s "Bent's Stockade" by amateur historian C. W. Hurd in 1960. Archival, architectural and archaeological evidence indicated the site is the remains of a small ranch established in the late 1860s or early 1870s (Hurd 1960; Socha and Posner 1975:45-52; Zier and Kalasz 1985: 42-45, 74-48; Zier 1987; Zier et al. 1997). Review of archival sources or physical contexts fail to indicate establishment of a fur trading post near the location of site 5PE64 or anywhere else within Fort Carson. A number of streams run through the Fort Carson area to include, Fountain Creek, Little Fountain Creek, Little Turkey Creek, Red Creek, Sand Creek, and Turkey Creek (Zier et al. 1987). While trappers probably worked the streams throughout Fort Carson, their temporary campsites most likely have been lost through natural processes or latter human interaction with the land (Stout 2002; Zier et al. 1997).

The Arkansas River was the international boundary of the Louisiana Territory from 1819 to 1848. To promote settlement in Mexico's northern frontier, the Mexican government issued a series of land grants between 1833 and 1843 to individuals for the development of towns and natural resources (Hafen and Hafen 1943; Abbott et al. 1982). Mexico established three large land grants in 1843. The Sangre de Cristo Grant, a million acre tract in present Costilla County extended into New Mexico. The Nolan Grant encompassed an area south of Pueblo, and the Virgil and St. Vrain Grant, extended east of Pueblo to the Purgatory River and south of Trinidad. Prior to 1843, individuals received from Mexico the Maxwell Grant, south of Trinidad into New Mexico, and the Tierra Amarilla Grant, southwest of the San Juan Mountains (Hafen and Hafen 1943).

Before the establishment of any permanent Mexican settlements, the land grants transferred to the United States in 1848 after the war with Mexico. The treaty between the United States and Mexico honored the land and property rights of the individuals who held the Sangre de Cristo, Maxwell, and Tierra Amarilla grants. Congress reduced the size of the Nolan, and the Virgil and St. Vrain Grants, and did not ratify the Conejos Grant. The Navajo and Ute thwarted earlier attempts (1833 and early 1840s) to settle the Conejos Grant (Abbott et al. 1982). Hispanic *pobladores* migrated from northern New Mexico to develop towns within the Sange de Cristo Grant along the Costilla River (1849), and San Luis (1851), San Pedro (1852), and San Acacio (1853) and the Culebra River. Humble farmers raised families, tilled the soil with crude wooden plows, dug irrigation ditches, and raised crops of wheat, corn, and beans (Hafen and Hafen 1943). These small Hispanic communities were the first permanent agricultural settlements in Colorado (Hafen and Hafen 1943; Carrillo 1990; Stout 2002; Zier et al. 1997). By 1860, more than 2,000 emigrants had settled in the area establishing at least forty irrigation ditches (Abbott et al. 1982).

American Frontier (A.D. 1849 - A.D. 1858)

The Mexican War officially ended in 1848, with the Treaty of Guadalupe Hidalgo. The United States annexed the Mexico territory from Texas to the Pacific Ocean, from the Rio Grande to the forty-second parallel, the present American Southwest, including the area of Colorado south of the Arkansas River (Ubbelohde et al. 2001). The postwar period brought several significant changes resulting in permanent occupation of the region. American population in Colorado

increased as a direct result of gold and silver mining and emigrants seeking fortunes through mineral prospecting in California, or settling on farms or ranches in Utah and Oregon (Stout 2002; Zier et al. 1997). While wagon wheels continued to furrow deeply along the Santa Fe Trail, the flow of emigrants heading to Oregon, California, and Utah (1840 – 1850), the rush to gold fields and cattle drive routes contributed to the emergence of formal communication and transportation systems, linking frontier posts and villages. Frontier building increased hostilities between emigrants and the indigenous tribes eventually resulting in systematic removal of the Indians as early as the 1860s (Stout 2002; Zier et al. 1997).

Enthusiastic reports brought back by Lewis and Clark in 1806 of the fertile valleys of Oregon, and the Fremont expeditions (1842, 1843 and 1844) returning with maps of the major trails over the mountains to Oregon and California territories, encouraged many emigrants to head west. The Fremont expedition of 1842 employed the seasoned frontiersman Kit Carson as their guide to survey the area between the Missouri River and South Pass for passable routes and sites for the development of military posts (Ubbelohde et al. 2001). Bent's Fort established in the 1830s continue to serve as a portal from which many expeditions and emigrants began their journey into the western frontier.

Originally, emigrants made the journey west in search of land to establish farms and ranches. The discovery of gold in 1848 on a ranch belonging to John Sutter in California altered the purpose and demographics of those traveling west changed. By 1849, the gold rush brought many seekers of fortune over the Great American Desert and the Rocky Mountains (Ubbelohde et al. 2001). In 1846, Mormons in search of a heavenly fortune sought a "homeland" to practice their beliefs began their trek west establishing their haven in the Great Salt Lake Basin of Utah. In 1846, near Pueblo, a temporary settlement was set up for sick and disabled soldiers of the "Mormon Battalion" who had enlisted in the United States army during the war with Mexico to spend the winter. They left their log cabins and church in the spring of 1847 and traveled northward to the Oregon Trail with their final destination Salt Lake City, Utah (Stout 2002; Zier et al. 1997).

While Fort Carson is not located along the most frequently traveled Oregon Trail that took emigrants through central Wyoming, or the Overland Trail through northeastern Colorado and southern Wyoming, important "feeder" trails of the Oregon Trail did traverse through the immediate Fort Carson area (Zier et al. 1997). A number of exploration parties traveled along the Fountain Creek route: George Ruxton (1847), the Sumner Kansas Territory Survey (1857) and the Hayden Geological Survey (1873). The Cherokee Trail may have originated as early as 1849 with the Evans party of 124 gold prospectors, including 15 Cherokee Indians, on their way to the gold fields north of Denver. The trail followed along Fountain and Jimmy Camp Creeks to the headwaters of the South Platte drainage, then north to Denver. The trail became a frequently used thoroughfare after 1858, as news spread quickly through the Kansas and Missouri frontiers of the discovery of gold in the Pikes Peak area. Following the path of the gold prospectors, came freight wagons with needed supplies to outfit and feed those seeking their fortunes (Stout 2002; Zier et al. 1997).

Eastern Colorado, from 1854-1855, was part of the Kansas and Nebraska Territories, a region largely unsettled by Euro-Americans, with no established civil government (Sprague 1976;

Alexander et al. 1982). Scattered Euroamerican settlements emerged in the Arkansas Valley during the early 1850s. Early settlers included “Uncle Dick” Wooten, Joseph Doyle, and Charles Autobees. Communication between the United States and its new territories was a necessity; thus in1850 the U.S. government established the first mail contract between Independence, Missouri and Santa Fe, New Mexico. Settlement, along with the appearance of smallpox, increased tensions between Native Americans and emigrants (Stout 2002; Zier et al. 1997). Indian hostilities often caused abandonment of early settlements and ranches before the decade of the 1850s closed, and prior to the 1858 Colorado gold rush (Hafen and Hafen 1943).

Indian populations adapted to the limited presence of American traders and fur trappers along the South Platte and Arkansas River drainages, but became more agitated as Americans began to extensively travel through and settle in the Colorado Territory. The Treaty of Fort Laramie established in 1851 between the United States government and nine Plains tribes allowed Americans the right to build forts and roads within the tribal territories. The tribal territories agreed upon in the treaty set aside eastern Colorado from the Arkansas River to the North Platte River in Wyoming for the Cheyenne and Arapahoe. The central Rockies and the western slope was the land of the Ute, who resisted the gradual emigration of Hispanic American groups from New Mexico into the San Luis Valley. The U.S. Army erected Fort Massachusetts in 1852 to protect the settlers from Indian hostilities (Sprague 1976; Alexander et al. 1982). On Christmas Day in 1854, the Muache Ute and their Jicarilla Apache allies attacked the trading post at Pueblo, killing most of the residents (Carrillo 1990).

Increased traffic along the Santa Fe Trail and the establishment of the cattle drive routes in the new territory created further problems with Native American populations. In June 1860, the War Department ordered construction of a military fort at Big Timbers (known as Fort Lyon after the Civil War). Nevertheless, the situation between settlers and Native Americans continued to degenerate. In 1861, under pressure from the U.S. Government and white settlers, the Cheyenne and Arapahoe surrendered in the Treaty of Fort Wise the bulk of their land, which included the heart of their hunting lands at the base of the mountains. While most of the Cheyenne peace chiefs, lead by White Antelope and Black Kettle, supported the agreement, many of the young men and members of the warrior society claimed they had not agreed to the cessation of their land. The amount of game necessary to support the tribes was not plentiful enough on the fraction of the land north of the Arkansas allotted to the tribes. Stealing livestock from farms and ranches became a way to supplement the lack of game (Abbott et al. 1982).

In the spring of 1864, Cheyenne and Arapahoe Indians began raiding isolated ranches, running off horses, and antagonizing detachments of cavalry primed for action after a long winter (Abbott et al. 1982). A Cheyenne party attacked and burned the Iron Spring stage station along the Santa Fe Trail, and, in June, the brutally murdered the Hungate family on their ranch thirty miles from Denver. Reprisals by the military led to a series of events that culminated in the Sand Creek Massacre on 29 November1864. Cheyenne came to Sand Creek to witness the aftermath of the massacre. Incited by what they saw, the Cheyenne joined by Arapaho and Sioux gathered a force of thousands in early 1865, and initiated two attacks on the freight station of Julesburg killing forty whites, and blockading Denver (Abbott et al. 1982). William Bent associated through marriage with a Cheyenne woman and his trade relationship with the Cheyenne from the 1830s – 1840s, helped open negotiations for a new treaty in late 1865. However, intensive

raiding of settlers continued into 1867. A major military campaign occurred in the winter of 1868-1869, resulting in the Treaty of Medicine Lodge, where most of the Southern Cheyenne and Arapaho agreed to relocate to a reservation in Oklahoma (Abbott et al. 1982; Carrillo 1990; Stout 2002; Zier et al. 1997).

Colorado Territory

The formation of the Colorado Territory coincided with the onset of the Civil War in 1861. Geographically the newly established territory included portions of western Kansas and Nebraska, eastern Utah, and northern New Mexico (Alexander et al. 1982). However, due to political infighting, the prospect of attaining actual statehood was less and less attractive to many Coloradans. From 1868 to the approach of the presidential election of 1876, Colorado statehood was a dead issue. Then, with the national elections fast approaching, President Grant promised Colorado statehood in return for three Republican electoral votes. The proclamation was issued on August 1, 1876, and that fall Hayes defeated Tilden by a one-vote margin (Cowen, personal communication).

By 1860, the population of Colorado had expanded to almost 35,000, with 82.4% of the working force employed in mineral extraction (Arrington 1963; Schulze 1977; Alexander et al. 1982). The first detailed census (1860) for the Fort Carson vicinity reported 737 individuals living within the area of Canon City, down the north side of Fountain Creek, and up Fountain Creek to Colorado City. Demographics of this population consist of 614 men, 122 females, and one Negro (Alexander et al. 1982). The Colorado Territory gold rush was short lived with the primary gold deposits in the Leadville district depleted by 1863, and the mining industry entered a depressed phase lasting through the 1860s. By the 1870s, the work force employed in the mining industry had dropped to 12.5%, a dramatic change from the 82.4% indicated in the 1860s census (Arrington 1963; Alexander et al. 1982). Most prospectors eventually left, some turned to agriculture, and some stayed on to bolster new communities such as Boulder, Central City, and Fort Collins (Stout 2002; Zier et al. 1997). With new mining discoveries in the 1870s and development of railroad transportation Denver effectively doubled its size by 1872; by 1874 Denver's population reached 20,000 (Carrillo 1990; Stout 2002; Zier et al. 1997).

Settlement and Development of the Fort Carson Area

Fort Carson does not include locations of known outstanding events in the history of the region or the nation, but areas within and adjacent to the military reservation are directly associated with important historical themes and eras. Principal historical themes are homestead/ranch settlement and hardrock mining, but the area has also seen Spanish military and trading expeditions, placer gold prospecting, exploration expedition, overland emigration, United States military expeditions of the Mexican, Civil, and Indian wars, open range ranching and trail herding, railroad construction, and stagecoach communications. The following overview is intended to be a general background statement about the themes, events and eras of the Fort Carson region, with specific references to threshold events of themes and eras and to events within or adjacent to Fort Carson associated with the themes. Of no less importance is the direct association of Fort Carson Military Reservation itself with the United States' role in World War II as well as its association with the Korean and Vietnam wars (Zier et al. 1997).

The overview necessarily addresses a broad regional context, as well as the more particular context of the present Fort Carson Military Reservation. The regional context is part of southeastern Colorado bounded on the south by the Arkansas River, on the east by the Kansas-Colorado border, on the north by the headwaters of the Platte River system, and on the west by the Front Range of the Rocky Mountains.

Historic sites predating the 1860s have not been located within Fort Carson proper (Zier and Kalasz 1985). The climate in the Fort Carson area is semiarid to arid and unsuitable for settlement on the subsistence scale. Settlement within the present boundaries of Fort Carson was sparse due to the lack of water and the difficulty of travel. The area surrounding Fort Carson would greatly expand as a result of gold rush of 1859, bringing with it population and economic fluctuations, and as readily assessable minerals were depleted, resulted in a substantial decline in settlement of the area. The demand for fresh meat in mining camps played a role in the development of the Colorado cattle industry. The cattle industry developed gradually in the Fort Carson area beginning in 1860. The Civil War, depletion of readily accessible minerals, the difficulty in transportation and the transportation of goods, and growing conflicts between settlers and native tribes tempered growth between the mid-to late-1860s. With the cessation of Indian hostilities in 1868, development of better transportation alternatives and communication mechanisms, settlement gradually increased within the region surrounding Fort Carson and within its boundaries. Resurgence in population and community development resulted from the mining industry in Leadville in the 1870s and discovery of large gold deposits in Cripple Creek in the 1890s.

The discovery of gold in 1858 in the mountains near present day Denver and in Leadville (1859) would bring approximately 100,000 gold-seekers to Colorado in 1859, where they spread like wild fire up the South Platte into the upper reaches of the Arkansas River drainage to pan for gold. Not all emigrants came to seek fortune by panning for gold, but rather they took advantage of the needs of those who did. Thousands of would-be miners eventually stayed and became ranchers and farmers (Zier et al. 1997). Towns and villages emerged out of the wilderness in the late 1850s. A few communities developed to serve as supply points and agricultural centers near the present boundaries of Fort Carson: Fountain City (Pueblo), Canon City, El Dorado, and Colorado City. Canon City and Colorado City were located along the foot of the mountains on trails that lead to the gold mines in South Park and along the Blue River. Attributes of these two cities—the scenery, fresh mountain air, and fertile soil near streams—made settling in the area favorable. Regional farms could supply fresher food for mining towns then supply trains departing from the Missouri River. Thus, farms sprung up along the branches of the Arkansas, especially in Huerfano and Fountain Creek, offering fresh radishes, lettuce, onions, and peas for sale in the Denver market (Hafen and Hafen 1943).

Colorado City received its name because it was located along the natural gateway leading to upper branches of the Colorado River. By 1860, the population of Colorado City had reached 1,000; many were merchants and forwarders (Griswold 1958). In a marketing campaign in May 1860, Colorado City advertised free access to the South Park Mines, abundant agricultural resources, medicinal springs, and inspiring views of the Garden of the Gods. From 1861 to 1862, Colorado City briefly held the distinction as capitol of the Colorado Territory. The first publication of the Canon City newspaper on September 8, 1860, included references to an

operating shingle mill and steam saw mill, discovery of an oil spring, and announced that subscriptions were being taken up to begin a new church. By November, the population was 800, with forty businesses established (Hafen and Hafen 1943). The growth of Colorado City and Canon City would go through a period of decline as the mining industry entered a depressed phase in 1863. By the end of the decade, Colorado City was virtually deserted (Hafen and Hafen 1943; Griswold 1958; Alexander et al. 1982).

The cattle industry in Colorado Territory developed as a direct result of the 1859 gold rush. Prior to the gold rush, ranches were located at widely scattered locations in the Arkansas River Valley, most close to the Santa Fe Trail. Former New Mexico citizens who trailed cattle herds northward in search of grassy pastures along major rivers operated many of the ranches. Cattle were brought in from Missouri or Kansas, rather than from Texas or New Mexico (Zier et al. 1997). In 1860, the cattle industry found its official beginnings in Colorado when the Lovell and Reed Cattle Company brought Texas longhorn cattle to the lower Turkey Creek area near Pueblo. Over the summer, cattle grazed, until sold in small packs to resident ranchers or for butchering. Many small ranches, established as early as1860, continued to grow, and their success encouraged the establishment of others between 1869 and 1872. The home ranch or ranch headquarters often was located on a stream with at least semi-permanent water, and the cattle would graze the adjacent public domain land (Stout 2002; Zier et al. 1997).

True to the old pattern, most ranches continued to be located close to established trails. Settlement near present day Fort Carson began in 1860. The first settlement along Fountain Creek started when J.P. Robinson, Johnson Sanders, and Oliver Locks brought their families to the area and established small ranches. Several families, along with J.B. Bates, settled along Monument Creek, northeast of present day Fort Carson. Lewis Conley operated a gristmill on lower Beaver Creek, southwest of Fort Carson. William T. Holt established a cattle and sheep ranch on Horse Creek, east of Fort Carson, where he eventually ran 1,200 cattle, 1,000 horses, and 125,000 sheep. D. M. Holden settled with his family in the Bijou Basin east of present-day Colorado Springs. By 1878, the Holden ranch was running 2,700 sheep and 1,500 cattle. Sparseness of water and lack of transportation routes would delay settlement within the Fort Carson area until the late 1860s (Sandoz 1958; Whittemore 1967; Zier et al. 1997).

Agricultural settlement in the area between Fountain Creek and Beaver Creek was limited almost entirely to raising stock because of the rough and arid landscape and the lack of surface water. The term "settlement" does not accurately apply to occupation and use of the area until at least 1880. Scattered and usually isolated ranches were established throughout the Fort Carson area in the early 1870s, but most of the southern and eastern portions of the area were hinterland ranges for ranches headquartered along Fountain, Beaver, Red and lower Turkey Creeks. Virtually all of the territory remained unfenced range, and therefore used as common range by the ranchers (Zier et al. 1997).

Just outside the boundaries of Fort Carson, J.L. White and H.S. Clark secured CE patents in 1868. C.B. Wells (1867), P.D. Miller (1868), and J.W. Love (1869) held land patents located within the first terrace of the Fountain Creek flood plain (Schweigert 1997). By 1872, ranches were located along the length of Turkey Creek (Bullen 1939; *Canon City Daily Record* 5/8/1962; Whittemore 1967). In the 1870s, sheep were a dominant livestock in the area. One of the earliest

and most successful sheep ranchers within the Fort Carson area was David Degraff who settled near Fountain Creek in 1871. Reported to have run about 6,000 sheep at one time, Degraff switched to raising shorthorn cattle in 1887. The Skinner and Tabor Ranch started a sheep operation in 1878, with its headquarters at the Skinner railroad siding just northeast of Fort Carson (Osgood 1970; Zier et al. 1997). W.A. Cuthell operated a large sheep ranch in 1878 near Cheyenne Valley, located in the original Fort Carson cantonment area. W.D. Corley purchased the ranch and operated as a Hereford cattle ranch until purchased by the Army (Alexander et al. 1982; Zier et al. 1997).

The Charter Oak Ranch/Brown Ranch operated in the general vicinity of the present Fort Carson Rod and Gun Club. Charter Oak ranch was founded prior to 1886 with the original name of Brown Ranch (Alexander et al. 1982). C.S. Haynes, owner of the Haynes Cattle Company, changed the name to Charter Oak. Haynes filed a land entry in Sec. 10, T16S/R66W in 1885, later canceled. The Mary Helen Ranch, named by owner Charles Carson in the 1930s, was from part of the Old Charter Oak property (Alexander et al. 1982). Latter the Engle Land and Cattle Company owned the ranch. Both ranches produced Hereford Cattle (Whittemore 1967; Zier et al. 1997).

In 1866, Charles Goodnight and Oliver Loving established the Goodnight-Loving Trail, to bring cheap Texas beef to the mining camps of the Front Range. The trail extended from the Pecos River in Texas to Trinidad, Pueblo, Colorado City, and Denver. Goodnight and Loving brought 2,000 Texas longhorns into Colorado in 1867, and started a ranch on Apishapa Creek. Colorado's cattle industry was growing, with an estimated 147,000 cattle in 1867. As early as 1868, El Paso County stockgrowers held meetings to discuss concerns that Texas cattle traveling through the region could transport tick fever and other diseases that would endanger Colorado herds, and possibly affect the efforts of selective breeding to improve range stock (Stout 2002; Zier et al. 1997). Petitions passed against the importation of Texas cattle, and armed men soon turned back Texas herds entering the Colorado Range, causing the search for ranges and slaughterhouses further north that welcomed Texas longhorns (Osgood 1970; Stout 2002; Zier et al. 1997).

The route of trail drives probably changed somewhat depending upon the time of year and condition of the grass and streams. Some Texas herds possibly trailed through Fountain Creek on a trail reportedly used in the 1870s and 1880s until fencing and railroad construction made the overland cattle drive unprofitable and unnecessary. After the Union Pacific Railroad was built through Wyoming in 1868-1869 a vast opportunity for ranching opened up on the Central and Northern Plains, and primary cattle drives moved eastward away from the Fort Carson area (Zier et al. 1997).

Attack by Indians was not the only violence settlers and ranchers faced in eking out a living on the frontier. The Arkansas Valley Claim Club was organized by ranchers in 1860 "to protect life and property", and to arbitrate range rights. In April 1863, a band of horse rustlers disturbing the peace in the southeastern section of the newly formed Colorado territory, were stopped by a shoot-out near an outcrop called "Crows Roost" on Squirrel Creek, east of Fort Carson. That same year, the Espinosa brothers, Vivian and Filipe, committed a series of robberies and murders in a rampage leading from Hardscrabble Creek to South Park, then southward to the Fort Garland

area. Near upper Beaver Creek, the brothers killed Henry Harkings on March 19, 1863. Harkings was buried in Deadman Canyon, outside the present northwest boundary of Fort Carson (Little 1996; Whittaker 1917; Whittemore 1976; Zier et al. 1997).

In the spring of 1876 most of the cattlemen on Turkey Creek, Red Creek, and Little Fountain Creek formed the Turkey Creek Stock Association in order to handle their stock more effectively and economically. The constitution of the Association required ranchers to contribute one herder for each six hundred head of cattle on the range and to pay assessments for the cost of roundup proportional to the number of cattle. During the first summer, the Association herders spent about five months on a roundup that apparently extended from the Arkansas River northward to the Arkansas-South Platte divide. The *Pueblo Chieftain* (November 7, 1877) reported completion of the annual roundup. The principal beef sellers were J.W. Booth, Mrs. A.D. Hamlin, John Palmer, Rich Toof (whose home ranch was near the mouth of Beaver Creek), Ed Van Erder, Frank Price, Mr. Barnardsdale, Mr. Redman, and Jeff and Mass Steel. By 1878, the Turkey Creek Stock Association had 35 members whom cumulatively owned about 8,000 head of cattle. The roundup of that year consisted of fourteen herders under the direction of ranch foreman, John Palmer. Organized at the Steel Ranch on Fountain Creek the roundup took place on May 18 (*Pueblo Chieftain* 4/8/1877, 5/5/1878, 5/14/1878; Zier et al. 1997).

In the fall of 1877, field cattle buyers began to visit the ranches of the study region to buy stock directly from the ranchers. Individual ranchers responded by rounding up their market-ready steers. The *Pueblo Chieftain* (11/25/1877) reported that several ranchers were having a tough time extracting their stock from Wild Mountain, a densely wooded mountain between Beaver Creek and Red Creek. The newspaper reported in the same article that J.W. Booth, John Allen, Charles Hobson, and the Myers brothers sold steers to one of the buyers (Zier et al. 1997).

With the arrival of railroad service, ranchers shipped most of their stock by rail from Colorado Springs, Fountain, or Pueblo. However, the high cost of shipping led several members of the association to drive herds of cattle overland to Kansas City. The last trail drive from the Fort Carson area probably occurred in the early 1880s (Osgood 1970; Stout 2002; Zier et al. 1997).

Stagecoach lines were one of the first modes of transportation to provide passenger and mail service to supply stations and gold camps. The Leavenworth and Pike's Peak Express Company, already operating under a federal contract to deliver supplies to army units in Utah Territory, provided daily passenger service between Kansas and the Cherry Creek settlements for a fare per person of $100 to $125 one way. In 1860, after reorganization, the name changed to the Central Overland, California and Pike's Peak Express Company (COC&PP), and besides running passenger service, the COC&PP also ran the Pony Express across western America until 1861. Ben Holladay's Overland Mail and Express Company took over the COC&PP in 1861, and the Wells, Fargo & Company took over the line five years later. Stagecoach and mail service between Denver and Santa Fe in the 1860s was irregular. The line apparently ran "…from Denver…through Russellville, Jimmy's Camp, the Fountaine and Jenk's Ranch; then" left "over the hill to the Arkansas near the mouth of the Huerfano…"(Burnett and Burnett 1965; Zier et al. 1997).

Several stage stations were located near the eastern boundary of Fort Carson. The Widefield Stage Station was about two miles south of the present junction of Colorado Highway 83 and U.S. 85. The Fountain Stage Station was on the southern edge of the present city limits of Fountain, on the north bank of Jimmy Camp Creek. The Little Buttes Stage Station was in Section 33, T16S/R65W, at a ranch operated by Mr. Lincoln and Mathias Lock. A "Map of the Colorado Territory Embracing the Central Gold Region" (1886) shows a community/stage station (?) of El Paso, perhaps three miles north of the Pueblo-El Paso County boundary. The map locates Wood Valley about four miles south of the boundary. Piñon possibly had a stage station on the west bank of Fountain Creek in Section 31, T18S/R65W, and east of the southeast corner of Fort Carson (Bullen 1939; Ebert 1866; Long 1947; Township Map of El Paso County 1913; Whittemore 1967; Zier et al.1997).

Congress appropriated $1 million to subsidize daily transcontinental mail service, either by main line or extension routes in 1861. Denver was interested in establishing a direct east-west route, but after investigation development of a pass over the mountains proved too difficult to maneuver. Daily service to the gold camps came by way of a tri-weekly branch from Julesburg, off the Oregon Trail (Ubbelohde et al. 2001). Weibling received a mail contract in 1862 to provide regular mail service from Denver to Pueblo. Jacobs took over the mail contract and extended the service to Trinidad. The Barlow, Sanderson and Company established a stage line in 1861 from Independence, Missouri to Santa Fe, and took over the Jacobs' line, known as the Denver & Santa Fe Stage Line in 1869. A branch telegraph line extended from Julesburg to Denver in 1863. By 1868, the telegraph line ran from Denver to Santa Fe by way of Colorado City, Pueblo, and Trinidad (Burnett and Burnett 1965; Clausen 1963; Hafen 1948; Ubbelohde et al. 2001, Zier et al. 1997). Colorado Territory would not gain transportation service by rail until 1870.

In the 1870s, sporadic new gold and silver strikes were discovered in the mountains west of the region nearest the Fort Carson area. The Union Pacific Railroad completed its mainline through Cheyenne, Wyoming in 1868, and the transcontinental link by 1869. When Coloradans learned the Union Pacific would not be extending a line to Denver, citizens with financial backing built the Denver Pacific Railroad in 1870, with a line extending from Denver to Cheyenne, where it connected with the transcontinental line of the Union Pacific. The Kansas Pacific Railroad completed its line from St. Louis to Denver that same year. As these two railroad lines reached completion, W.A.H. Loveland began building the Colorado Central Railroad, which extended out of Denver to Golden and on to the mines on Clear Creek. By 1871, the Denver and Rio Grande Railroad (DRG), directed by General William Palmer, began building a line southward, reaching Colorado Springs on October 21, 1871. The DRG extended its line south, east of Fountain Creek reaching Pueblo on June 15, 1872, eliminating the stage line along that route. The Canon City Railroad, a line financed by the DRG to gain access to the coal fields, extended up the Arkansas River to Coal Creek, several miles east of Canon City.

The growing industry at Cañon City, the failure of railroads to reach Cañon City until 1877, and the settlement along Beaver Creek resulted in a demand for overland passenger and freight service between Colorado Springs and Cañon City. When the railroad did not provide service to Canon City in the early 1870s, Bob Spotswood and William McClelland constructed a wagon road in

1873 from Beaver Creek northward to Colorado Springs, over much of the route later known as Lytle Road. The Granite-Colorado City Stage began carrying passengers and freight over the road. One source reported that at least one hundred people used this route per day. The exact route of the stageline/wagon road is not known, but it probably conformed in large measure to a road or trail shown on an 1862 map of Colorado territory (Campbell 1972:59; Case 1862; Zier et al. 1997). As in many other cases, the stage service was probably preceded for some time by mounted mail service on the route. Two sub-post offices were set up along the route. Sun View, the home of Bob Womack on the Little Fountain served as one sub-post office, and the other at the John Lytle homestead on Turkey Creek. Thus the area took on another title of recognition as "the Lytle" area (*Cañon City Daily Record* 5/8/1962; Zier et al. 1997).

Other archival sources identify two stage stations farther to the southwest on Beaver Creek. The little community of Hatten, also called Upper Beaver Creek, was served at an unknown date and for an unknown period. Hatten area settlers grew vegetables and fruit for the mining camps and began providing cheaper imported foodstuffs. Farther south, near the confluence of Red Creek and Beaver Creek, the community of Glendale was established about 1873 as a station on the stage line. John McClure, a merchant in Cañon City, built a large hotel "of pale stone from near-by quarries" on the east bank of Beaver Creek, above the junction with Red Creek, called the McClure House. Large barns and corrals that held a thousand mules and horses for exchange teams were located below the hotel where the road forded the creek. During the years when mining along the Upper Arkansas brought an enormous amount of traffic through the area, D. S. Coffman, then proprietor of the hotel served more than a hundred passengers a day. In addition, "the spacious, well-furnished rooms made it a popular spot for local weddings, dances, and occasional gospel meetings. It was frequented by Indians and Cowhands as well as more cultured ladies" (Fremont County historian Rosemae Campbell 1972). Campbell may have exaggerated the importance and the business of the stage stop to a considerable extent.

Glendale remained a bustling stage station and settlement center until railroads reached Leadville and removed both the need for transportation to the Upper Arkansas from Colorado Springs and some of the market for agricultural products grown around Glendale. The stagecoach was discontinued in the late 1870s; archival sources give the date of demise of the community as 1896 and 1909 (Alexander et al. 1982). A flood on June 5, 1921 destroyed everything at Glendale except the stone hotel (Campbell 1972). Glendale was apparently located in Section 35, T18S/R68W, about a half-mile to the west of the Fort Carson Military Reservation. Hatten was well outside the reservation boundary (Zier et al. 1997).

In 1876, the Atchison, Topeka, and Santa Fe Railroad (ATSF) completed a line up the Arkansas River to Pueblo eliminating the need for the Southern Overland Stage. In response to the ATSF, the Denver and Rio Grande Western Railroad (D&RGW) extended its track from Pueblo south to the Purgatoire River. By 1878, the two companies were in competition for access to Raton Pass. "Uncle Dick" Wooten disliked the D&RGW, which worked favorably for the ATSF to received access in 1878 to Raton Pass via Wooten's former toll route. The ATSF reached Trinidad on September 1, 1878. The Pueblo and Arkansas Valley Railroad, a subsidiary of ATSF, built a track between Granada and Pueblo in 1877, and continued construction to Cañon City and the Royal Gorge, and the 1873 the Granite-Colorado City Stage route was abandoned shortly thereafter (Stout 2002; Zier et al. 1997). Additional rail access to the Fort Carson area was

established when the Denver and New Orleans Railroad (know later as the Denver, Texas and Fort Worth Railroad, a subsidiary of the Chicago, Burlington, and Quincy) built a line from Denver to Trinidad in 1881. The Missouri Pacific reached Pueblo from the east in 1887. That same year the ATSF built a line from Pueblo to Denver by way of Colorado Springs. The last major rail link to the region occurred in 1888 when the Chicago, Rock Island, and Pacific Railroad reached Colorado Springs via Limon (Ormes 1976; Sprague 1980; Zier et al. 1997).

During the late nineteenth century Euroamerican interests came to control and dominate southeast Colorado. Several factors contributed to the intensive settlement of the plains in the area by the early twentieth century, including the passage of the Enlarged Homestead Act of 1909 and the Stock Raising Act of 1916. Methods of dryland farming also improved, and new wheat strains better adapted to arid environments were introduced. World War I was a major factor in the spread of dryland agriculture in the region, as the United States became an important exporter of wheat and corn to Europe. This period resulted in significant changes for southeastern Colorado, rivaling the gold rush era in terms of demographic effects (Carrillo 1990; Stout 2002).

Rail connections, coal, oil, and available water greatly influenced the growth of Pueblo and Florence. The discovery of oil, sometime in 1859 or 1860, became the lifeblood of Florence and Canon City where several small extraction and refining enterprises operated. Florence Well Field, established in 1881 with the development of the first deep well, holds the distinction as the second oldest oil field in the United States. In 1885, Florence opened a refinery with the capacity to refine 100 barrels daily, and other refineries were built. The Florence Well Field reached a peak in crude oil production in 1892, with 824,000 barrels extracted. By1892 there were 75 producing wells, but gradually production declined and new exploration was halted by 1923 (Little and McFall 1972; *Pueblo Star-Journal and Sunday Chieftain*, 8/31/1975; Riches 1978; Scamehorn 1978; Zier et al. 1997).

Major ore milling and smelting industries developed in Pueblo and Florence. Pueblo built the first smelting industry in 1878 and was devoted to extracting gold and silver. Large deposits of iron ore discovered at Orient and Calument in 1880-1881, and ore hauled from many sources in Colorado, resulted in the founding of the Colorado Coal and Iron Company in Pueblo. Six smelting furnaces, each with the capacity of 40 tons were operating by 1881. Meyer Gugenheim and his sons built the Philadelphia Smelter in Pueblo in 1888, one of the smelting bases that would contribute to the eventual world domination of the smelting industry by the Gugenheims (Bullen 1939; *Pueblo Star-Journal and Sunday Chieftain*, 4/5/1959; Zier et al. 1997). Three railroads built from the plains into the mountains included lines from Colorado Springs to Florence. The Florence and Cripple Creek Railroad built in 1894 brought low-grade ores directly to the reduction mills, causing Florence to develop into a milling and smelting center in its own right. When in 1901 the Colorado Springs and Cripple Creek District Railroad, the “short line”, reached the mines, Florence gradually declined as a reduction center. The last mill closed in 1910 (Scamehorn 1978; Zier et al. 1997).

The railroad stimulated the growth in the Pike’s Peak Region and in areas on the Front Range. The mining industry in the 1870s also significantly affected the area surrounding Fort Carson, resulting in the establishment of several towns and rural railroad stations. Colorado Springs,

originally Fountain Colony, established by General William Jackson Palmer in 1871 near the nearly abandoned town of Colorado City, was located on the new Denver and Rio Grande Western route from Denver to Pueblo. By 1879, the population of Colorado Springs had grown to about 5,000 people, and included members of Fountain Colony, a Quaker agricultural colony within the environs of the township (Lavender 1968). Recreation and tourism greatly influenced the early development of Colorado Springs, however the 1890 gold strikes in Cripple Creek expanded economic and societal development as it became an important ore-smelting center (Zier et al. 1997).

When the Denver and Rio Grande Railroad built its mainline south of Colorado Springs through the mouth of Jimmy Camp Creek in 1872, the town/siding of Fountain was probably established. Various sources seem to confuse the Fountain community with Fountain City, a precursor to Pueblo established in 1859, and Fountain Colony at Colorado Springs. Early settlement around Fountain relied on irrigation, and the community became a farming and stock shipping center. In 1888, the town had a population of around 200 persons, but in that year a runaway train struck rail cars filled with naphtha and blasting powder in the Fountain switchyard destroying most of the town. The town was rebuilt and remains a small farming center (Fountain, Colorado Historical Survey Report n.d.). Other towns established along the railroad included Kelker, Wideland, and Wigwam (Carrillo 1990; Stout 2002; Zier et al. 1997).

Robert Womack's famous gold strike in 1890 resulted in a second Pikes Peak gold rush. By 1900, more than 450 mines developed yielding an estimated $125,000,000 in gold extracted. The Cripple Creek Mining District is listed on the National Register (Scamehorn 1978; Zier et al. 1997). Gold strikes at Cripple Creek encouraged prospectors to examine streams of the Fort Carson area. During the 1890s, local farmers and ranchers joined prospectors mining for gold in Beaver Creek. Placer workings on Red Creek and Turkey Creek were extensive enough to encourage William A. Williamson to plat the town of Red Creek, near the head of Red Creek in 1893. The first day of the sale, June 22, 1893, fifteen lots sold, with arrangements to construct a two-story hotel made a week later. Settlement at Red Creek, directly west of the present Camp Red Devil, appears to have been temporary at best. Several claims established between 1916 and 1919 were located about a mile from Turkey Creek, west of Fort Carson. Occasional prospecting on Turkey Creek may have continued until Fort Carson was established (Stout 2002; Zier et al. 1997).

Beginning in the late 1860s, as manufacturing, commercial and governmental structures established in developing towns, so did the desire for substantial buildings to house these enterprises. Stone and brick, to face prominent buildings, came into demand (Carrillo et al. 1991; Van Hook 1933; Zier et al. 1997). In the early 1870s, the Denver and Rio Grande Railroad extended a line from Pueblo to the mountains, offering a way to ship stone from quarries established between Pueblo and Beaver Creek to Denver. Pueblo developed into an ore-smelting center in the late 1870s, leading to the successful development of the iron and the steel industry. By 1874, Denver and Pueblo were vying for the distinction of being the state capital, with Denver winning the title in 1881. In 1881, the firm of Mather and Geist built eight new calcine furnaces and four new blast furnaces in Pueblo. The Standard Fire and Brick Company of Pueblo organized in 1890, and by 1901 occupied a 21-acre track of land west of Fountain Creek. The plant employed 650 workers, and in a 24-hour day production capabilities numbered nearly one-quarter of a million bricks, consisting of 75,000 firebricks, 75,000 paving bricks, and 50,000 pressed bricks. By the turn of the century, Pueblo was

reducing ore from areas outside Colorado, to include Arizona, New Mexico, Mexico, Montana, and Utah and shipping products to St. Louis, Chicago, and Pittsburg. The steel industry employed 3,000 workers, and produced steel for markets ranging from California to Missouri (Van Hook 1933; Carrillo et al. 1991).

Large-scale, sustained quarrying and other extraction developed in 1898 when the Colorado Portland Cement Company began mining and manufacturing cement, 23 miles west of Pueblo on the Arkansas River. The towns of Portland and Cement developed. By 1908, the Colorado Portland Cement Company joined operations with an affiliated firm, the Portland Company. After 1910, the Ideal Cement Company built a ten-million-dollar cement plant at Portland. From 1915 to 1927, the Ideal Cement Company ran a small railroad from Portland about twenty miles northeastward to a limestone quarry on Beaver Creek (Campbell 1972; Ormes 1976; Zier et al. 1997).

In the early 1900s, Robert K. Potter, owner of a lumber business in Cripple Creek in the 1890s, became interested in quarrying building stone deposits in the Turkey Creek region of Booth Gulch. His ranch was located just south of the area that developed into the small stone quarrying and clay mining town of Stone City (1912) eventually purchased by Fort Carson in the 1960s. Porter established quarries in Booth Gulch in 1908. Clay mining had already begun in Booth Gulch in 1906, when J. Wands, owner of the Pueblo Clay Products Company, developed three clay mines to extract exposed Red Creek anticline clay deposits. Nevertheless, Potter was instrumental in establishing a railroad line into the area. Prior to the development of the rail line, wagons hauled stone to Pueblo.

Development of stone and clay industries at Booth Gulch remained limited by distance and difficulty of transporting materials to Pueblo. In 1908, the Kansas-Colorado Railway planned to build an electric railway line from Cañon City to Dodge City, Kansas, with a 25-mile extension from northwest Pueblo to the Turkey Creek region. R. K. Potter, owner of the Turkey Creek Stone Company, and a principle supporter of the plan, held groundbreaking ceremonies on his Turkey Creek Ranch on July 31, 1908 (*Pueblo Chieftain*, July 31, 1908). Management problems and financial setbacks prevented construction of the line, until the company reorganized in 1910, and constructed 21 miles of railroad grade from Pueblo to Booth Gulch. An ambitious plan was to extend the railroad a few miles east of Turkey Creek following Lytle Road to the north, eventually ending in Cripple Creek. Only limited grading had begun on this segment and discontinued in favor of a route that afforded better grades and a more adequate water supply for the locomotives (McKenzie 1972; Ormes 1975; Zier et al. 1987). Additional financial difficulties sent the railroad into receivership until reorganization in April 1911 as the Colorado Kansas Railway. Construction of the Pueblo/Booth Gulch railroad resumed with 14.8 miles of rail completed by the end of the year. By late May/early June 1912, with the addition of eight miles of rail following the west bank of Turkey Creek, the goal to provide rail service to the Booth Gulch quarries had been reached (Carrillo et al. 1991; McKenzie 1972; Ormes 1975; Wilkins 1974; Zier et al. 1987). The Booth Gulch line was 22.2 miles long and had 1.8 miles of sidings. An estimated five hundred Pueblo residents boarded inaugural excursion trains on June 12, 1912, to travel to the mining area (Carrillo et al. 1991; McKenzie 1972; Ormes 1976:17; *Pueblo Chieftain* 6/13/1912).

Several large quarries opened after the railroad reached the area. A quarry about three miles from the nominal rail terminus at Stone City produced a fine white sandstone which was used to build the

massive Pueblo County courthouse in 1918 (McKenzie 1972; see also Carrillo 1991: Figures 14, 15). Adjacent to the quarry was a large stone working yard with a railroad track running through it. A large overhead crane was used to move blocks of stone to a finishing plant and then to flatbed railroad cars for shipment (Carrillo et al. 1991: Figures 16, 17). McKenzie's description, confirmed by archaeological survey, indicates that this quarry complex was to the southeast of Stone City, and portions of a spur rail grade are visible, which served various quarries in that area (Carrillo et al. 1991). Builders began switching to reinforced concrete as a major building material after World War I, to the detriment of the natural stone industry. The Turkey Creek Stone, Clay & Gypsum Company ceased quarrying sandstone at its large pit in 1930, but the company maintained an office in Stone City and probably continued to mine other products through 1934 (Carrillo et al. 1991; *Colorado State Business Directory* 1922-1935; McKenzie 1972).

The Colorado Kansas Railway consistently operated at a loss; in 1930, it went into receivership. The line sold under foreclosure in 1932 and a corporation called the Colorado Railroad purchased it in 1938. Throughout its existence, the line operated with second-hand equipment; in 1917, the rolling stock consisted of one 30-year-old locomotive, one passenger car, ten flatcars, and one service car (Carrillo et al. 1991: Figure 9). When the original locomotive was no longer operable in 1938, a locomotive leased from the Denver and Rio Grande Western Railroad replaced it. The leased locomotive proved too heavy for the deteriorated condition of the grade and track, and in 1940, replaced with a gasoline-electric locomotive (Carrillo et al. 1991: Figure 10). The line continued to operate, usually at a loss, until 1957 when a flash flood washed out several bridges on the line. The management of the Colorado Railroad then determined that the haulage potential of the line was not sufficient to justify repair of the bridges and grade, and the tracks removed in 1958 (Carrillo et al. 1991; McKenzie 1972; Wilkins 1974:265).

Clay mining proved to be a much more durable industry at Booth Gulch than was quarrying of building stone. The primary means of mining clay was driving drift tunnels into the slopes and excavating the clay seams found between solid sandstone and limestone roofs and floors. In later years, the mining of clay evolved in Stone City with the quarrying of limestone and sandstone as seams of clay were exposed. Accounts of pre-1912 mining are lacking, but it is likely wagons carried the clay to Pueblo for processing and firing. The *Pueblo Chieftain* reported in June 1912 that a large brick plant would be installed to kiln the eight kinds of clay being mined. This brick plant was probably built; a brick manufacturer, J. E. McCusker, was listed as a resident of the town in 1913 and 1914. However, a brickyard also was operated in Pueblo in association with the Booth Gulch mines, and no archaeological evidence of a brick plant at Stone City has been found. The Booth Gulch clay deposits were first mined by Wands' Colorado Clay Company and the Turkey Creek Stone, Clay & Gypsum Company. Other companies that also mined these deposits in were the Pueblo Quarries Incorporated, the Standard Fire Brick Company, and the Diamond Fire Brick Company (*Colorado State Business Directory* 1913, 1914; Carrillo et al. 1991; McKenzie 1972; *Pueblo Chieftain* 6/3/1912; Vanderbilt 1947).

Archival sources do not indicate that clay mining was done anywhere other than at Stone City. A number of materials mined in Stone City were gannister (a pure form of silica), limestone, flint fire clay, sandstone, plastic clay, calcite, roof tile clay, vitrifying clay, gypsum, glass sand, and gypsite (McKenzie 1972). Calcine kilns, which heated raw materials to make them friable and pure of unwanted organic material, operated at Stone City at least from 1924 to 1930, with H.R. Colby

serving as superintendent. Pueblo Clay Products Company built and operated the calcine kilns, and possibly promoted Colby to general manager of the firm's Stone City complex. In 1930 or 1931, Colby became manager of the Pueblo Clay Products Company, presumably in Pueblo, and thereafter the manager of the calcine kilns no longer appears in the business directories (Carrillo et al. 1991; *Colorado State Business Directory* 1924-1931). Very limited, part-year mining of clay in the area, by the Colorado Clay Company, continues to the present day. Clay is now hauled by truck (Carrillo et al. 1991; McKenzie 1972; Wilkins 1974).

Mining is represented at Fort Carson by one recorded site, Stone City (5PE793), located within and at the extreme southern end of the reservation in the vicinity of lower Booth Gulch and the southernmost reaches of Booth Mountain. The site was heavily impacted by intentional demolition by the Army and impacted further during training exercises. In 1988 and 1989 the site of Stone City and associated industrial complex was extensively documented using a combination of aerial photography and photogrammetric mapping, surface inventory and recording, and archival research (Carrillo et al. 1991). In addition to Stone City, the study area encompassed two previously recorded sites (5PE319 and 5PE230) and one newly recorded site (5PE1126). Ultimately, 123 features were recorded and include quarries and related features, mines and related features, railroad grade and associated features, residences, and miscellaneous features. Two of the features, a calcine kiln and culvert, were assessed as NRHP-eligible. Feature 1 at site 5PE319 is a largely intact calcine kiln that dates to the earlier years of quarrying in the Stone City area. Feature 19 at site 5PE793 is one of nine culverts associated with the Colorado-Kansas Railroad bed or related rail spurs. Spanning an ephemeral drainage above Stone City proper, it exhibits a vaulted configuration and is constructed of mortared sandstone blocks.

The vitality of the small community of Stone City was entirely tied to the fortunes of the nearby mines. The Turkey Creek Stone, Clay & Gypsum Company (Figure 5) filed the official plat of Stone City on December 24, 1912. The town was located in the W1/2 of the E1/2 of the SW1/4, Section 26, T18S/R67W. It consisted of five blocks of 34 lots each and one block containing 17 lots; each lot was 25 by 120 feet. The original plat indicated that portions of four blocks would be included in the right-of-way of the Colorado-Kansas Railway. Four of the five avenues and one of the two streets on the plat were named after officials of the Turkey Creek Stone, Clay & Gypsum Company: McCorkle, Potter, Crews, Harvey, and Candow. West Street and Hillside Avenue were geographical truths. An addition to the plat, of unknown date, indicates a "Water Main" extending along the east edge of the north half of the town and ending in a "City Water Supply."

As may be expected, the commercial focus of the town was the railroad depot, which was a small wood frame structure with a gabled roof and a simple board platform facing the tracks to the north. The depot also housed the general merchandise store operated by J. W. Heath from 1912 to 1915. The depot building eventually moved to Penrose presently stands at the corner of Broadway and Grand (Carrillo et al. 1991: Figures 12, 13). C. M. Jasper and Mrs. E. V. Jasper operated a general merchandise store from 1916 to 1921, followed by Roscoe E. Sutton in 1923, J. O. Southwell in 1924, and L. B. Keigley from 1925 to 1937. By 1939, Clyde Wands sold groceries in association with his auto service station. In 1950, James W. Mayfield operated the Stone City Grocery. The locations of the grocery/general stores are not known; the store may have remained in the depot for sometime after 1915 (Carrillo et al. 1991).

The post office, established at Stone City in 1912, was usually associated with the grocery or general stores. In 1920 through 1921, Mrs. William Candow ran a large hotel, built in 1920, followed by Dumbeck & Dodge in 1922. After 1922, the hotel listing disappears from the business directories. One source indicated the building was dismantled and the stone was used in construction of a building in Pueblo (Staton 1959). For varying lengths of time, the town also had resident blacksmiths, an automobile stage to Pueblo, a chiropractor, a constable and justice of the peace, and two ranch owners. A resident principal served a combined grade and high school at least as early as 1922. The school building burned in December of 1939 and was replaced with a two-room school built as a Works Progress Administration project in the summer of 1940 (Carrillo et al. 1991; *Pueblo Chieftain* 4/4/1940, 4/25/1940).

The population of Stone City appears to have been rather static; an estimated 100 persons lived there in 1912, 100 in 1914, 150 in 1917, 175 in 1929, 125 in 1935, and 100 in 1950 (*Colorado State Business Directory*; *Pueblo Chieftain* 6/13/1912). The post office was closed on June 30, 1957, serving only seven families with mailboxes at Stone City, and some boxes serving ranch families who did not live in the town (*Pueblo Star-Journal* and *Sunday Chieftain* 6/12/1957). Photographs taken at an unknown date show small one-and-a-half story wood frame cottages surrounded by lawns and trees. Some persons may have continued to live in Stone City until the U. S. Army purchased the area in 1965 when the Fort Carson Military Reservation expanded. The Army subsequently bulldozed the Stone City structures and only the trees, foundation remnants of structures, and widely scattered refuse are now visible (Carrillo et al. 1991; Zier et al. 1997).

Other smaller stone quarries and clay mines are known to exist inside the Fort Carson Military Reservation. Records of mineral entries on public lands indicate that several claims were filed in the period 1915-1919 in areas removed from stream courses, which probably means the claims were filed to reserve mining rights to stone or clay. The historical and engineering significance of the small mines and prospects is probably much less than that of the Stone City complex (Zier et al. 1997).

Unlike other areas of the Plains, the Fort Carson area did not have distinct homestead settlement periods. Sizable ranches prior to the 1940s involved a combination of purchasing land claims and filing claims on available land. Generally, later homesteaders, often limited to marginal land, characteristically claimed land under laws requiring a period of residence and improvement. Between 1865 and 1965, 1,735 land entries were filed in the immediate Fort Carson area. The number of entries rose dramatically from the 1860s to the end of the 1880s. After a quieter decade of the 1890s, land entries jumped to a peak during 1900-1909. Homesteading remained strong in the 1910s and 1920s, with a large drop off in the 1930s (Stout 2002; Zier et al. 1997).

Sixty percent of all land entries occurred between 1900 and 1929. This corresponds with the prime homestead period on the Plains when the government encouraged the establishment of family farms and dryland agriculture. Laws that encouraged dryland farming and the system's inappropriateness are demonstrated in the number of failing land entries. Of land claims filed in the 1870s, only 11 percent failed. Thereafter percentages rose with 15 percent in the 1880s, 25 percent in the 1890s, 42 percent in the 1900s, 68 percent in the 1910s, 40 percent in the 1920s, and 91 percent in the 1930s (Stout 2002; Zier et al. 1997).

The period 1900 to 1920 was the prime homestead period for the dryland areas of the High Plains, and therefore a high number of land entries for the Fort Carson area are not surprising. The high volume of land entries in the 1920s, when climate and the economy of the region made any agricultural existence difficult, may be attributable to inertia from the preceding decades and/or attempts by previous claimants to obtain sufficient land to make a living. Despite the facts that the land was open for settlement in the 1860s and railroads penetrated the area in the 1870s, 60% of all land entries in the area were made between 1900 and 1929 (Zier et al. 1997).

The inappropriateness of dryland farming and the laws, which encourage it, are demonstrated in the ratios of the number of land entries to the number of entries that failed to reach patent. Of land claims filed in the decade of the 1880s, 27% (3 of 11) failed to reach patent because the claims were canceled or relinquished. The number is not statistically reliable because of the small universe and because the actions of a single settler could determine the entire ratio. During the 1870s only 11% of land claims failed. Thereafter the ration of failures rose steadily: 15% in the 1880s, 24% in the 1890s, 42% in the 1900s, 68% in the 1910s, a mere 40% in the 1920s, and 91% in the 1930s (Zier et al. 1997).

Availability of water was a key factor in success of settlement. The first known irrigation system in the area was in place in 1863. A General Land Office survey plat (1863) shows "Murray, Cooper, Miller and Stubbs Ditch" east of Fountain Creek in T15S/R66W. About the same date Lincoln and Lock filed water right claims and began irrigating hay meadows near Fountain, and several settlers began irrigating fields on Beaver Creek near what later became Glendale (Little 1966; Whittemore 1967). A number of applications were made for rights-of-way for irrigation ditches and reservoirs within the Fort Carson area in the period 1865 to 1965 (Centennial Archaeology, Inc. 1997). Only one filing for a ditch appears in the Federal land records; it was entered in 1911 and relinquished in 1924. The ditch was planned to run through 23 legal sections in townships T17S/R66W, T18S/R66W, T18S/R67W, T18S/R68W, and T?S/R67W. Considering the long period the rights were in force, this ditch undoubtedly served a number of settlers. One other ditch was filed with Pueblo County officials, rather than with the General Land Office. Oscar P. Harpel filed a plat for the Harpel Turkey Creek Ditch on December 26, 1895. Other small ditches may also have been filed with county officials (Zier et al. 1997).

Harpel filed rights to a reservoir location in Section 19, T18S/R66W in 1903, but this entry was canceled in 1910. Applications were also filed for reservoir sites in Section 3, T17S/R66W in 1906; Section 34, T17S/R66W in 1913 (proof of construction filed 1923); and Sections 29 and 32, T18S/R67W in 1909 (relinquished 1929). The largest reservoir project was the construction of a dam on Turkey Creek, which resulted in the present Teller Reservoir in Section 30 and 31, T18S/R66W. The General Land Office reserved the general site as a potential reservoir area in 1891, and in 1894 R. K. Potter and Red Rock Reservoir, Inc. filed an application for rights to build a reservoir in Sections 19, 20, 29, 30, and 31 of this township. That claim was canceled in 1915 (Zier et al. 1997).

In the meantime, much of the land came to private patent, which would not necessarily negate the rights of other persons to build and maintain a reservoir there. R. K. Potter and associated companies obtained special warranty deeds and other deeds for some of the property beginning in 1910. The progression of companies interested in the project appears to have been Turkey

Creek Reservoir Company (1910), Turkey Creek Irrigation Company (1914), Meadow Investment Company (1921), Pueblo Meadow Land Company (1923), and Red Rock Reservoir, Inc. (1923). In 1924 Frederick J. Muench of Stone City filed a plat with the Pueblo County Clerk for the Hood Rock Reservoir in Section 30, T18S/R66W. Muench's plan included two dams, one 90 feet high and one 20 feet high on Turkey Creek, and a diversion ditch below the second and lower dam. The development would also be known as the Turkey Creek Dam (Pueblo County Clerk and Recorder, Plat of Hood Rock Reservoir). Muench's project appears to have been slightly south of the Red Rock Reservoir project. The present dam was apparently built shortly thereafter (Zier et al. 1997).

The ribbon of settlement on Beaver Creek began to expand onto the mesa to the west about 1900. In 1907 Florence merchant J. Q. MacDonald convinced Spencer Penrose and other Colorado Springs investors to develop large-scale fruit growing businesses on the mesa. The Beaver Creek Land and Irrigation Company bought out settlers on Beaver Creek to obtain water rights, and they build an extensive series of irrigation ditches to the west of Beaver Creek. The company platted Beaver Park agricultural subdivision on November 1, 1907, and in June of 1908 the Fremont Townsite Company superimposed the townsite of Penrose over parts of Beaver Park. To provide access and transportation to the 18,000-acre development, Penrose and other investors built the Beaver, Penrose and Northern Railroad in 1909. The line ran from Penrose Townsite to Beaver Station on the Denver and Rio Grande Railroad at the mouth of the Beaver Creek. The Beaver, Penrose and Northern ran only until 1919; in its last years it operated with a Cadillac flange-wheeled auto car as its locomotive power (Campbell 1972; *Cañon City Daily Record* 5/8/1962; Zier et al. 1997).

The introduction of refrigerated railroad cars after World War I caused a decline in the demand for Beaver Creek fruits. Heavy rains in the spring of 1921 caused the Shaeffer Dam on Beaver Creek to collapse; a wall of water sped down Beaver Creek and eventually down the Arkansas River to devastate the valley and a large area of Pueblo. The Shaeffer Dam was a chief source of irrigation water for Beaver Park, and in the following years the farmers turned to other kinds of produce. The Shaeffer Dam was rebuilt and other reservoirs were constructed, but the drought and economic difficulties of the Great Depression brought a general decline to the community. The Penrose Canning Factory and an alcohol distillery each lasted only two years in Penrose (Campbell 1972; Zier et al. 1997).

Very little information has been found about the architecture of the settlements in the Fort Carson area. The area had abundant sources of building stone and most foundations and retaining walls found in the area to date were constructed of mortared and dry-laid sandstone. Timber suitable for building purposes, particularly for cribbed log construction, generally did not exist in the area but was available to the west and north. Some of the larger structures built in the 1860s and 1870s probably were built of imported logs, and many of the smaller structures were undoubtedly built of native piñon pine and juniper logs. Remains of a log structure have been found in site 5FN496 in the southwestern part of the reservation. William Ninehouse, a settler on Beaver Creek, constructed his dwelling, barns, and granary by anchoring cedar poles in a vertical rock face, placing cedar poles as rafters, and then covering the roof with a poured concrete slab (Campbell 1972). Similar construction is indicated in the physical remains of a settlement site (5EP150) recorded in Fort Carson (Zier et al. 1997).

Piñon and juniper poles were also sunk vertically into the ground in close order to form corrals. The pole enclosures offered increased shelter to livestock, were cheap to build and did not cause injury to livestock as pole-and-wire fences often did. This kind of corral was particularly appropriate for horses and mules, which were prone to wire-related injuries. One such corral was built and used by a grading crew during construction of the railroad from Pueblo to Stone City in 1910 (Carrillo et al. 1991: Figure 7). The "stockade" at the supposed Bent trading post on Turkey Creek (site 5PE64) may simply be a corral built after 1873 (Zier 1987; Zier and Kalasz 1985; Zier et al. 1997).

By the early 1870s sawmills were producing milled lumber on upper Beaver Creek and in the area called "The Pinery" near Colorado Springs. Milled lumber could also be obtained at the railroad sidings along Fountain Creek on the east edge of the Fort Carson area. Most settlement structures were probably simple wood frame buildings, but some true sod, adobe brick, and mortared stone masonry buildings are known to have been constructed in the region in the early settlement period (Alexander et al. 1982; Freed and Barber 1977; Whittemore 1967). Mounding of clay material around some foundations in the Fort Carson Military Reservation indicates either that superstructures were partially composed of earthen materials (or insulated with stacked sod) or, more likely, the roofs were covered with earth or sod (Zier et al. 1997).

Ethnic reflections in settlement architecture are apparently rare in the region, other than the ephemeral association of adobe with Mexican Americans. Regional urban stylistic preferences during the period 1865 to 1920 tended toward "Western Victorian" forms and decorations, but rural structures in the region were characteristically utilitarian in design with little if any ornamentation (Freed and Barber 1977; Naeve 1972). A notable exception to this pattern was Spencer Penrose's Turkey Creek Farm. Shortly after Penrose bought the farm in 1912, he hired the Colorado Springs firm of MacLaren & Thomas, Architects to design a showcase house, garage, stable, hay shed, and large cow barn to be built on the site. Several buildings already existed on the site at that time, and the new structures eclipsed the old buildings in size. The house was designed in Spanish Revival Style, as was Penrose's sprawling mansion called El Pomar in Colorado Springs. The house featured curved Baroque gables, round-arched windows and doors, columns, balustrades, and wrought iron railings. Like the mansion in town, the house looked out on wide lawns and fine shrubbery. The house still stands today (Zier et al. 1997).

The most famous ranch located within Fort Carson (SW Section 34, T16S/R67W), is the Turkey Creek Ranch. The ranch is eligible for inclusion as a historic district in the National Register of Historic Places's, because of its association with Spencer Penrose and the development of ranching in the area. Supposedly established in the late 19th century by Frank Cross (Alexander et al. 1982; Socha and Posner 1972), it seems as though Cross never owned the property. H.H. Jacobs started the ranch in 1883, followed by 10 other owners before Spencer Penrose bought the ranch in 1912. Penrose reregistered the property in 1916 as the Turkey Creek Farm. The ranch saw much development under Penrose with many structures that contribute to the historic district because of architectural significance. The U.S. Army purchased the ranch in 1965, and its use has changed over the years. Today it is the Turkey Creek Recreation Area (Zier et al. 1997).

Nearly all of the historic period sites recorded to date in the Fort Carson Military Reservation are related to the settlement theme. Most of the sites consist of remains of stone or concrete

foundations, depressions, and scatters of domestic and agricultural artifacts. The only known intact standing structures related to settlement remaining in Fort Carson include Turkey Creek Ranch, one building in the Fort Carson cantonment area, and possibly several buildings at the Fort Carson Rod and Gun Club and at Camp Red Devil (Schweigert 1987; Barnes 1991). Site 5FN290 contains portions of buildings probably moved from within Fort Carson to just west of the reservation boundary. All but a very few of the recorded settlement sites appear to have had stock raising as the primary economic base; the remainder appear to have had a partial fruit-raising economic base. Other features associated with settlement within the reservation are occasional graves, windmills, dams, irrigation ditches, stock watering tanks, artifact scatters, and rock faces with historic graffiti (Zier et al. 1997).

Historic Development of Fort Carson

The modern history of the Fort Carson region began in 1940 when a group of Colorado Springs business and community leaders started lobbying for a military installation near their city in hopes of reviving a sagging economy (Barnes 1992; Jepson 1990; McCarthy and McCullough 2003; Zier 1987). The Pikes Peak region possessed many features suited to military training, including miles of prairie for large-scale training maneuvers and a mild climate permitting year-round training (Barnes 1992; Connor and Schneck 1996; Connor et al. 1999; Jepson 1990; Stout 2002).

World War II, 1942-1945

Construction of Camp Carson

The U.S. Army announced plans in January 1942 to establish a military installation on approximately 60,000 acres of rangeland between Colorado Springs and Pueblo. The installation received the name Camp Carson after Army Brigadier General Christopher "Kit" Carson, famed nineteenth century frontiersman and Indian agent. The installation would encompass 5,533 acres donated by the city of Colorado Springs, 29,676 acres purchased from private owners, 262 acres acquired from the Department of the Interior, and 24,577 acres leased from the State of Colorado (Barnes 1992; Connor and Schneck 1996; Connor et al. 1999; Stout 2002; Zier 2004).

In mid-January of 1942, specifications for construction of the camp were completed and the bidding process opened. Colorado Springs Constructors, Incorporated, "The Big Five", a team of five construction firms, won the contract with the bid of $30,054,390; signed February 1942 (Public Affairs Office undated). Companies organized under the "Big Five" included Edward H. Honnen Construction Company, Colorado Springs; Peter Kiewit, Omaha, Nebraska; Condon-Cunningham Construction Company, Omaha; Thomas Bate and Sons, Denver, Colorado, and the C.F. Lytle Company, Sioux City, Iowa. The concept of a group of contractors organized together under one large company to reduce liability risks was not entirely new; the first successful implementation was during construction of Boulder Dam. Within the framework of the package contract, each company was responsible for only the percentage it agreed to perform. Honnen, a native of Colorado, became the contractor/sponsor of the project. His experience included work on Army installations at Cheyenne, Wyoming, Rock Island Arsenal in Illinois, and Peterson Field east of Colorado Springs (Connor et al. 1999; Stout 2002; Zier 2004).
Thousands of men and women, laboring around the clock, participated in construction. A force of contractors and skilled laborers were initially coordinated through union rosters nationwide.

At the peak of construction, when the unions could not provide enough skilled labor, recruitment of additional laborers from the general work force was necessary. During peak construction, the project employed close to 11,500 workers. Construction of the camp proceeded quickly. In less than a month's time after the January announcement of the establishment of Camp Carson, the first building was completed. Crews finished a large segment in a two-week period, causing the need for a Kiewit representative from the firm's home office to visit the construction site to verify the achievement.

The design layout of Camp Carson conformed to the contour of the land, thus avoiding unnecessary grading, and accounts for the banana shape of the post. Series 800 building plans, first introduced in 1941, was the architectural type used for most of the buildings constructed on Camp Carson. Dissatisfaction of design and amount of materials necessary to construct this type of architecture led to its discontinuation in October 1942. Assembly-line construction, making the headlines around the United States, was the method used at Camp Carson, as well as elsewhere. The first-floor level of a building and its foundation was staked by a transit crew, followed by a foundation crew, who drilled holes with an auger (6-minutes for each) to set in wood or concrete support piers. Framing crews consisted of two crews; construction of floors done by one crew, while the other erected walls. Prefabrication methods helped to speed construction, and as building sites were leveled pre-cut lumber arrived. A sawmill located near the railroad cut lumber planks to size, which were then shipped to Camp Carson on a specially constructed railroad spur. The D&RGW laid a spur connecting the warehouse district with Kelker, Colorado. When ever possible, procurement of construction materials was local, and when necessary shipped in from out-of-state. Plumbing and electrical crews were subcontracted, and quickly became drawn in with the assembly-line concept of construction. As the tempo of construction increased, the Mountain States Telephone and Telegraph Company joined in the activity, hurrying to keep pace with the demand for communication (Barnes 1992; Conner and Schneck 1996; Connor et al. 1999; Friedman 1986; Jepson 1990; Stout 2002; Zier 2004).

Completed six weeks before the deadline, the Army took possession of the first segment of two-story, wood-frame buildings on June 2, 1942. When the installation's facilities were complete, they provided for 35,173 enlisted men, 1,818 officers, and 592 nurses. Most buildings were of mobilization type construction, *i.e.* buildings assembled as a component in the effort to place human and material resources in a state of readiness for war. Shortly before the contract expired, the Army negotiated additional construction of a prisoner of war internment camp, barns for 3,310 horses and mules, and 374 additional buildings to house 5,000 more enlisted men and 200 officers, raising the total cost of construction to approximately $41 million. The extended date for completion was November 4; the skill and expertise brought to the project by the five companies working under Colorado Springs Construction enabled completion by the deadline. In doing so, the government received a refund of nearly $2.5 million in accordance with the "renegotiation" clause of the contract (Barnes 1991; Conner and Schneck 1996; Connor et al. 1999; Friedman 1986; Jepson 1990; McCarthy and McCullough 2003; Stout 2002; Zier 2004).

Training and Mobilization

During World War II, four infantry divisions prepared for combat at Camp Carson. The camp's peak troop strength occurred in late 1943 with approximately 43,000 military personnel. In June 1942, the 89th Infantry Division, from Jefferson Barracks, Missouri, reactivated at Fort Carson on

July 14, and deployed in 1944. Following deployment to the European theater in January 1945, the division gained the nickname "Rolling W" while making assault crossings of the Moselle and Rhine rivers and advancing 350 miles into Germany. Created by the War Department in 1943, the 71st Infantry Division met the need for a small strike force capable of fighting in rough terrain. Activated at Camp Carson as the 71st Light Division in July 1943, the unit was designated the 71st Infantry Division on May 26, 1944, and transferred to Europe in February 1945. The 104th Infantry Division, activated in August 1943 at Camp Adair, Oregon, transferred to Camp Carson on March 11, 1944. The "Timberwolves" deployed to France in September 1944 and fought through Northern Europe from Antwerp to the Rhine River (Barnes 1991; Conner and Schneck 1996; Connor et al. 1999; Friedman 1986; Jepson 1990; McCarthy and McCullough 2003; Stout 2002; Zier 2004).

Mountain and Cold Weather Training at Camp Hale

In 1942, Camp Hale constructed west of Pikes Peak near Leadville, Colorado, operated as a sub-installation of Camp Carson during the war. The Mountain Training Command, activated at Camp Carson on September 2, 1942, moved to Camp Hale in November. An increased need for troops trained in the art of mountain warfare led to the formation of the 10th Mountain Division. Activated at Camp Hale, Colorado, in July 1943, the 10th Mountain was the Army's only specifically trained mountain division. Trained by Norwegian General Dagfin Dahl, the 10th Mountain Division deployed to the mountains of Northern Italy and proved instrumental in defeating the Axis powers in the Italian campaigns (Barnes 1992; Connor and Schneck 1996; Friedman 1986; Jepson 1990; McCarthy and McCullough 2003; Stout 2002).

Prisoner-of-War Camp

In 1942, the U.S. War Department established a prisoner-of-war (POW) camp on Camp Carson, one of 511 installations throughout the United States to detain Axis prisoners of war. Colorado was the location of more than 30 POW camps, and many served as small temporary branch camps under the jurisdiction of Camp Carson. The location of Fort Carson, not in close proximity of any crucial war industries afforded maximum security; the temperate climate of the area ensured construction costs and maintenance would be minimal (Connor et al. 1999; Jepson 1990; McCarthy and McCullough 2003; Stout 2002; Zier 2004) .

Fort Carson's prisoner-of-war (POW) camp opened on January 1, 1943. Original camp facilities were minimal, and meant to accommodate 3,000 enlisted men and 32 officer POWs.
In January 1943, a wildfire hit Camp Carson, and swept through the POW camp destroying twenty-three buildings. In all, the fire caused over $1 million in damage (Barnes 1992; Jepson 1990; Connor and Schneck 1996; Connor et al. 1999; Stout 2002).

The initial group of 368 Italian prisoners arrived at Camp Carson in May 1943, and soon moved to another camp outside Colorado. During their short internment, the Italian POWs built a camp theater for their production of "Romeo and Juliet." Shortly after the Italian POWs moved, German POWs arrived. Camp Carson POWs participated in athletic events, musical performances and plays. A POW library was established, a wide variety of educational classes organized, and religious services held. A POW post exchange was set-up, and prisoners published a weekly German-language newspaper. The demands of war caused a work force shortage in Colorado, which POWs help to alleviate by doing general farm work and aiding in

logging operations. Prisoners earned $0.80 a day, but the wages could range from $0.60 to $1.20 throughout the period of internment.

One of the largest prisoner repositories in the U.S., Camp Carson housed nearly 10,000 German prisoners, during one period from 1943 – 1946 (Connor et al. 1999; Jepson 1990; McCarthy and McCullough 2003; Stout 2002; Zier 2004).

During the war, Fort Carson incarcerated nearly 9,000 German, Italian, and some Japanese prisoners of war. In 1945, near the end of the war, Fort Carson housed an additional 5,000 prisoners in barracks located east of Pershing Field. Repatriation of all POWs to their respective homelands occurred by July 21, 1946.

Archival research (1990) and archaeological investigations of 1989 and 1990 determined that there was little intact evidence of the Camp Carson Prisoner-of-War camp. Archaeological testing (1995) determined that there were no subsurface remains (Barnes 1992; Jepson 1990; Connor and Schneck 1996; Connor et al. 1999; Stout 2002).

Carson Hospital Center/Old Hospital Complex

In 1942, the Carson Hospital Center, the largest of nine medical centers built in the nation during World War II, opened to provide immediate medical care for Camp Carson's soldiers. The Center had a 2,000-bed capacity with 11 square miles of floor space. The combined general and convalescent hospitals cared for more than 30,000 patients over the course of the war. The staff consisted of three Women's Army Corps (WAC) hospital companies, 2,000 civilians, and hundreds of doctors, nurses, and medical corpsmen. The Carson Hospital Center was also a major training center for nurses. The Army Nurse Training Center trained more than 3,000 nurses between October 1943 and the end of the war. When the war ended the Carson Hospital Center was inactivated, and a temporary separation center was established. The 400-bed center continued treating patients scheduled for release before May 31, 1946. About 9,000 soldiers from installations in a four-state area processed for discharge through the center (Barnes 1992; Connor and Schneck 1996; McCarthy and McCullough 2003; Stout 2002).

The Old Hospital Complex at Fort Carson was determined as an eligible property for inclusion in the National Register in 1991. The complex, constructed of semi-permanent buildings, followed the Department of the Army's Series 800 plans. A 1991 Memorandum of Agreement (MOA) and a 2002 amended MOA with the Colorado State Historic Preservation Office, allowed for disposal of all complex buildings except Buildings #6237 and #6236. In 1995, a Historic Architectural Building Survey was completed on 59 buildings in the complex and Colorado site forms completed, with both the interior and exterior of buildings inventoried and evaluated. Literature research and review of the Directorate of Public Works real property forms were completed and an historic context written. The 2002 MOA provides for adaptive reuse of Building #6237 and Building #6236. The exterior of Building #6236 has been restored to historic standards, and the Directorate of Environmental Compliance and Management currently occupies the building. Plans for Building #6237 involve restoring its interior and exterior to historic standards to accommodate additional office space for Fort Carson personnel. Management includes establishing a buffer zone around Buildings #6237 and #6236 to maintain existing line-of-sight features (Napier and McCarthy 2000; Clapper 2000; Stout 2002).

Cold War, 1946-1989

By 1946, with activities greatly reduced, it appeared that Camp Carson would close. The military strength at the camp had dropped to around 600, not including 320 patients at the hospital. In April, an announcement made by the War Department verified that the camp would remain open. In late April and May, troop strength increased when the 38th Regimental Combat Team and the 611th Field Artillery Battalion transferred to Camp Carson. To facilitate the families of enlisted men, the Army converted a large block of two-story barracks into NCO apartments for families of enlisted men.

A fire that started in the Broadmoor area on January 17, 1950, and driven by 50 mile-per-hour winds soon spread over the post. It would be the worst fire to strike the post in its history. In an attempt to stop the fire, post engineer bulldozers cut a firebreak across the northern part of the post. The unceasing winds blew the fire where there were no men and equipment available to extinguish or control its velocity, causing the destruction of more than 33 buildings. Civilian volunteers and fire fighting equipment from the surrounding town was not able to come to the camp's aid until mid-morning. Families evacuated from the NCO housing area went to Pueblo. By noon, when the fire still blazed, it appeared total destruction was the fate of the entire camp. Wind velocity dropped by dusk, allowing firefighters finally to extinguish the fire by midnight. Six people lost their lives in the fire, and 92 buildings destroyed resulting in $3 million in damage (Barnes 1992; Stout 2002).

In 1950, at the onset of the Korean War, activities at Camp Carson increased. Many Reserve and National Guard units called into active duty began to arrive. The 196th Regiment Combat Team from the South Dakota National Guard, the largest unit, arrived in September. The camp also served as duty station for more than 20 engineer and artillery battalions and several miscellaneous companies and detachments. To process returning veterans, Activated in July 1951, the Camp Carson Separation Center prepared to process returning Korean War veterans. More than 100,000 soldiers were processed by the end of 1953 (Connor et al. 1999; McCarthy and McCullough 2003; Stout 2002).

As the nation emerged from war to peace in the early 1950s, Camp Carson continued to serve as duty station for approximately 25,000 troops. The future of the camp was uncertain, and the lack of approval for new construction did not indicate positive prospects. Colorado Springs was just beginning to recover from an economic recession, when an announcement indicated that Camp Carson would become a fort. The designation of the post as Fort Cason officially occurred on August 27, 1954. This distinction from camp to fort did not necessarily ensure a secure future for the post. Congress approved approximately $3.5 million for the construction of new barracks and officer quarters. Fort Carson was authorized $13 million for construction of 1,000 sets of family quarters, and a NCO mess hall. By the mid-1950s, cuts made to the Department of Defense's budget affected Fort Carson. Units of the 9th Infantry Division, stationed on Fort Carson, were inactivated. Efficiency experts argued that Fort Carson was too remote from main transportation arteries and population centers to be economically viable as an Army post. By 1960, the 2nd United States Army Missile Command (Medium) was the only major unit stationed at Fort Carson (Barnes 1992; Connor and Schneck 1996; Connor et al. 1999; McCarthy and McCullough 2003; Stout 2002; Zier 2004).

In response to the Berlin Crisis of 1961 and the Cuban Missile Crisis of 1962, two more divisions activated at Fort Carson. The 5th Infantry Division (Mechanized), formally reactivated at Fort Carson on February 19, 1962, was the first division to be organized under the "ROAD" (Reorganization Objectives Army Division) concept. Training a mechanized division triggered the need for more land. In 1965, Fort Carson acquired 24,577 acres of state land by trading it for federal land located at the Lowry Bombing Range east of Denver. In 1965 and 1966, the Army acquired a total of 78,741 acres of land south of Fort Carson's original reservation at a cost of approximately $3.5 million. These additions brought Fort Carson to its current size of 138,523 acres (Connor et al. 1999; McCarthy and McCullough 2003; Stout 2002).

Fort Carson opened Camp Red Devil, the first year-round training area for soldiers in a field environment on March 7, 1966 (Barnes 1992). Training for Southeast Asia was also a priority at Fort Carson. By the end of 1966, Fort Carson deployed 9,000 soldiers to Vietnam, with another 9,000 deployed in 1967, and 6,000 in 1968. Activities at Fort Carson had risen to a higher level near the end of 1968 than at any time since World War II. In October 1965, the military strength was 9,658 and by March 1967 had more than doubled with 24,735 troops. In March 1965, civilian strength was 1,337 and had increased to 2,445 in July 1967. The economic impact of Fort Carson on the Colorado Springs region rose from approximately $55 million in 1964 to $100 million in 1967. By January 1973, the economic impact was over $340 million (McCarthy and McCullough 2003; Stout 2002).

Force reductions in Vietnam, 1 November 1970, deployed the 4th Infantry Division back to the United States and to Fort Carson, replacing the 5th Infantry Division. In its new western home, the 4th Infantry Division was reorganized as a mechanized infantry division (Stout 2002). Fort Carson would become an initial test site for The Modern Volunteer Army concept in January 1971. The 18-month field test aimed to create an environment conducive for an all-volunteer Army, with plans to incorporate the best field test experiences in future Army budgets (McCarthy and McCullough 2003; Stout 2002).

The need for additional land for Army training received considerable emphasis during 1974. The Army was considering the Pinon Canyon area southeast of Pueblo, Colorado, for land acquisition by the late 1970s. Purchase of 245,000 acres in the Pinon Canyon area, 100 air miles southeast of Fort Carson, was made in September 1983 at an approximate cost of $26 million. Relocation of eleven landowners and school bond relief cost an additional $2 million. The Pinon Canyon Maneuver Site opened for training in the summer of 1985 (Connor and Schneck 1996; Connor et al. 1999; McCarthy and McCullough 2003; Stout 2002). In 1986, the Evans Army Community Hospital was dedicated continuing Fort Carson's long tradition of providing medical care to U.S. citizens and soldiers (McCarthy and McCullough 2003).

Post Cold War, 1990-Present

Changes in troop units assigned to Fort Carson in the 1990s reflect the evolving role of defending the United States. The 43rd Corps Support Group, supported the 4th Division and III Corps and was deployed to Saudi Arabia in October 1990 and served in Operations Desert Shield and Desert Storm until April 1991. The 43rd sent units to Somalia in December 1992 for Operation Restore Hope, and redesigned as Area Support Group. In 1992, the 10th Special

Forces Group (Airborne) arrived at Fort Carson. In 1995, a number of brigades and troop units were inactivated, reassigned or re-flagged. The 4th Infantry Division headquarters, one maneuver brigade (1st Brigade), and support units at Fort Carson were inactivated. One brigade of the 3rd Brigade Combat Team was reassigned to the 2nd Armored Division, Fort Hood, Texas, but remained at Fort Carson. The 2nd Armored Division at Fort Hood was re-flagged as the 4th Infantry Division, and the 3rd Armored Cavalry Regiment was relocated to Fort Carson from Fort Bliss, Texas. The latest major unit change is the formation of the 7th Infantry Division at Fort Carson in 1999 (Stout 2002; McCarthy and McCullough 2003; Zier 2004).

REFERENCES CITED

Abbott, C., S. J. Leonard, D. McComb
1982 *Colorado: A History of the Centennial State*, Revised Addition. University Press of Colorado, Niwot, Colorado.

Bass, W. B., and P. Kutsche
1963 A Human Skeleton from Pueblo County, Colorado. *Southwestern Lore* 29(2):40-43.

Beck, W. A.
1962 *New Mexico: A History of Four Centuries.* University of Oklahoma Press, Norman, Oklahoma.

Benedict, J. B.
1979 Getting Away From it All: A Study of Man, Mountains, and the Two-Drought Altithermal. *Southwestern Lore* 45(3):1-12.

Benedict, J. B., and B. L. Olson
1978 *The Mount Albion Complex: A Study of Prehistoric Man and the Altithermal.* Research Report, No. 1, Center for Mountain Archeology, Ward, Colorado.

Berthrong, D. J.
1963 *The Southern Cheyenne.* University of Oklahoma Press, Norman.

Black, K. D.
1986 Archaic Origins in the Colorado Mountains: The Runberg Site Excavations. Paper presented at annual meeting of Colorado Council of Professional Archaeologists, Fort Morgan, Colorado.

1991 Archaic Continuity in the Colorado Rockies: The Mountain Tradition. *Plains Anthropologist* 36(133):1-29.

Brodnicki, E. C. G.
1986 *Cultural Resource Reconnaissance Study of Wild Horse Canyon Gravel Extraction Site*. U.S. Army Corps of Engineers, Omaha District, Omaha, Nebraska.

Bryson, R. A., D. A. Baerreis, and W. M. Wendlund
1970 The Character of Late-Glacial and Post-Glacial Climatic Changes. In, *Pleistocene and Recent Environments of the Central Great Plains*, edited by W. Dort, Jr. and K. Jones, University of Kansas Press, Lawrence.

Bryson, R. A., and W. M. Wendlund
1967 Tentative Climatic Patterns for some Late Glacial and Post-Glacial Episodes in Central North America. In, *Life, Land and Water*, edited by W. J. Mayer-Oakes, University of Manitoba Press, Winnipeg.

Buckles, W. G.
1974 *The 1973 Archaeological Survey of the Proposed Alignment of the Fountain Valley Conduit, Fryingpan-Arkansas Project, Bureau of Reclamation in Fremont and El Paso Counties, Colorado.* Southern Colorado State College, Pueblo. Submitted to the National Park Service under NPS Contract No. CX-6000-3-0085.

Buckles, W. G., and N. B. Buckles
1984 *Colorado Historical Archaeology Context.* Office of Archaeology and Historic Preservation, Colorado Historical Society, Denver.

Bullen, M. B.
1939 *Pueblo County History.* Pueblo Chapter of Daughters of the American Revolution, Pueblo, Colorado.

Burnett, H., and E. Burnett
1965 *Brand Book of the Westerners.* Edited by Francis B. Rizzari, Johnson Publishing Company, Boulder, Colorado.

Burns, G. R., and W. K. Killam
1983 *Cultural Resource Inventory of Tank Gunnery Range Fan Number 145, Fort Carson Military Reservation, Colorado.* Cultural Resource Report, No. 5, Goodson and Associates, Inc., Lakewood, Colorado. Submitted to the National Park Service under Contract No. PX 1200-3-0734,

Burt, W. H., and R. P. Grossenheider
1976 *A Field Guide to the Mammals of America North of Mexico.* Peterson Field Guide Series, third edition, Houghton Mifflin Company, Boston.

Butler, W. B.
1988 The Woodland Period in Northeastern Colorado. *Plains Anthropologist* 33(-122):449-465.

1990 *Cultural Resource Survey of Ten Soil Conservation Structures and the Gale Irrigation Ditch, Fort Carson Military Reservation, El Paso and Pueblo Counties, Colorado.* National Park Service, Interagency Archeological Services-Denver, Denver, Colorado. NTIS No. PB91-151134.

1991 *Reconnaissance Survey of a Proposed Fiber-Optic Line, Fort Carson Military Reservation, El Paso and Pueblo Counties, Colorado.* National Park Service, Interagency Archeological Services-Denver, Denver, Colorado. NTIS No. PB92-158708.

1992 *Cultural Resource Investigation of Several Small Scale Projects on the Fort Carson Military Reservation, El Paso and Pueblo Counties, Colorado.* National Park Service, Interagency Archeological Services-Denver, Denver, Colorado. NTIS No. PB93-138543.

Butler, W. B., S. A. Chomko, and J. M. Hoffman
1986 The Red Creek Burial, El Paso County, Colorado. *Southwestern Lore* 52(2):627.

Campbell, R. G.
1969 *Prehistoric Panhandle Culture on the Chaquaqua Plateau, Southeast Colorado.* Ph.D. dissertation, Department of Anthropology, University of Colorado, Boulder.

Campbell, R. W.
1972 *From Trappers to Tourists: Fremont County, Colorado, 1830-1950.* The Filter Press, Palmer Lake, Colorado.

Carrillo, R. F., C. J. Zier, and A. M. Barnes
1991 *The Documentation of Stone City (5PE793): Historical Archaeology on the Fort Carson Military Reservation, Pueblo County, Colorado*. Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado, and the U.S. Army Office of Environment, Energy, and Natural Resources, Fort Carson, Colorado under NPS Contract No. CX 1200-8-PO25. NTIS No. PB92-158773.

Case, F. M., Surveyor General
1862 *Map of Colorado.* Map to accompany U.S. Congress, House of Representatives Executive Document No. 1, 37th Congress, 3rd Session, Washington, D.C.

Centennial Archaeology, Inc.
1997 Catalog of Historic Land Entries for Fort Carson Military Reservation. Ms. on file, Centennial Archaeology, Inc., Fort Collins, Colorado; also appears as Catalog of Historic Land Entries, Appendix D in Zier *et al.* 1995.

Chapman, J. A., and G. A. Feldhamer (editors)
1990 *Wild Mammals of North America, Biology, Management and Economics.* The John Hopkins University Press, Baltimore.

Charles, M., P. Duke, and R. Nathan
1997a Draft: *A Cultural Resource Inventory of Portions of Booth Mountain, Fort Carson Military Reservation, Pueblo County, Colorado.* Department of Anthropology,

Fort Lewis College, Durango, Colorado. Prepared for the Directorate of Environmental Compliance and Management, Headquarters Fort Carson, Fort Carson, Colorado.

Charles, M., R. Nathan, P. Duke, N. Salazar, and S. Larmore
1997b Draft: *Results of a Cultural Resource Inventory of Portions of Fort Carson Military Reservation and Test Excavation of Site 5EP2524, El Paso County, Colorado, 1996.* Department of Anthropology, Fort Lewis College, Durango, Colorado. Research administered by the Midwest Archeological Center, National Park Service, Lincoln, Nebraska. Funding provided by the Directorate of Environmental Compliance and Management, Fort Carson, Colorado.

Chittenden, H. M.
1902 *The American Fur Trade of the Far West* (3 volumes). Harper, New York.

Chomko, S. A., L. A. Ganje, and T. Roesgen
1992 *Our Past, Our Future: Cultural Resources of the Piñon Canyon Maneuver Site.* A 25 minute videotape, University of North Dakota. Submitted to the National Park Service, Rocky Mountain Regional Office, Interagency Archeological Services, Denver under NPS Contract No. CX 1200-7-B061.

Chomko, S. A., and M. D. Hoffman
1993 *The East Fork Burial, El Paso County, Colorado.* Interagency Archaeological Services, Denver, Colorado.

Clark, W. S., and B. K. Wheeler
1987 *A Field Guide to Hawks, North America.* Peterson Field Guide Series, Houghton Mifflin Company, Boston.

Clausen, H. A.
1963 Some Fragments from the Story of Early Colorado Stage Lines. Unpublished ms. on file, Penrose Public Library, Colorado Springs, Colorado.

Colorado OAHP Files
n.d. Site record forms on file, Colorado Office of Archaeology and Historic Preservation, Colorado Historical Society, Denver.

Colorado State Business Directory
1913-1950 Gazetteer Publishing and Printing Company, Denver, Colorado.

Connor, M. A. and J. Schneck
1996 *The Old Hospital Compex (5EP1778) Fort Carson, Colorado.* National Park Service, Midwest Archeological Center, Lincoln, Nebraska. Prepared for the Directorate of Environmental Compliance and Management, Fort Carson, Colorado. NTIS No. AD-A321945.

Coues, E. (editor)

1970 *The Journal of Jacob Fowler.* University of Oklahoma Press, Norman, Oklahoma.

Craighead, J. J., and J. A. Mitchell
1990 Grizzly Bear. In, *Wild Mammals of North America,* edited by J. A. Chapman and G. A. Feldhamer, The John Hopkins University Press, Baltimore.

Dames and Moore
1978 *Fort Carson, Colorado: Terrain Analysis.* Prepared by Dames and Moore, Washington, D.C., under the direction of the Terrain Analysis Center, U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Virginia.

Dean, J. C.
1992 *Guidelines to Required Procedures for Archeological Field and Laboratory Work at Piñon Canyon Maneuver Site, Las Animas County, Colorado.* Department of Anthropology, University of North Dakota, Grand Forks, North Dakota. Submitted to the National Park Service, Rocky Mountain Regional Office, Interagency Archeological Services, Denver under Contract CX 1200-0-P018. Ms. on file, IAS-Denver.

Dean, J. S., and W. J. Robinson
1976 Dendroclimatic Variability in the American Southwest. Ms. on file, Laboratory of Tree-Ring Research, University of Arizona, Tucson.

Department of the Army
1980 *Draft Environmental Impact Statement: The Continuing Operation of Fort Carson, Colorado.* Prepared by the U.S. Army in cooperation with Higginbotham and Associates, Environmental Quality Office, Fort Carson Military Reservation, Colorado.

Department of the Army (continued)
1984 Army Regulation 420-40; Facilities Engineering; Historic Preservation. Ms. on file, U.S. Army Directorate of Environmental Compliance and Management, Fort Carson, Colorado. Headquarters, Department of the Army, Washington, D.C.

Department of the Interior
1977 *How to Complete National Register Forms.* National Register Division, Office of Archeology and Historic Preservation, National Park Service, U. S. Department of the Interior, Washington, D. C.

Diersing, V. E., D. J. Tazik, and E. W. Novak
1987 Growth Rate of Pinyon Pine (*Pinus edulis*) on Fort Carson and Piñon Canyon Maneuver Site, Colorado. *USA-CERL Technical Report* No. N-87/20, U. S. Army Corps of Engineers, Construction and Engineering Research Laboratory, Champaign, Illinois.

Dorn, R. I.
1989 Cation-Ratio Dating. In, *Nine Rock Art Sites in the Piñon Canyon Maneuver Site, Southeastern Colorado*:128-137, edited by Lawrence L. Loendorf, Department of

Anthropology, University of North Dakota, Grand Forks. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado.

Dorset, P. F.
1970 *The New Eldorado: The Story of Colorado's Gold and Silver Rushes.* Macmillan Company, New York.

Downing, B. J.
1981 A Re-Appraisal of Old Archaeological Collections: The Renaud Collection. Master's thesis, Department of Anthropology, University of Denver, Denver, Colorado.

Ebert, F. J.
1866 *Map of Colorado Territory Embracing the Central Gold Region.* G. W. and C. B. Colton and Company, New York.

Eddy, F. W. (editor)
1982 *A Cultural Resources Inventory of the John Martin Reservoir, Colorado.* Science Applications, Inc., Boulder, Colorado. Prepared for the U.S. Army Corps of Engineers, Albuquerque District. NTIS No. AD-A147028.

Eichler, G. R.
1977 *Colorado Place Names.* Johnson Publishing Company, Boulder, Colorado.

Eighmy, J. L.
1984 *Colorado Plains Prehistoric Context.* Office of Archaeology and Historic Preservation, Colorado Historical Society, Denver.

Euler, R. C., G. J. Gumerman, T. N. V. Karlstrom, J. S. Dean, and R. Hevly
1979 The Colorado Plateau: Cultural Dynamics and Paleoenvironment. *Science* 205:1089-1101.

Farmer, T. R., F. W. Eddy, and R. E. Oberlin
1982 Prehistoric Research Design. In, *A Cultural Resources Inventory of the John Martin Reservoir, Colorado,* edited by F. W. Eddy, Science Applications, Inc., Boulder, Colorado. Prepared for the U.S. Army Corps of Engineers, Albuquerque District. NTIS No. AD-A147028.

Federal Register
1977 Recovery of Scientific, Prehistoric, Historic and Archeological Data and Methods, Standards, and Reporting Guidelines (36 CFR 66). *Federal Register,* issue of January 28, Washington, D. C.

1983 Archeology and Historic Preservation: Secretary of Interior's Standards and Guidelines. *Federal Register,* issue of September 29, Washington, D. C.

1986a 36 CFR 800 - Protection of Historic Properties. *Federal Register*, issue of September 2, Washington, D. C.

1986b 36 CFR parts 60 and 63 - National Register of Historic Places. *National Register*, issue of August 5, Washington, D. C.

Ferring, C. R.
1982 The Late Holocene Prehistory of Delaware Canyon, Oklahoma. *Contributions in Archaeology*, No. 1, Institute of Applied Science, North Texas State University, Denton, Texas.

Fladmark, K. R.
1983 Times and Places: Environmental Correlates of Mid-to-Late Wisconsinan Human Population Expansion in North America. In, *Early Man in the New World*, edited by R. Shutler, Jr., Sage Publications, Beverly Hills, California.

Fort Carson
1981 Fort Carson Draft Historic Preservation Program. Ms. on file, Environment, Energy and Natural Resources Office, Fort Carson Military Reservation, Colorado.

Fountain, Colorado Historical Survey Report
n.d. Unpublished ms. on file, Office of Archaeology and Historic Preservation, Colorado Historical Society, Denver.

Francis, J. E.
1983 *Procurement and Utilization of Chipped Stone Raw Materials: A Case Study from the Bighorn Mountains and Basin of North-Central Wyoming.* Ph.D. dissertation, Department of Anthropology, Arizona State University, Tempe.

Freed, E., and D. Barber
1977 *Historic Sites and Structures, El Paso County, Colorado.* Colorado History Associates and, Barber and Yergensen, Architects for the El Paso County Land Use Department, Colorado Springs, Colorado.

Friedman, P.
1985 *Final Report of History and Oral History Studies of the Fort Carson Piñon Canyon Maneuver Area, Las Animas County, Colorado.* Powers Elevation. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado. NTIS No. PB855-177277.

Frison, G. C.
1981 The Terminal Paleo-Indian and Beginning Archaic Period on the High Plains: Some Suggested Relationships. Paper presented at the 39th Annual Plains Conference, Bismarck, North Dakota.

1991 *Prehistoric Hunters of the High Plains.* 2nd ed. Academic Press, San Diego, California.

Galinat, W. C., and R. C. Campbell
1967 The Diffusion of Eight-Row Maize from the Southwest to the Central Plains. *Massachusetts Agricultural Experiment Station Monograph Series,* No. 1, Amherst, Massachusetts.

Gifford, C. A. and E. A. Morris
1985 Digging for Credit: Early Archaeological Field Schools in the American Southwest. *American Antiquity* 50(2):395-411.

Gilbert, B. M.
1980 *Mammalian Osteology*. Modern Printing Company, Laramie, Wyoming.

Grant, M. P., and C. J. Zier
1987 *An Archaeological Inventory of Selected Sample Transects on the Fort Carson Military Reservation, El Paso, Fremont, and Pueblo Counties, Colorado*. Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado and the U.S. Army Office of Environment, Energy, and Natural Resources, Fort Carson, Colorado under NPS Contract No. CX 1200-5-A006. NTIS No. PB88-145255.

Griswold, D., and J. Griswold
1958 *Colorado's Century of Cities.* Privately printed, Denver, Colorado.

Gunnerson, J. H.
1960 An Introduction to Plains Apache Archaeology--The Dismal River Aspect. *Bureau of American Ethnology Bulletin,* No. 58, U.S. Government Printing Office, Washington, D.C.

1969 Apache Archeology in Northeastern New Mexico. *American Antiquity* 34(1):23-39.

1986 Excavations along the Lower Apishapa Canyon. Paper presented in Symposium on Post-Archaic Adaptations in Southeastern Colorado, 44th Plains Conference, Denver, Colorado.

1987 Archaeology of the High Plains. *Cultural Resource Series,* No. 19, Colorado Bureau of Land Management, Denver.

1989 *Apishapa Canyon Archeology: Excavations at the Cramer, Snake Blakeslee and Nearby Sites.* J & L Reprint Company, Lincoln, Nebraska.

Gunnerson, J. H., and D. Gunnerson

1971 Apachean Culture: A Study in Unity and Diversity. In, Apache Culture History and Ethnology, edited by K. H. Basso and M. E. Opler, *Anthropological Papers of the University of Arizona,* No. 21, Tucson.

Hafen, L. R.
1948 *Colorado and its People* (5 volumes). Lewis Historical Publishing Company, Inc., New York.

Hafen, L. R., A. W. Hafen
1943 *Colorado: A History of the State and its People*. The Old West Publishing Company, Denver, Colorado.

Hagar, I. K.
1976 CR1-Draper Cave Excavation and Research Report. *Southwestern Lore* 42(3):1-13.

Hall, S. A.
1977 Holocene Geology and Paleoenvironmental History of the Hominy Creek Valley. In, *The Prehistory and Paleoenvironment of Hominy Creek Valley*, edited by D. O. Henry, Laboratory of Archaeology, Department of Anthropology, University of Tulsa, Tulsa, Oklahoma.

1980 Paleoenvironmental Synthesis of Hominy Creek Valley: Pollen and Snail Evidence. In, *The Prehistory and Paleoenvironment of Hominy Creek Valley: 1978 Field Season*, edited by D. O. Henry, Laboratory of Archaeology, Department of Anthropology, University of Tulsa, Tulsa, Oklahoma.

1982 Late Holocene Paleoecology of the Southern Plains. *Quaternary Research* 17:391-407.

Hall, S. A., and C. Lintz
1984 Buried Trees, Water Table Fluctuations, and 3000 Years of Changing Climate in West-Central Oklahoma. *Quaternary Research* 22:129-133.

Hammond, G. P.
1927 *Don Juan de Onate and the Founding of New Mexico.* Santa Fe, New Mexico.

Hartley, J. D., C. A. Rolen, T. F. Babcock, and R. K. Alexander
1983 *A Settlement Survey of the Fort Carson Military Reservation,* vol. II: 1982 Site Investigations. Grand River Consultants, Inc., Grand Junction, Colorado. Submitted to the National Park Service under Contract No. C3572(78).

Hickerson, H.
1972 Fur Trade Colonialism and the North American Indian. *Journal of Ethnic Studies,* 1(2):15-44.

Higginbotham and Associates

1986 *Master Plan Report: Fort Carson*. Higginbotham and Associates, P.C., Colorado Springs, Colorado. Prepared for the U.S. Army Engineer District, Omaha, Nebraska under Contract No. DACA 45-82-C-01133.

Higginbotham/Briggs and Associates

1993 *Real Property Master Plan (Long Range Component), Fort Carson, Colorado.* Higginbotham/Briggs and Associates, Colorado Springs, Colorado. Prepared for Headquarters, 4th Infantry Division (Mechanized) and Fort Carson, Colorado, and the United States Army Corps of Engineers, Omaha District, under Contract No. DACW45-91-D-0016.

Hill, D. R.

1984 *Colorado Urbanization and Planning Context.* Office of Archaeology and Historic Preservation, Colorado Historical Society, Denver.

Howbert, I.

1914 *The Indians of the Pike's Peak Region*. Knickerbocker Press, New York.

1925 *Memories of a Lifetime in the Pike's Peak Region.* G. P. Putnam's Sons, New York.

Hoyt, S. D.

1979 Archaeological Investigations of Torres Cave (5LA1310), Las Animas County, Colorado, 1977. *Southwestern Lore* 45(1,2):1-21.

Hunt, G. O.

1975 *The Archaeology of the Belwood Site.* Master's thesis, Department of Anthropology, University of Denver, Denver, Colorado.

Hurd, C. W.

1960 Bent's Stockade Hidden in the Hills. *Bent County Democrat*, Las Animas, Colorado.

Hyde, G. E.

1959 *Indians of the High Plains.* University of Oklahoma Press, Norman.

Ireland, S. K.

1968 *Five Apishapa Focus Sites in the Arkansas Valley, Colorado.* Master's thesis, Department of Anthropology, University of Denver, Denver, Colorado.

Irwin, C., and H. T. Irwin

1959 Excavations at the LoDaisKa Site in the Denver, Colorado Area. *Denver Museum of Natural History Proceedings,* No. 8., Denver, Colorado.

Irwin-Williams, C., and H. T. Irwin
1966 Excavations at Magic Mountain: A Diachronic Study of Plains-Southwest Relations. *Denver Museum of Natural History Proceedings,* No. 12, Denver, Colorado.

Jablow, J.
1951 The Cheyenne in Plains Indian Trade Relations, 1795-1840. *Monographs of the American Ethnological Society*, No. 19, J. J. Augustin, New York.

Jackson, D.
1966 *The Journals of Zebulon Montgomery Pike,* vol. 1. University of Oklahoma Press, Norman, Oklahoma.

Jepson, D. A.
1987 *Archaeological Survey of Thirty-three Soil Conservation Structures on the Fort Carson Military Reservation, El Paso and Pueblo Counties, Colorado*. Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado under NPS Contract No. CX 1200-7-BO71. NTIS No. PB88-119805.

1990 *Historical and Archaeological Perspectives on the World War II Prisoner of War Camp at Fort Carson, Colorado*. Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado and U.S. Army Environment, Energy, and Natural Resources Office, Fort Carson, Colorado under NPS Contract No. CX 1200-9-SO29. NTIS No. PB90-266750

1991 Camp Carson, Colorado: European Prisoners of War in the American West During World War II. *The Midwest Review* XIII:32-53.

Jepson, D. A., C. J. Zier, S. M. Kalasz, and A. M. Barnes
1992 *Archaeological Survey of High Priority Parcels and Other Miscellaneous Areas on the Fort Carson Military Reservation, El Paso, Pueblo, and Fremont Counties, Colorado*. Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado, and the U.S. Army Environment, Energy, and Natural Resources Office, Fort Carson, Colorado under NPS Contract Nos. 1200-8-PO25 and CX 1200-9-SO29. NTIS No. PB92-158781.

Johnson, A. M., W. B. Butler, S. A. Chomko, and J. J. Hoffman
1991 Guidelines for Reporting Prehistoric Plains Ceramics. In, *Southwestern Lores* Vol. 57, No. 1, The Colorado Archaeological Society, Denver.

Kainer, R. E.
1976 *Archaeological Investigations at the Spring Gulch Site (5LR252).* Master's thesis, Department of Anthropology, Colorado State University, Fort Collins.

Kalasz, S. M.

1985 Prehistoric Architectural Remains. In, *A Chronological Framework of the Fort Carson Piñon Canyon Maneuver Site, Las Animas County, Colorado*, edited by C. Lintz, U.S. Army Fort Carson Piñon Canyon Cultural Resources Project, Contribution No. 2, Center for Archaeological Research, University of Denver, Denver, Colorado. NTIS Nos. PB87-132478; Volume 1, PB87-132486; Volume 2, PB87-132494; Volume 3, PB87-132502.

1986 A Typology for Post-Archaic Architecture in Southeastern Colorado. Paper presented at Symposium on Post-Archaic Adaptations in Southeastern Colorado, 44th Plains Conference, Denver, Colorado.

1988 *The Temporal and Spatial Distribution of Prehistoric Architecture in the Taylor Arroyo Drainage Basin of Southeastern Colorado.* Master's thesis, Department of Anthropology, Northern Arizona University, Flagstaff.

1990 Prehistoric Feature Analysis. In, *An Introduction to the Archaeology of Piñon Canyon, Southeastern Colorado* (6 volumes), edited by W. Andrefsky, Jr., Larson-Tibesar Associates, Inc., Laramie, Wyoming and Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service-Rocky Mountain Regional Office. NTIS Nos. PB87-132478; PB90-192097; PB90-192105; PB90-192113; PB90-192121; PB90-192139.

Kalasz, S. M., D. A. Jepson, C. J. Zier, and M. A. Van Ness

1993 *Test Excavation of Seven Prehistoric Sites on the Fort Carson Military Reservation, El Paso and Pueblo Counties, Colorado.* Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado and the U.S. Army Directorate of Environmental Compliance and Management, Fort Carson, Colorado under NPS Contract No. CX 1200-9-SO29. NTIS No. PB96-145248.

Kenner, C. L.

1969 *History of New Mexico-Plains Indians Relations.* University of Oklahoma Press, Norman, Oklahoma.

Krieger, A. D.

1964 Early Man in the New World. In, *Prehistoric Man in the New World*, edited by J. D. Jennings and E. Norbeck, University of Chicago Press, Chicago.

Lavender, D.

1954 *Bent's Fort.* University of Nebraska Press, Lincoln, Nebraska.

1968 *The Rockies.* University of Nebraska Press, Lincoln, Nebraska.

Leach, L. L.

1966 Excavations at Willowbrook: A Stratified Site near Morrison. *Southwestern Lore* 32(2):25-46.

Lecompte, J.
1964 Gantt's Fort and Bent's Picket Post. *The Colorado Magazine* 41(2):111-125.

1978 *Pueblo, Hardscrabble, Greenhorn: The Upper Arkansas, 1832-1856.* University of Oklahoma Press, Norman.

Lewis, O.
1942 The Effects of White Contact Upon Blackfeet Culture. *Monographs of the American Ethnological Society*, No. 6.

Lintz, C.
1984 *Architecture and Community Variability within the Antelope Creek Phase of the Texas Panhandle.* Ph.D. dissertation, Department of Anthropology, University of Oklahoma, Norman.

Lintz, C. (editor)
1985 *A Chronological Framework of the Fort Carson Piñon Canyon Maneuver Site, Las Animas County, Colorado*. U.S. Army Fort Carson Piñon Canyon Cultural Resources Project, Contribution No. 2, Center for Archaeological Research, University of Denver, Denver, Colorado. NTIS No. PB87-132478.

Lintz, C., and J. L. Anderson (editors)
1989 *Temporal Assessment of Diagnostic Materials from the Piñon Canyon Maneuver Site.* Memoirs of the Colorado Archaeological Society, No. 4, Denver, Colorado.

Little, W. T.
1966 Roundup. *Cañon City Daily Record*, Cañon City, Colorado.

Little, W. T., and J. McFall
1972 Looking Back Into History. *Cañon City Daily Record*, Cañon City, Colorado.

Loendorf, L. L. (editor)
1989 *Nine Rock Art Sites in the Piñon Canyon Maneuver Site, Southeastern Colorado.* Department of Anthropology, University of North Dakota, Grand Forks. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado. NTIS No. PB89-231922.

Loendorf, L. L., C. Kordecki, and M. L. Gregg
1988 *Piñon Canyon Maneuver Site Rock Art Project.* Department of Anthropology, University of North Dakota, Grand Forks, North Dakota. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado. NTIS No. PB90-171760.

Loendorf, L. L., and L. Ganje
1990 *The Rock Art of the Piñon Canyon Maneuver Site.* A 22 minute videotape, University of North Dakota. Submitted to the National Park Service, Rocky Mountain

Regional Office, Interagency Archeological Services, Denver, Colorado under NPS Contract No. CX 1200-7-B061.

Loendorf, L. L., L. Olson, and S. Conner
1991 Draft: *A Recording Manual for Rock Art.* Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado.

Long, M.
1947 *The Smoky Hill Trail.* W. H. Kistler Stationery Company, Denver, Colorado.

Loomis, N. M., and A. P. Nasatir
1967 *Pedro Vial and the Roads to Santa Fe.* University of Oklahoma Press, Norman, Oklahoma.

Lutz, B. J., and W. J. Hunt, Jr.
1979 *Models for Patterns and Changes in Prehistoric Settlement-Subsistence Systems of the Purgatoire and Apishapa Highlands.* University of Northern Colorado, Greeley.

Madole, R. F.
1989a Geomorphology and Late Quaternary Stratigraphy. Chapter 10 in, *Archaeological Excavations of Recon John Shelter (5PE648) on the Fort Carson Military Reservation, Pueblo County, Colorado,* edited by C. J. Zier, Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado and the U.S. Army Environment, Energy, and Natural Resources Office under NPS Contract No. CX 1200-6-BO57. NTIS No. PB89-230981.

1989b Holocene Stratigraphy of Turkey Creek, A Small Drainage Basin in the Southern Colorado Piedmont. *Open-File Report,* No. 89-93, U.S. Geological Survey, Golden, Colorado.

Mattes, M.
1969 The Great Platte River Road: The Covered Wagon Mainline Via Fort Kearny to Fort Laramie. *Nebraska State Historical Society Publications*, Vol. XXV, Lincoln, Nebraska.

McCord, C. M., and J. E. Cardoza
1990 Bobcat and Lynx. In, *Wild Mammals of North America,* edited by J. A. Chapman and G. A. Feldhamer, The John Hopkins University Press, Baltimore.

McGimsey, C. R. III
1972 *Public Archeology*. Seminar Press, New York.

McKenzie, B.
1972 Stone City Lies Buried Somewhere Inside Fort Carson. *Colorado Springs Sun Silhouette,* September 3, 1972.

Mehls, S. F.
1984 *Colorado Plains Historic Context.* Office of Archaeology and Historic Preservation, Colorado Historical Society, Denver.

Mehls, S. F., and C. J. Carter
1984 *Colorado Southern Frontier Historic Context.* Office of Archaeology and Historic Preservation, Colorado Historical Society, Denver.

Michlovic, M. G.
1986 Cultural Evolutionism and Plains Archaeology. *Plains Anthropologist* 31(113):207-218.

Mishkin, B.
1940 Rank and Warfare Among the Plains Indians. *Monographs of the American Ethnological Society*, No. 3, J. J. Augustin, New York.

Moore, J. W., Jr.
1973 *Bent's Old Fort: An Archaeological Study*. Pruett Publishing Company, Boulder.

Morison, S. E., H. S. Commager, and W. E. Leuchtenburg
1969 *The Growth of the American Republic.* Oxford University Press, London.

Mueller, M. A.
1995 *Users Guide to the Fort Carson Site-Level Databases.* Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado and the U.S. Army Directorate of Environmental Compliance and Management, Fort Carson, Colorado under NPS Contract No. CX 1200-1-PO16.

Mueller, M. A., and S. A. McBride
1995 *Fort Carson Curation Notebook and Artifact Database Documentation.* Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado and the U.S. Army Directorate of Environmental Compliance and Management, Fort Carson, Colorado under NPS Contract No. CX 1200-1-PO16.

Naeve, M.
1972 *A Century of Building in the Pike's Peak Region.* Colorado Springs Fine Arts Center, Colorado Springs, Colorado.

National Register Bulletin
1991a Guidelines for Completing National Register of Historic Places Forms: How to Complete the National Register Registration Form. *National Register Bulletin* 16A,

National Register Branch, Interagency Resources Division, National Park Service, U. S. Department of the Interior, Washington, D. C.

1991b Guidelines for Completing National Register of Historic Places Forms: How to Complete the National Register Multiple Property Documentation Form. *National Register Bulletin* 16B, National Register Branch, Interagency Resources Division, National Park Service, U. S. Department of the Interior, Washington, D. C.

1995 Defining Boundaries for National Register Properties by Donna J. Seifert. *National Register Bulletin* 21, U. S. Department of the Interior, National Park Service, Interagency Resources Division, National Register of Historic Places, Washington, D. C.

Oborne, H. W., and W. A. Fischer

1960 Stratigraphy of Colorado Springs-Cañon City Area. In, *Guide to the Geology of Colorado*, edited by Robert J. Weimer and John D. Haun, Geological Society of America, Rocky Mountain Association of Geologists, Denver.

Olyphant, G. A.

1985 Topoclimate and the Distribution of Neoglacial Facies in the Indian Peaks Section of the Front Range, Colorado, U.S.A. In, *Artic and Alpine Research* 17(1):69-78.

Ormes, R. M.

1976 *Tracking Ghost Railroads in Colorado.* Century One Press, Colorado Springs, Colorado.

Osgood, E. S.

1970 *The Day of the Cattlemen.* University of Chicago Press, Chicago, Illinois.

Parkman, F. E.

1882 *The Oregon Trail.* Little, Brown and Co., Boston.

Paul, R. W.

1963 *Mining Frontiers of the Far West, 1848-1880*. University of New Mexico Press, Albuquerque, New Mexico.

Perkins, V. K. B.

1936 *The History of Indian Activities in the Pike's Peak Region.* Master's thesis, Colorado College, Colorado Springs, Colorado.

Phillips, P. C.

1961 *The Fur Trade.* University of Oklahoma press, Norman, Oklahoma.

Programmatic Memorandum of Agreement

1986 Programmatic Memorandum of Agreement Among the United States Department of Defense, the Advisory Council on Historic Preservation and the National Conference

of State Historic Preservation Officers. On file in the offices of the U.S. Army, Headquarters Fort Carson, Directorate of Environmental Compliance and Management, Fort Carson, Colorado.

Reeves, B. O. K.
1973 The Concept of an Altithermal Cultural Hiatus in Northern Plains Prehistory. *American Anthropologist* 75(5):1221-1253.

Renaud, E. B.
1930 Unpublished notes from 1930 field season, on file at Department of Anthropology, University of Denver, Denver, Colorado.

1931a *Archaeological Survey of Eastern Colorado: First Report*. Department of Anthropology, University of Denver, Denver, Colorado.

1931b Investigation of Rock Shelter in Turkey Creek District, Colorado. *Science Service Research Announcement,* 59, Science Service, Washington, D.C.

1931c Unpublished notes from 1931 field season, on file at Department of Anthropology, University of Denver, Denver, Colorado.

1932 *Archaeological Survey of Eastern Colorado: Second Report*. Department of Anthropology, University of Denver, Denver, Colorado.

1935 *The Archaeological Survey of Colorado: Fourth Report, Seasons 1933 and 1934.* Department of Anthropology, University of Denver, Denver, Colorado.

1936a *Archaeological Survey of Eastern Colorado: Eighth Report--Pictographs and Petroglyphs of the High Western Plains.* Department of Anthropology, University of Denver, Denver, Colorado.

1936b Pictographs and Petroglyphs of Colorado. *Southwestern Lore* 2:54-60.

1942 Indian Stone Enclosures of Colorado and New Mexico. *Archaeological Series, Second Paper,* Department of Anthropology, University of Denver, Denver, Colorado.

1947 *Archaeology of the High Western Plains: Seventeen Years of Archaeological Research.* Department of Anthropology, University of Denver, Denver, Colorado.

Riches, S. M.
1978 *Cultural Resources Survey, Florence Local Protection Project, Fremont County, Colorado.* Prepared for the U.S. Army Corps of Engineers, Albuquerque, New Mexico.

Roberts, F. H. H.

1935 A Folsom Complex: A Preliminary Report on Investigations at the Lindenmeier Site in Northern Colorado. *Smithsonian Miscellaneous Collections* 94:1-35, Washington, D.C.

Robinson, P., and K. Carpenter
1980 *Paleontological Resources of Fort Carson, Colorado.* Paleontological Associates, Inc., Boulder, Colorado. Submitted to the National Park Service under Contract No. C3572(78).

Rodeck, H. G.
1964 Natural History of the Boulder Area. *University of Colorado Museum Leaflet,* No. 13, Boulder.

Ruxton, G. F.
1950 *Ruxton of the Rockies.* Collected by Clyde and Mae Reed Porter and edited by LeRoy R. Hafen, University of Oklahoma Press, Norman, Oklahoma.

Sandoz, M.
1958 *The Cattlemen.* Hastings House Publishers, New York.

Scamehorn, H. L.
1978 In the Shadow of Cripple Creek: Florence from 1885 to 1910. *The Colorado Magazine,* 55:205-229.

Schneck, J.
1997 *Management and Maintenance Manual, the Old Hospital Complex, Fort Carson, Colorado (5EP1778).* National Park Service, Midwest Archeological Center, Lincoln, Nebraska. Prepared for and funded by the U.S. Army Directorate of Environmental Compliance and Management, Fort Carson, Colorado.

Schneck, J. and K. M. Roberts
1997 Draft: *Waste Water Plant and Incinerator Complex (5EP2447 and 5EP2446) Fort Carson, Colorado.* National Park Service, Midwest Archeological Center, Lincoln, Nebraska. Prepared for and funded by the U.S. Army Directorate of Environmental Compliance and Management, Fort Carson, Colorado.

Schuldenrein, J.
1985 *Geomorphological and Geoarcheological Investigations at the U.S. Army Fort Carson-Piñon Canyon Maneuver Site, Las Animas County, Colorado.* Gilbert/Commonwealth, Inc., Jackson, Michigan. NTIS No. PB85-210300.

Schweigert, K. P.
1987 *A Selected Standing Structures Survey of the Fort Carson Military Reservation, Colorado.* Cultural Research and Management, Inc., Bismarck, North Dakota as subcontractor to Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado and the U.S.

Army Environment, Energy, and Natural Resources Office, Fort Carson, Colorado under NPS Contract No. CX 1200-5-A006. NTIS No. PB88-145248.

1986 (ca.) Draft: *The Montana Homestead Study*. Cultural Research and Management, Inc., Bismarck, North Dakota. Prepared for the Montana Historical Society, Helena.

Scott, G. R.
1975 Historic Trail Maps of the Pueblo 1 x 2 Quadrangle, Colorado. *U.S. Geological Survey Miscellaneous Investigations Series*, Map 1-930, Reston, Virginia.

Scott, G. R., R. B. Taylor, R. C. Epis, and R. A. Wobus
1978 Geologic Map of the Pueblo 1 Degree X 2 Degree Quadrangle, South-central Colorado. *U.S. Geological Survey Miscellaneous Investigations Series*, Map I-1022, U.S. Geological Survey, Denver, Colorado.

Secoy, F. R.
1953 *Changing Military Patterns on the Great Plains.* J. J. Augustin, New York.

Shaw, C. E., and S. Campbell
1974 *Snakes of the American West.* Alfred A. Knopf Company, New York.

Shields, W. L.
1980 Preliminary Investigations at the McEndree Ranch Site, 5BA30. *Southwestern Lore* 46(3):1-17.

Shimkin, D. B.
1940 Shoshone-Comanche Origins and Migration. *Pacific Congress Proceedings* 6(4):17-25.

Shott, G. C., Jr.
n.d. Cultural Resource-Land Use Impacts. Ms. on file, Environment, Energy and Natural Resources Office, Fort Carson Military Reservation, Colorado.

Smith, A. M.
1974 Ethnography of the Northern Utes. *Papers in Anthropology*, No. 17, Museum of New Mexico Press, Santa Fe.

Smith, D. E.
1975 History of El Paso County. In, *The Historical Encyclopedia of Colorado*, Colorado Historical Association, Denver, Colorado.

Socha, M. E., and I. B. Posner

1972 *Fort Carson: A Tradition of Victory.* Public Affairs and Information Office, Fort Carson, Colorado.

Späth, C.
1993 *City of Colorado Springs, Department of Wastewater, Proposed Test Wells on Fort Carson Military Reservation, Township 16 South, Range 66 West, Section 36, El Paso County: Class III Cultural Resource Inventory.* Metcalf Archaeological Consultants, Inc., Eagle, Colorado. Prepared for the Department of Wastewater, City of Colorado Springs, Colorado.

Sprague, M.
1976 *Colorado: A Bicentennial History.* W. W. Norton and Company, New York.

1980 *Newport in the Rockies.* Swallow Press, Chicago, Illinois.

Stanford, D.
1974 Preliminary Report of the Excavation of the Jones-Miller Site, Yuma County, Colorado. *Southwestern Lore* 40(3, 4):29-37.

1983 Pre-Clovis Occupation South of the Ice Sheets. In, *Early Man in the New World,* edited by R. Shutler, Jr., Sage Publications, Beverly Hills, California.

Stanford, D., W. R. Wedel, and G. R. Scott
1981 Archaeological Investigations of the Lamb Spring Site. *Southwestern Lore* 47(1):14-47.

Staton, C. R.
1959 Stone City Stone: Uses, History, Present Status. Unpublished research paper on file at the McClelland Library, Pueblo, Colorado.

Stoffle, R. W., H. F. Dobyns, M. J. Evans, and O. C. Stewart
1984 *Toyavita Piavuhuru Koroin, "Canyon of Mother Earth": Ethnohistoric and Native American Religious Concerns in the Fort Carson-Piñon Canyon Maneuver Area.* University of Wisconsin-Parkside, Kenosha, Wisconsin. NTIS No. AD-A146807.

Sullivan, A. P., and K. C. Rozen
1985 Debitage Analysis and Archaeological Interpretation. *American Antiquity* 50(4):755-799.

Thomas, A. B.
1932 *Forgotten Frontiers: A Study of the Spanish Indian Policy of Don Juan Bautista de Anza, Governor of New Mexico, 1777-1787.* University of Oklahoma Press, Norman, Oklahoma.

1974 The Jicarilla Apache Indians: A History, 1598-1888. In, *Apache Indian,* VIII, Garland Press, New York.

Thomas, A. B. (editor)
1935 *After Coronado: Spanish Exploration Northeast of New Mexico, 1696-1727.* University of Oklahoma Press, Norman.

Toll, M. S.
1989 Corn from Dry Shelters Along Turkey Creek, Near Pueblo, Colorado. *Castetter Laboratory for Ethnobotanical Studies, Technical Series,* No. 248, Department of Biology, University of New Mexico, Albuquerque.

Township Map of El Paso County
1913 Map on file at Penrose Library, Colorado Springs, Colorado.

Trenholm, V. C.
1970 *The Arapahoe, Our People.* University of Oklahoma Press, Norman, Oklahoma.

Tweto, O.
1979 *Geologic Map of Colorado.* U.S. Geological Survey, Denver, Colorado.

Ubbelohde, C, M. Benson, D. A. Smith
2001 *A Colorado History* Eight Edition. Pruett Publishing Company, Boulder, Colorado.

United States Geological Survey
1907 Colorado Springs Quadrangle. U.S. Geological Survey, Washington, D.C.

Vanderbilt, J. W.
1947 *Mineral Resources of Colorado.* State of Colorado Mineral Resources Board, Denver.

Van Hook, J. O.
1933 *Settlement and Economic Development of the Arkansas Valley from Pueblo to the Colorado-Kansas Line, 1860-1900.* Unpublished Ph.D. dissertation, University of Colorado, Boulder.

Van Ness, M. A.
1985 Flotation Analysis. In, *Archaeological Survey and Test Excavations in the Multi-Purpose Range Complex Area, Fort Carson Military Reservation, Colorado,* by C. J. Zier and S. M. Kalasz, Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado and the U.S. Army Environment, Energy, and Natural Resources Office under NPS Contract No. CX 1200-4-A007. NTIS No. PB86-170537.

1986 Botanical Remains from Archaeological Sites in Southeastern Colorado. Paper presented at 44th Annual Plains Anthropological Conference, Denver, Colorado.

1991 Macrobotanical Remains from 4 Sites on Fort Carson, Colorado. Ms. on file, Centennial Archaeology, Inc., Fort Collins, Colorado.

Van Ness, M. A., S. M. Kalasz, C. J. Zier, D. A. Jepson, M. S. Toll, R. F. Madole, and R. F. Carrillo

1990 *Archaeological Survey and Test Excavation in the Turkey Canyon Area, Fort Carson Military Reservation, Pueblo and El Paso Counties, Colorado*. Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, and the U.S. Army Environment, Energy, and Natural Resources Office, Fort Carson, Colorado under NPS Contract No. CX 1200-7-BO66. NTIS No. PB90-266768.

Wallace, E., and E. A. Hoebel

1952 *The Comanches: Lords of the South Plains.* University of Oklahoma Press, Norman.

Watts, H. K.

1971 *The Archaeology of the Avery Ranch Site on Turkey Creek, Southeastern Colorado.* Master's thesis, Department of Anthropology, University of Denver, Denver, Colorado.

1975 The Avery Ranch Site. *Southwestern Lore* 41(1):15-27.

Weber, D. J.

1970 *The Taos Trappers: The Fur Trade in the Far Southwest, 1540-1846*. University of Oklahoma Press: Norman.

Weber, K. R.

1980 History and Contemporary Culture (Part 2). Cultural resource narrative, *Class I Cultural Resources Inventory for BLM Lands in South San Juan County, Utah*, Centuries Research, Inc., Montrose, Colorado.

Weber, W. A.

1976 *Rocky Mountain Flora.* Colorado Associated University Press, Boulder, Colorado.

1990 *Colorado Flora: Eastern Slope*. University Press of Colorado, Niwot.

Wheat, J. B.

1972 The Olsen-Chubbuck Site: A Paleo-Indian Bison Kill. *Society for American Archaeology Memoir,* No. 26. Washington, D.C.

1979 The Jurgens Site. *Plains Anthropologist Memoir,* No. 15, Lincoln, Nebraska.

Whittaker, M. L.

1917 *Pathfinders and Pioneers of the Pueblo Region.* Franklin Press, Pueblo, Colorado.

Whittemore, L.
1967 *An Illustrated History of Ranching in the Pikes Peak Region.* Dentan-Berkland Printing, Colorado Springs, Colorado.

Wilkins, T. E.
1974 *Colorado Railroads Chronological Development.* Pruett Publishing Company, Boulder, Colorado.

Withers, A. M.
1954 Reports of Archaeological Fieldwork in Colorado, Wyoming, New Mexico, Arizona, and Utah in 1952 and 1953: University of Denver Archaeological Fieldwork. *Southwestern Lore* 19(4):1-3.

1964 *An Archaeological Survey of Northwestern Pueblo County, Colorado.* Ms. on file, Department of Anthropology, University of Denver, Denver, Colorado. National Park Service Contract No. 32-NPS-649.

Wood, J. J.
1967 *Archaeological Investigations in Northeastern Colorado.* Ph.D. dissertation, Department of Anthropology, University of Colorado, Boulder.

Wood, W. R.
1978 Upper Republican Archaeology in Colorado. Paper presented at 36th Annual Plains Anthropological Conference, Denver, Colorado.

Wood-Simpson, C. E.
1976 *Trinchera Cave: A Rock Shelter in Southeastern Colorado.* Master's thesis, Department of Anthropology, University of Wyoming, Laramie.

Wormington, H. M.
1957 Ancient Man in North America. *Denver Museum of Natural History Popular Series,* No. 4, Denver, Colorado.

Zier, C. J.
1984 *An Archaeological Inventory of the Red Creek Parcel on the Fort Carson Military Reservation, Colorado*. Metcalf-Zier Archaeologists, Inc., Eagle, Colorado. Submitted to the National Park Service under Contract No. CX 1200-3-A110.

1986a *An Intensive Archaeological Inventory of the Multi-Purpose Range Complex Water Pipeline Right-of-Way, Fort Carson Military Reservation, El Paso and Pueblo Counties, Colorado*. Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, and the U.S. Army Environment, Energy, and Natural Resources Office under NPS Contract No. CX-1200-4-A007.

1986b *Archaeological Survey of 18 Soil Conservation Structures in the Turkey Creek Drainage, Fort Carson Military Reservation, Colorado.* Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service under NPS Contract No. PX 1200-6-B110.

1987 Bent's Stockade Hidden in the Hills: A Myth Laid to Rest. *Southwestern Lore* 53(2):23-32.

1990 Prehistoric Rock Art. Chapter XIII in, *An Introduction to the Archaeology of Piñon Canyon, Southeastern Colorado,* vol. I, Background and Methods, edited by William Andrefsky, Jr., Larson-Tibesar Associates, Inc., Laramie, Wyoming, and Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service-Rocky Mountain Regional Office. NTIS Nos. PB90-192097; PB90-192097; PB90-192105; PB90-192113; PB90-192121; PB90-192139.

1997 *The Archaeology and History of Fort Carson Military Reservation Colorado.* Centennial Archaeology, Inc., Fort Collins, Colorado. Prepared for the National Park Service, Rocky Mountain Regional Office, Denver, Colorado and the U.S. Army Directorate of Environmental Compliance and Management, Fort Carson, Colorado under NPS Contract No. CX 1200-1-PO16.

Zier, C. J. (editor)

1989 *Archaeological Excavation of Recon John Shelter (5PE648) on the Fort Carson Military Reservation, Pueblo County, Colorado.* Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, and U.S. Army Office of Environment, Energy, and Natural Resources under NPS Contract No. CX-1200-6-BO57. NTIS No. PB89-230981.

Zier, C. J., and S. M. Kalasz

1985 *Archaeological Survey and Test Excavations in the Multi-Purpose Range Complex Area, Fort Carson Military Reservation, Colorado.* Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, and the U.S. Army Environment, Energy, and Natural Resources Office under NPS Contract No. CX-1200-4-A007. NTIS No. PB86-170537.

1991 Recon John Shelter and the Archaic-Woodland Transition in Southeastern Colorado. *Plains Anthropologist* 36(135):111-138.

Zier, C. J., J. H. Altschul, M. K. Kelly, M. P. Rose, K. P. Schweigert, and K. R. Weber

1987 *Historic Preservation Plan for Fort Carson Military Reservation, Colorado.* Centennial Archaeology, Inc., Fort Collins, Colorado, Cultural Research and Management, Inc., Bismarck, North Dakota, and Kenneth R. Weber, Boulder, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office and the U.S. Army Environment, Energy, and Natural Resources Office under NPS Contract No. CX-1200-5-A006. NTIS No. PB88-203401.

Zier, C. J., S. M. Kalasz, A. H. Peebles, M. A. Van Ness, and E. Anderson
1988 *Archaeological Excavation of the Avery Ranch Site (5PE56) on the Fort Carson Military Reservation, Pueblo County, Colorado.* Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, and the U.S. Army Environment, Energy, and Natural Resources Office under NPS Contract No. CX-1200-4-A007. NTIS No. PB88-211461.

1990 The Avery Ranch Site Revisited. *Plains Anthropologist* 35(128):147-173.

Zier, C. J., and R. F. Carrillo
1989 *Archaeological Survey of Live Firing Lanes in Range 111, Fort Carson Military Reservation, El Paso County, Colorado.* Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service under NPS Contract No. PX 1242-9-0700. NTIS No. PB89-205165.

Zier, C. J., K. P. Schweigert, M. W. Painter, M. A. Mueller, and K. R. Weber
1995 Draft: *Cultural Resource Management Plan for Fort Carson Military Reservation, Colorado,* vols. I and II. Centennial Archaeology, Inc., Fort Collins, Colorado. Prepared for the Directorate of Environmental Compliance and Management, Fort Carson, Colorado, and National Park Service, Rocky Mountain Regional Office, Denver, Colorado, under NPS Contract No. CX 1200-1-PO16.

Zier, C. J., S. M. Kalasz, D. A. Jepson, and S. A. Brown
1996 *Archaeological Survey, Site Documentation and Test Excavation Conducted During the 1991 and 1993 Field Seasons on the Fort Carson Military Reservation, El Paso, Pueblo and Fremont Counties, Colorado.* Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado and the U.S. Army Directorate of Environmental Compliance and Management under NPS Contract No. CX 1200-1-PO16. NTIS No. PB97-136220.

Zier, C. J., M. W. Painter, and K. P. Schweigert
1997 *Cultural Resources of Fort Carson Military Reservation, El Paso, Fremont, and Pueblo Counties, Colorado.* A National Register of Historic Places Multiple Properties Documentation Form for Fort Carson Military Reservation. Centennial Archaeology, Inc., Fort Collins, Colorado. Submitted to the National Park Service, Rocky Mountain Regional Office, Denver, Colorado and the U.S. Army Directorate of Environmental Compliance and Management, Fort Carson, Colorado under NPS Contract No. CX 1200-1-PO16.

Miscellaneous Information Sources

<u>Newspapers</u>

Cañon City Daily Record, Cañon City, Colorado (5/8/62).

Pueblo Chieftain, Pueblo, Colorado (various, 1877-1940).

Pueblo Star-Journal and Sunday Chieftain, Pueblo, Colorado (various, 1957-1975).

Institutions and Agencies

Cañon City Public Library, Cañon City, Colorado.

Department of Anthropology, University of Denver, Denver, Colorado.

El Paso County Clerk and Recorder, El Paso County Courthouse, Colorado Springs, Colorado.

Fremont County Clerk and Recorder, Fremont County Courthouse, Cañon City, Colorado.

General Land Office Records, Public Lands Records, U. S. Bureau of Land Management, Colorado State Office, Denver.

McClelland Library, Pueblo, Colorado.

National Archives and Records Center, Denver, Colorado.

National Park Service, Rocky Mountain Regional Office, Denver, Colorado.

Norlin Library, University of Colorado, Boulder.

Office of Archaeology and Historic Preservation, Colorado Historical Society, Denver.

Penrose Library, Colorado Springs, Colorado.

Pueblo County Clerk and Recorder, Pueblo County Courthouse, Pueblo, Colorado.

Tutt Library, The Colorado College, Colorado Springs, Colorado.

U. S. Army Office of Environment, Energy and Natural Resources, Fort Carson Military Reservation, Colorado.

Western History Collection, Denver Public Library, Denver, Colorado.

Individuals Contacted

Grand Junction, Colorado.

University of Arizona, Tucson, Arizona.

Arapahoe Community College, Littleton, Colorado.

University of Colorado Museum, Boulder, Colorado.

Colorado Springs, Colorado

Provided by

Fort Carson

Cultural Resources Program

ATTACHMENT F.2

1980 Memorandum of Agreement Regarding Fort Carson Military Reservation

1980 MEMORANDUM OF AGREEMENT REGARDING FORT CARSON MILITARY RESERVATION

Advisory
Council On
Historic
Preservation

1522 K Street, NW
Washington, DC 20005

MEMORANDUM OF AGREEMENT

WHEREAS, the Department of the Army, Headquarters Fort Carson and Headquarters 4th Infantry Division (Army), propose to continue training at the Fort Carson (Installation); and,

WHEREAS, the Army proposes to acquire additional training land within Southeastern Colorado (for the purposes of this Agreement the term "Fort Carson" includes the existing installation as well as any additional lands that may be acquired); and,

WHEREAS, the Army, in consultation with the Colorado State Historic Preservation Officer (SHPO), has determined that these undertakings as proposed may have an adverse effect upon cultural properties included in or eligible for the National Register of Historic Places; and,

WHEREAS, pursuant to Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. Sec. 470f, as amended, 90 Stat. 1320), Section 2(b) of Executive Order 11593, "Protection and Enhancement of the Cultural Environment," the Army has requested the comments of the Advisory Council on Historic Preservation (Council) in accordance with the Council's regulations, "Protection of Historic and Cultural Properties" (36 CFR Part 800); and,

WHEREAS, representatives of the Council, the Army and the Colorado SHPO have consulted and reviewed the undertakings as proposed; and,

NOW, THEREFORE, it is mutually agreed that the implementation of the undertakings, in accordance with the following stipulations, will avoid, minimize, or mitigate adverse effects on cultural properties.

Stipulations

The Army will ensure that the following stipulations are carried out at Fort Carson (Installation).

I. All survey, evaluations, data recovery, monitoring of land disturbing activities, or rehabilitation work performed in accordance with this Agreement will be conducted under the direct supervision of a person who meets at a minimum the appropriate professional qualifications set forth in 36 CFR Part 1210, Appendix C and who has professional experience relevant to Southeastern Colorado.

II. The Army will ensure compliance with the Archeological Resources Protection Act of 1979 and will advise all contract and Army personnel

and resident dependents against illegal collection of cultural materials and of the penalties for such collection imposed by the Act.

III. Copies of all scopes of work, reports, plans, or other products generated under this Agreement will be provided to the Colorado SHPO for review and comment.

IV. Copies of any final technical reports will be furnished to the Council and to Interagency Archeological Services (Heritage Conservation and Recreation Service, Department of the Interior, Washington, D.C. 20243), for possible submission to the National Technical Information Service (NTIS). Any precise locational data should appear in a separate appendix and may be withheld from NTIS publication pursuant to Section 11 of the General Authorities Act of 1970, as amended (P. L. 94-458).

V. An Historic Preservation Program for the Installation will be developed and implemented in consultation with the Colorado SHPO and, as appropriate, historical architects, archeologists, or other historic preservation specialists. The Historic Preservation Program will be included as an element of the Installation Master Plan and will be used to guide installation and training exercise planning. In order to promote consistency in the treatment of cultural properties on the Installation, the Historic Preservation Program will be responsive to Army Technical Manuals TM5-801-1, TM5-801-2, and Technical Note No. 78-17, dated September 15, 1978, until it is superceded by Army Technical Manual TM5-801-3 (presently in draft form).

A. The Historic Preservation Program must include, but need not be limited to, the following elements:

1. A cultural property overview and archeological research design (or designs) that identifies the types of cutural properties that are expected to be found on the installation; that sets forth the research topics to be addressed; and that establishes survey and other investigation strategies for the identification and evaluation of such properties.

2. A strategy for completing the cultural property survey required by Section 2(a) of Executive Order 11593, "Protection and Enhancement of the Cultural Environment." This strategy will include:

a. assignment of all installation land into land-use categories based on intensity of military use or land disturbing activities, such as planned construction and new training areas;

b. survey priorities based on the land-use categories;

c. time table for completion of the survey; and,

d. staffing and funding programs.

3. An Installation procedure to be followed in determining historic and cultural properties eligible for inclusion in the National Register of Historic Places, which is consistent with 36 CFR 1204.

4. An Installation procedure for reviewing actions to determine effects (36 CFR Sec. 800.3) on National Register or eligible properties.

5. An Installation procedure for the preservation of affected National Register or eligible properties. This procedure will include, but need not be limited to, the following:

   a. an assessment of alternatives that would avoid project effects by project design, relocation or physical means such as signing, fencing or patrolling,

   b. an assessment of alternatives designed to mitigate any adverse effects, where it is not prudent and feasible to avoid effects.

   c. a process for selecting an appropriate alternative course of action (avoidance or mitigation) that includes consultation with the Colorado SHPO. The Council will be afforded an opportunity to comment where agreement cannot be reached with the Colorado SHPO and the Army, the affected property is of national significance (recognized as a National Landmark, National Historic Site, National Historic Monument, or National Historic Trail), or beyond its historic or scientific value is known to have historic or cultural significance to a community, ethnic, or social group that would be impaired by its disturbance.

   d. standards and guidelines for archeological data recovery that take into account 36 CFR Part 1210 and the Council's "Recommendations for Archeological Data Recovery" (Part III of Guidelines-attached).

   e. a procedure to be followed, if after meeting all the responsibilities for identification of National Register or eligible properties, the Army finds or is notified after the undertaking has begun that the undertaking will affect a previously unidentified National Register or eligible property. This procedure should permit delay of the undertaking, consultation with the Colorado SHPO and compliance with Section 800.7 of the Council's regulations.

6. Provision for curation of all specimens, field notes, photographs, negatives, and processed data in a manner that makes them available for future study at an appropriately equipped institution that meets the standards set forth in 36 CFR Sec. 1210.4 and that makes these data available to other parties for research or other appropriate purposes. Specimens may be disposed of permanently only with the written concurrence of the Secretary of the Interior and the Colorado SHPO.

7. Provision for routine maintenance of all National Register or eligible properties consistent with Army Technical Manual TM5-801-1.

8. Provision for periodic review and refinement of the Historic Preservation Program in consultation with the Colorado SHPO.

B. After the Historic Preservation Program has been developed, it will be submitted to the Council and the Colorado SHPO for review. If, after 30 days, neither has provided written objections, the program may be implemented. Once approved, should the Historic Preservation Program be modified, the Council and the Colorado SHPO will be afforded an opportunity to provide written objections within 30 days of receipt of the modified program. Should the Council or the Colorado SHPO object to the proposed Historic Preservation Program, or any modifications thereof, the Army, Colorado SHPO, and the Council will consult to resolve the objections.

VI. Within 180 days after ratification of this Agreement, the Army will submit a draft of the Historic Preservation Program to the Council and the Colorado SHPO..

VII. Until the Historic Preservation Program is implemented and during any period in which objections between the Army and SHPO remains unresolved, the Army will follow the procedure set forth in 36 CFR Part 800.

VIII. If any of the signatories to this Agreement determine that the terms of the Agreement cannot be met or believes a change is necessary, that signatory shall immediately request the consulting parties to consider an amendment or addendum to the Agreement. Such an amendment or addendum shall be executed in the same manner as the original Agreement.

[redacted] MAY. 14 1980

Executive Director (date)
Advisory Council on Historic Preservation

[redacted]

26 Nov 8
(date)

Deputy Post Commander
Fort Carson, U.S. Army

[redacted]

12.9.8
(date)

Colorado State Historic
Preservation Officer

[redacted]

12-15-80
(date)

Chairman
Advisory Council on Historic Preservation

CULTURAL RESOURCES LAWS, REGULATIONS, AND EXECUTIVE ORDERS

The Cultural Resources Management Program at the US Army Environmental Center offers a variety of resources to help support military readiness and quality of life for our soldiers.

An archeological project is not complete simply because the artifacts are out of the ground and a final report has been submitted. The materials recovered from archeological inventories, evaluations and data recovery projects must be appropriately curated for the benefit of future scientists, educators, and museum specialists.

Statutes:

- Abandoned Shipwreck Act of 1987 (43 USC 2101-2106)
- Archeological Resources Protection Act of 1979 (16 USC 470aa-470mm)
- American Indian Religious Freedom Act of 1978, as amended (42 USC 1996-1996a)
- Archeological and Historic Preservation Act of 1974 (16 USC 469-469c)
- National Environmental Policy Act of 1969 (42 USC 4321-4370c)
- National Historic Preservation Act of 1966, as amended (16 USC 470-470w)
- Historic Sites, Buildings and Antiquities Act of 1935 (16 USC 461-467)
- Antiquities Act of 1906 (16 USC 431-433; 34 Stat 225)
- Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001-3013)

Federal Regulations and Guidelines:

- Advisory Council on Historic Preservation: Protection of Historic Properties (36 CFR 800)
- Council on Environmental Quality: Regulations Implementing the National Environmental Policy Act (40 CFR 1500-1508)
- Department of Defense: American Indian and Alaska Native Policy
- Department of Defense Guidelines for the Curation of Archeological Soil Samples
- Protection of Archeological Resources (32 CFR 229)
- Department of the Interior: Native American Graves Protection and Repatriation Act Regulations (43 CFR 10)
- Department of the Interior: Curation of Federally-owned and Administered Archeological Collections (36 CFR 79)
- Department of the Interior: Determinations of Eligibility for Inclusion in the National Register of Historic Places (36 CFR 63)
- Department of the Interior: National Historic Landmarks Program (36 CFR 65)
- Department of the Interior: National Register of Historic Places (36 CFR 60)
- Department of the Interior: Preservation of American Antiquities (43 CFR 3)
- Department of the Interior: Protection of Archeological Resources (43 CFR 7)
- Secretary of the Interior’s Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to the National Historic Preservation Act
- Secretary of the Interior’s Professional Qualification Standards (48 FR 22716, 1983)

- Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation
- Secretary of the Interior's Standards for Architectural and Engineering Documentation: HABS/HAER Standards
- Secretary of the Interior's Standards for Rehabilitation
- Secretary of the Interior's Illustrated Guidelines for Rehabilitating Historic Buildings
- Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR 68)

Executive Orders:

- EO 11593 Protection and Enhancement of the Cultural Environment
- EO 13006 Locating Federal Facilities in Historic Properties in our Nation's Central Cities
- EO 13007 Indian Sacred Sites
- EO 13175 Consultion and Coordination with Indian Tribal Governments
- EO 13287 Preserve America

DoD and Army Regulations and Policy:

- Army Regulation 200-4: Cultural Resources Management
- DA Pamphlet 200-4: Cultural Resources Management
- Environmental Assessment for AR 200-4 —83.5kb DOC
- Department of Defense: American Indian and Alaska Native Policy
- Department of Defense: American Indian and Alaska Native Policy Memo

Prepared

for

U.S. Army, Fort Carson, Colorado



ATTACHMENT F.3

Fort Carson and PCMS Comparative Analysis

Fort Carson and PCMS Comparative Analysis

PURPOSE

The purpose of this comparative analysis exercise is to establish a projection as to the number of archaeological sites/historic properties with potential to be eligible for inclusion in the National Register of Historic Places (NRHP) that may be encountered and/or adversely impacted as a result of increased military training activities at Fort Carson and the Pinon Canyon Maneuver Site (PCMS).

Inventory and evaluation occur as the initial stages of cultural resources management for federal agencies. Both Executive Order 11593, *Protection and Enhancement of Cultural Environment* (1971) and Section 110 (1980) of the National Historic Preservation Act (NHPA) require the agency to locate and evaluate all properties under their control that may be eligible for inclusion in the National Register to determine the level of potential impact to known resources. Inventory and evaluation may also occur as part of the review process per Section 106 of the NHPA. Inventories identify cultural resources using literature review and physical, pedestrian survey methods.

This analysis is intended to be used as a projection of potential eligible sites, for planning and budgeting purposes only, and should in no way be interpreted as providing data to be used in lieu of archaeological pedestrian inventories or evaluation studies that determine site eligibility.

METHODOLOGY

It must first be noted that there are limitations and deficiencies in the data used for this comparative analysis. For example, there is the missing data problem. This occurs when project data was not entered correctly (data gaps), and this problem was observed in some of the early archaeological report information as site tallies in the conclusion chapters did not always match the number of sites discussed in the text. There is the selection bias problem; time and money constraints would not allow for utilizing all data from all projects that have ever occurred on Ft. Carson controlled lands. Several of the larger reports were selected based on similarity to land requiring survey for BRAC. More importantly, there are observational biases. Through time, and as methods have been refined, each individual archaeologist's interpretation of site information may differ radically from that of the initial recorder.

Recognizing these shortcomings, the following analysis standardizes the data utilizing a modified version of Binford's (1980) site-type model for prehistoric sites. The model is not currently in use on Fort Carson owned lands, but several large-scale archeological projects in southeast Colorado have applied the system to manage site data. In the current model, recorded sites have been classified as residential bases, locations, field camps, caches, or stations (Ahler 1986; Binford 1980). Historically, site function is much easier to determine and sites were classified appropriately.

Seventeen hundred and sixty-seven (1,767) sites were used in this analysis. Data was collected from 12 project reports (Table 1); 6 resulting from archaeological work on Fort Carson, and 6 from work on, or adjacent to, Pinon Canyon. Three hundred and thirteen (313) sites were sampled of the 1663 (19% of the total) from Fort Carson, and 1,454 were sampled from the area in, and around, Pinon Canyon.

DATA SOURCES

Fort Carson

A brief discussion of the projects from which the data were taken is in order. The Alexander et al. (1982) survey covered approximately 38,291 acres of land on Fort Carson. A total of 149 areas with cultural materials were identified. Discounting isolated finds and sites subsequently re-evaluated by archaeologists from Centennial Archaeology, Fort Lewis College, and New Mexico State University, 73 sites in this analysis came from the Alexander project. Sites were recorded in all geographical areas with most classified as locations where either foodstuffs or lithic materials were being procured.

In 1995, Fort Lewis College surveyed 1,460 acres of land on Booth Mountain on Fort Carson. They encountered 35 archaeological sites, most of which were food or lithic procurement areas. The next year, 842 acres were surveyed and 18 sites were identified (Charles et al. 1991). In addition, 87 previously recorded sites were re-evaluated to contemporary standards (Charles et al. 1999a). Most of the sites were found in the hills, and it is interesting to note the number of residential base sites. Fort Lewis continued re-evaluation work in 1999, recording 13 additional sites (Charles et al. 2001).

In the mid 1990's, Centennial Archeology surveyed 4,067 acres of Fort Carson land (Zier et al. 1996). A total of 87 sites were recorded; most of these were food or lithic procurement locations.

Pinon Canyon Maneuver Site

Most of the Pinon Canyon sources result from the archaeological work of New Mexico State University (NMSU). In 1995 and 1996, 3,205 acres of land was surveyed in the Welsh Canyon area with 234 sites identified (Loendorf and Loendorf 1999). In 1997, 5,463 acres of land was surveyed in the Black Hills of the PCMS. Primarily lithic and food procurement sites were found, with a total of 323 recorded (Owens et al. 2000). In 1998, large areas of open prairie were surveyed in the Training Area 7 portion of the PCMS. Only 169 sites were identified, these were primarily food procurement locations and field camps (Owens and Loendorf 2002).

In the largest Pinon Canyon project to date, NMSU surveyed 25,646 acres of high-priority land between 1999 and 2001 (Owens and Loendorf 2004). Most of this work occurred along the tops of canyons where abundant resources led to a high number of residential sites. In 2002 and 2003, 5,791 acres were surveyed in high-priority areas near Cedar Hill, Van Bremer Arroyo, and Bent Canyon of the PCMS (Owens and Loendorf 2005). A high proportion of residential base sites were identified among the 113 project sites recorded.

In the early 1990's, archaeologists surveyed 7,150 acres of Forest Service land just east of Pinon Canyon (Reed and Horn 1995). Three hundred sites (300) were identified, with most occupying the talus slopes of the Purgatoire River. This report is the most relevant to the PCMS data of this comparative analysis as it pertains to survey conducted in the Purgatoire Canyon. Since 1983, the canyons of the PCMS have been off-limits to mechanized military training, so they have not been subjected to an in-depth archaeological inspection.

COMPARATIVE ANALYSIS SITES

The overwhelming majority of the sites reviewed for this comparative analysis are prehistoric, with only 182 historic sites found in the literature (Table 1). The dominance of prehistoric sites in the sample is underscored by the fact that 59 of the historic sites also have a prehistoric component.

Five hundred and twenty-one (521) of the sites (29.5% of the total) were determined to be eligible for inclusion in the National Register of Historic Places (NRHP). Seven (7) of the sites require additional analysis before an eligibility recommendation can be given, 1,237 sites are not eligible, and two paleontological sites require no determination.

The 1,767 sites providing data for this comparative analysis are comprised of 3 caches, 286 field camps, 2 fortified sites, 123 historic only sites, 22 sites with mixed historic and prehistoric field camps, 29 locations with mixed historic and a prehistoric location, 7 sites with mixed historic and a prehistoric residential base, 902 prehistoric location sites, 360 prehistoric sites classified as a residential base, 27 sites with only rock art (one historic only), 2 prehistoric residential bases exhibiting rock art, 1 prehistoric residential base with outcropping palentological remains, 2 locations with dinosaur fossil remains, and 1 stacked stone feature of unknown temporal affiliation.

Chronologically, the sample sites, other than those with paleontological remains, cover the entire span of human existence in North America: 1,071 are of unknown affiliation, 8 of the temporally diagnostic sites are Paleoindian, 52 sites date to the Archaic period, the cultural remains from 35 sites were produced sometime between the Late Archaic and Developmental periods, 9 sites exhibit one occupation between the Late Archaic and Diversification periods, 1 site has an occupation that occurred sometime between the Middle Archaic and Developmental periods, 194 sites exhibit multiple, yet discrete, occupations, 275 sites are of strictly Late Prehistoric affiliation, and 120 sites are historic.

RESULTS

In the analysis of the comparative analysis sites, geographical settings were also recorded. The criteria for designating the settings were based wholly on physiographic differences in the landform types. Figure F.3-1 presents the land forms on Fort Carson, and Figure F.3-2 presents the land forms on the PCMS. Utilizing GIS data provided by Fort Carson, 6 settings were recorded: canyon top, hill, multiple, open prairie, talus slope, and valley floor. Most of the comparative analysis sites were encountered in the hills (597). Fewer sites were noted at the top

of canyons (395), on talus slopes (310), in the open prairie (280), and on the valley floor (179). Six (6) of the sites occupied multiple landforms and were recorded as such.

As of May 2006, there are 59,807 acres that remain un-surveyed on Fort Carson, and 70,402 on the PCMS. It should be noted that archaeological work on both installations is ongoing and these numbers will continue to decrease. The remaining acres to be surveyed for each installation were examined in accordance with the geographical information described above.

Fort Carson

At Fort Carson only three different landforms (see Figure F.3-1) contain land requiring future survey. Most work will occur in open prairie (44,555 acres) and hill (15,215) settings, with much less on talus slopes (36 acres). It should be noted that the acreage contained with the Large and Small Impact Areas will be subtracted. Due to past use and the danger for potential unexploded ordinance (UXO), the impact areas have been exempt from further survey. As such, only 34,594 acres will be surveyed at Fort Carson: 15,215 acres in the hills, 19,342 acres in the open prairie, and 36 acres in the talus.

The data presented in Table 1 reveals that far fewer sites are to be expected at Fort Carson as compared to Pinon Canyon, and the acreage per site calculations which appear in Alexander et al. (1982) seem erroneous when compared against those of other Fort Carson projects. For open prairie data the numbers from Zier et al. (1999) were used. In that project, 46 acres were surveyed for every site encountered. This means that a total of 420 sites should be expected. One in seven of the Zier et al. (1999) sites were eligible, so 60 eligible sites should be expected.

The information in Charles et al. (1997) was used to compile hill data. Charles' crew encountered 1 site per 41 acres, with one in three being determined as eligible. Therefore, the survey of the remaining hill acreage at Fort Carson will reasonably produce 371 sites, 123 of which will be eligible.

Regardless of the data is used, only 1 site should be expected in the remaining talus slope acreage.

Pinon Canyon Maneuver Site

At Pinon Canyon, there are 11,573 acres to be surveyed along the canyon tops, 8,875 acres to be surveyed in the hills, 39,430 acres in the open prairie, 3,809 acres on talus slopes, and 5176 valley bottom acres. See Figure F.3-2 for the distribution of land forms at the PCMS.

For canyon top survey data, the Owens and Loendorf (2004) data was used for comparative purposes (Table 1). At 81 acres per site, 142 sites are to be expected. One in four will be eligible for inclusion in the National Register, equating to 36 sites. Sites from all time periods will be expected, with a very high percentage of those being multi-component.

Hill data is best represented by Owens et al. (2000). One site per every 16 acres is projected, for a total of 555 sites anticipated in the remaining hill acreage to be surveyed. One in every seven sites is expected to be eligible for the National Register, or 79 sites.

The best PCMS open prairie comparative data is that of Owens and Loendorf (2002). They found an archaeological site for every 58 acres inspected. With 39,430.45 acres remaining to be surveyed at Pinon Canyon, a total of 680 new sites are to be anticipated. Given a lack of quality resources in the open plains, only one in fourteen sites is expected to be eligible, or 49 total eligible sites.

Only the reports of Loendorf and Loendorf (1999) and Reed and Horn (1996) provide talus slope data. Reed and Horn contain the larger sample (200 of their 300 total sites are found on talus slopes), and as such was used for the purpose of this comparative analysis. They encountered a site every 23 acres, so a total of 165 new sites are to be anticipated. Following the data in Table 1, almost every other site, or one in two, will be eligible for the National Register. If this pattern remains for the future survey areas, then 110 of the anticipated sites will be eligible.

The data in Loendorf and Loendorf (1999) best represents the valley floor. They encountered a site every 13 acres, for a total of 398 new sites to be encountered. Almost one in every three sites will be eligible, 132 in all.

CONCLUSIONS

Table 2 contains the predicted numbers generated by this comparative analysis. Because of its relatively pristine condition, Pinon Canyon will have sites from all time periods and in all settings. A total of 2,040 sites are expected, with 406 eligible for inclusion in the National Register.

Fort Carson, on the other hand, has experienced intense military training for many years, and its landforms have been obliterated. Likely the site and eligible site numbers presented here are inaccurate, and perhaps, the Alexander et al. (1982) numbers are not that unrealistic. Prior to heavy military impact, 792 sites would have been expected to be found during survey, with only 183 of these eligible for the National Register.

Table 1: Report Data for Comparative Analysis

	Alexander et al. 1982	Charles et al. 1997	Charles et al. 1999	Charles et al. 1999a	Charles et al. 2001	Loendorf and Loendorf 1999	Owens and Loendorf 2002	Owens and Loendorf 2004	Owens and Loendorf 2005	Owens et al. 2000	Reed and Horn 1995	Zier et al. 1996	Total
Size of Survey Area	38,291	1460	842	0	0	3205	9857	25646	5791	5463	7,150	4067	101,412
Number of Sites	73	35	18	87	13	234	169	315	113	323	300	87	1767
Eligible Sites	2	11	3	50	5	97	12	76	20	44	189	12	521
Canyon Top Sites	9	0	0	3	0	105	6	224	9	5	29	5	395
Hill Sites	18	35	14	44	11	3	41	27	55	318	0	31	597
Multiple Landform Sites	0	0	0	0	0	0	0	0	0	0	1	5	6
Prairie Sites	19	0	2	19	1	0	122	58	38	0	0	21	280
Talus Slope Sites	13	0	0	4	1	69	0	5	5	0	200	13	310
Valley Floor Sites	14	0	2	17	0	57	0	1	6	0	70	12	179
Acres Per Site *	524	41	46	0	0	13	58	81	51	16	23	46	57
Caches	0	0	0	0	0	1	0	0	0	0	2	0	3
Field Camp	9	4	3	20	7	43	49	38	8	37	54	14	286
Prehistoric Fortified	0	0	0	0	0	0	0	0	0	0	2	0	2
Paleontological	0	0	0	0	0	0	0	0	0	0	2	0	2
Historic Only	14	9	3	8	0	7	6	10	9	4	35	18	123
Mixed Historic and Prehistoric Field Camp	0	0	0	1	0	1	8	3	0	2	7	0	22
Mixed Historic and Prehistoric Location	0	2	2	2	0	0	2	7	4	7	2	1	29
Mixed Historic and Prehistoric Residential Base	0	0	0	1	0	0	0	5	0	0	1	0	7
Rock Art	0	0	0	4	0	1	1	3	2	0	16	0	27
Location	40	12	8	19	0	105	100	177	66	242	83	50	902
Residential Base	10	8	2	32	6	74	3	72	24	31	95	4	361
Mixed Residential Base and Rock Art	0	0	0	0	0	2	0	0	0	0	0	0	2
Unknown	0	0	0	0	0	0	0	0	0	0	1	0	1

Table 2: Site Predictions for BRAC EIS

PCMS						
	Canyon	Hill	Prairie	Talus	Valley	Total
Acres	11,573.51	8,875.42	39,430.45	3,809.74	5,176.41	68,865.53
Sites	142	555	680	265	398	2040
Eligible	36	79	49	110	132	406
FT. Carson						
Acres	0	15,215.06	19,342.96	36.39	0	34,594.41
Sites	0	371	420	1	0	792
Eligible	0	123	60	0	0	183

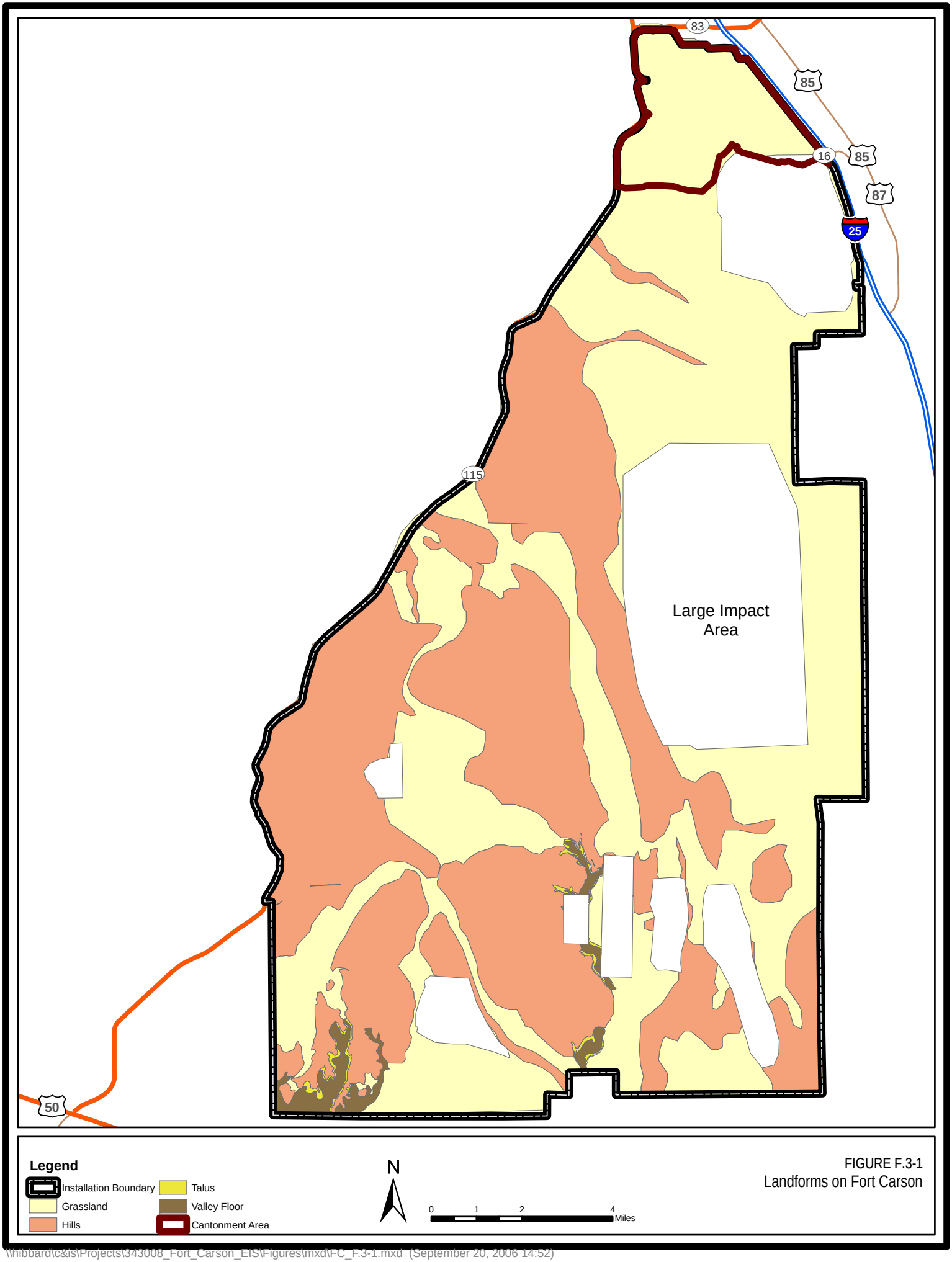


FIGURE F.3-1
Landforms on Fort Carson

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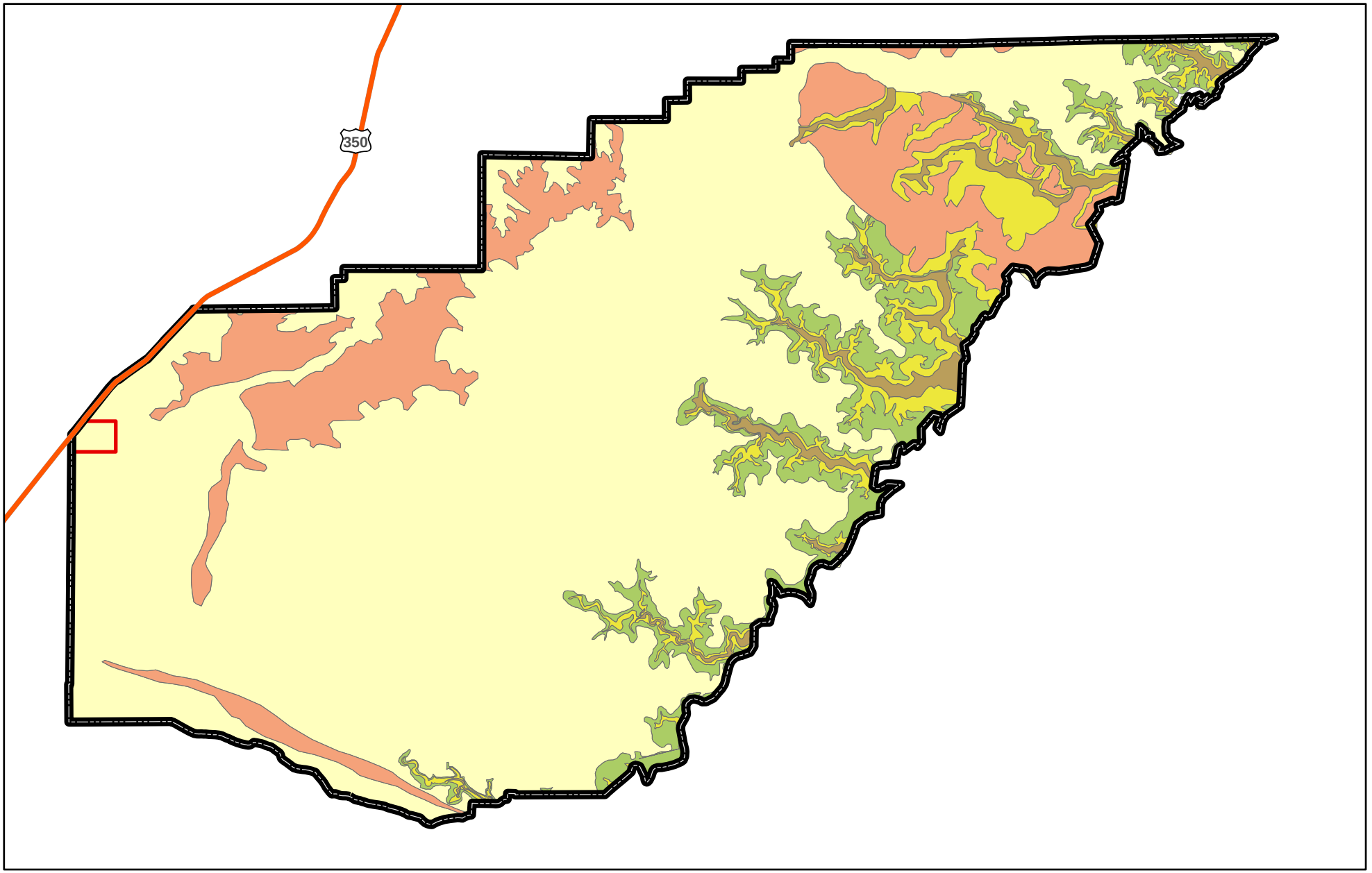


FIGURE F.3-2
Landforms at the PCMS

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Provided by

Fort Carson

Cultural Resources Program



ATTACHMENT F.4

Comprehensive Agreement

COMPREHENSIVE AGREEMENT

Regarding Tribal Access, Privacy and Information Sharing, and Inadvertent Discovery and Intentional Excavation of Native American Human Remains and Cultural Items Culturally Affiliated with the Following Indian Tribes:

Apache Tribe of Oklahoma
Cheyenne and Arapaho Tribes of Oklahoma
Comanche Nation of Oklahoma
Kiowa Tribe of Oklahoma
Northern Arapaho Tribe
Northern Cheyenne Tribe
Oglala Sioux Tribe of the Pine Ridge Reservation
Shoshone Tribe (Eastern Band)
Southern Ute Indian Tribe
Ute Mountain Ute Tribe

Within Federal Lands Owned or Controlled by Fort Carson, Colorado

Whereas, Fort Carson has need to engage in ongoing activities that may result in the inadvertent discovery or intentional excavation of human remains and/or cultural items culturally affiliated with the aforementioned Federally Recognized Tribes (Tribes); and

Whereas, Fort Carson, in consultation with the Federally Recognized Tribes, is responsible for identification, protection, and disposition of human remains and cultural items on lands it administers pursuant to the Native American Graves Protection and Repatriation Act of 1990 [25 U.S.C. 3001-3013] (NAGPRA) and 43 CFR 10; and

Whereas, appropriate treatment of Native American human remains and cultural items that may be affiliated with the Tribes requires respect for the cultural traditions of tribal members; and

Whereas, the Tribes represented by the signatories hereto were aboriginal occupants of lands now administered by Fort Carson and, based on cultural and/or aboriginal affiliation, do hereby claim and assert the right of possession and control of human remains and associated funerary objects on these lands in accordance with Section 3a(2)(B) of NAGPRA; and

Whereas, Section 11 of NAGPRA and 43 CFR 10.5(f) specifically encourage the development of comprehensive agreements between federal agencies and federally recognized tribal governments to ensure the appropriate treatment of Native American human remains and cultural items;

NOW, THEREFORE, Fort Carson and the identified Tribes agree that the following procedures will be followed for tribal notification and consultation and for the treatment and disposition of all Native American human remains and cultural items that are inadvertently discovered or excavated on lands administered by Fort Carson.

Definitions

For the purposes of this agreement, the following definitions apply:

- *Cultural affiliation* means "that there is a relationship of shared group identity which can reasonably be traced historically or prehistorically between members of a present-day Indian Tribe or Native Hawaiian organization and an identifiable earlier group. Cultural affiliation is established when the preponderance of the evidence, based on geographical, kinship, biological, archeological linguistic, folklore, oral tradition, historical evidence, or other information or expert opinion, reasonably leads to such a conclusion" [43 C.F.R. 10.2(e)].
- *Cultural items* means, collectively, human remains, associated and unassociated funerary objects, sacred objects, and objects of cultural patrimony [25 U.S.C. 3001].
- *Federally recognized tribe* means any tribe, band, nation, or other organized Indian group or community of Indians which is recognized as eligible for special programs and services provided by the United States to Indians because of their status as Indians. Such acknowledged or *federally recognized* Indian tribes exist as unique political entities in a government-to-government relationship with the United States.
- *Funerary objects* mean "items that, as a part of the death rite or ceremony of a culture, are reasonably believed to have been placed intentionally at the time of death or later with or near individual human remains." [43 C.F.R. 10.2(d)(2)]. *Associated funerary objects* are "those funerary objects for which the human remains with which they were placed intentionally are also in the possession or control of a museum or federal agency" [43 C.F.R. 10.2(d)(2)(i)]. *Unassociated funerary objects* are "those funerary objects for which the human remains with which they were placed intentionally are nor in the possession or control of a museum or federal agency" [43 C.F.R. 10.2(d)(2)(ii)].
- *Human remains* means the "physical remains of a human body, including but not limited to bones, teeth, hair, ashes, or mummified or otherwise preserved soft tissues, of a person of Native American ancestry. For the purposes of determining cultural affiliation, human remains incorporated into a funerary object, sacred object, or object of cultural patrimony, as defined below, must be considered as part of that item" [43 CFR 10.2(d)(1)].
- *Inadvertent discovery* means "the unanticipated encounter or detection of human remains, funerary objects, sacred objects, or objects of cultural patrimony found under or on the surface of Federal or tribal lands pursuant to section 3(d)" of NAGPRA [43 C.F.R. 10.2(g)(4)].
- *Intentional excavation* means "the planned archeological removal of human remains, funerary objects, sacred objects, or objects of cultural patrimony found under or on the surface of Federal or tribal lands pursuant to section 3(c)" of NAGPRA [43 C.F.R. 10.2(g)(3)].
- *NAGPRA SOP* is the *Fort Carson NAGPRA Standard Operating Procedures*, appended to this agreement.
- *Objects of cultural patrimony* means "items having ongoing historical, traditional, or cultural importance central to the Indian Tribe or Native Hawaiian organization itself, rather than property owned by an individual tribal or organization member. These objects are of such central importance that they may not be alienated, appropriated, or conveyed by any individual tribal or organization member. Such objects must have been considered inalienable by the culturally affiliated Indian Tribe or Native Hawaiian organization at the time the object was separated from the group" [43 C.F.R. 10.2(d)(4)].
- *Sacred objects* means "items that are specific ceremonial objects needed by traditional Native American religious leaders for the practice of traditional Native American religions by their present day adherents. While many items, from ancient pottery sherds to arrowheads, might be imbued with sacredness in the eyes of an individual, these regulations are specifically limited to objects that were devoted to a traditional Native American religious ceremony or ritual and which have religious significance or function in the continued observance or renewal of such ceremony" [43 C.F.R. 10.2(d)(3)].

Article I: Inadvertent Discovery of Human Remains

A. In the event of an inadvertent discovery of human remains or cultural items on lands administered by Fort Carson, Fort Carson will follow the procedures outlined in the NAGPRA Standard Operating Procedures (SOP - Appendix A).

B. All inadvertently discovered human remains that are not associated with a crime scene shall be analyzed *in situ* by means of non-destructive analysis to potentially determine cultural affiliation. Non-destructive analysis shall consist of direct physical measurement of the material, preceded, if necessary, by cleaning with a non-corrosive solution that does not damage or alter the material or object. Fragments or samples of the material shall not be taken. A qualified professional physical anthropologist or archeologist shall conduct such analysis. Other methods of analysis shall be conducted only upon consultation with the Tribes.

C. All inadvertently discovered cultural items associated with human remains shall be analyzed *in situ* and shall not be removed from their context. Other methods of analysis shall be conducted only upon consultation with the Tribes.

D. In the event that lineal descendants and cultural affiliation cannot be determined based on preliminary analysis, the signatory Tribes to this agreement, based on aboriginal occupation and use of Fort Carson lands, shall hereby claim joint ownership of the human remains and/or cultural items. Other notified Tribes not party to this agreement will have sixty (60) days within which to claim ownership.

E. The Tribes claiming ownership shall, among themselves, determine which Tribe will act as the lead in the disposition of the human remains and/or cultural items depending upon the particular circumstances of the case. If a lead cannot be determined, Fort Carson will follow the dispute resolution procedures outlined in the NAGPRA SOP (Section 6.0), and the matter may be put before the NAGPRA Review Committee.

Article II: Archeological or Other Investigation That May Result in the Discovery of Human Remains or Cultural Items

A. If Fort Carson proposes to undertake an archeological investigation or other activity that has a high probability to result in the discovery of Native American human remains, NAGPRA points-of-contact for the consulting Tribes shall be notified. Fort Carson shall consult with the Tribes (allowing for a thirty (30)-day period for response from the Tribes) to ensure that the scope of work for the investigation or activity addresses the concerns of the Tribes.

B. High probability for the discovery of Native American human remains or burial items will be determined by the Fort Carson Cultural Resources Manager based on whether the scope of work for the planned investigation or activity indicates that excavation is proposed in areas in which Native American cultural resources are likely to occur.

C. In the event of the discovery of human remains or cultural items during a planned investigation, all activity within a 30 meter radius of the remains shall stop, and the Fort Carson CRM will follow the procedures for consultation outlined in the NAGPRA SOP.

D. Analysis to determine cultural affiliation will be conducted *in situ* as stipulated in Article I of this agreement.

E. In the event that lineal descendants and cultural affiliation cannot be determined based on preliminary analysis, the signatory Tribes to this agreement, based on aboriginal occupation and use of Fort Carson lands, shall hereby claim joint ownership of the human remains and/or cultural items. Other notified Tribes not party to this agreement will have sixty (60) days within which to claim ownership.

F. The Tribes claiming ownership shall, among themselves, determine which Tribe will act as the lead in the

disposition of the human remains and/or cultural items depending upon the particular circumstances of the case. If a lead cannot be determined, Fort Carson will follow the dispute resolution procedures outlined in the NAGPRA SOP (Section 6.0), and the matter may be put before the NAGPRA Review Committee.

Article III: Access

A. In accordance with the American Indian Religious Freedom act of 1978, as amended, it is the policy of Fort Carson to accommodate requests by the Tribes for access to Fort Carson and the Pinon Canyon Maneuver Site to carry out their traditional and accustomed beliefs and practices when such access will not interfere with the military mission.

B. Tribes interested in visiting for ceremonial or other purposes shall submit a written request to the CRM at least forty-five (45) days in advance of their visit. Requests may be made via mail or e-mail. The CRM may be contacted at:

Department of Army
1638 Elwell St. – Bldg. 6236
Fort Carson, CO 80913-4356

C. Requests must come from the federally recognized tribal government, either via the tribal chairperson, a NAGPRA representative, or an authorized cultural or spiritual representative.

D. Depending on the circumstances, visitors may need to be escorted on site by Fort Carson personnel.

E. Tribal use of plants or other natural resources under the stewardship of Fort Carson for ceremonial or traditional purposes must be coordinated with the CRM and approved by the Director, DECAM.

Article IV: Privacy and Information Sharing

A. Fort Carson shall not provide details of any discovered human remains or cultural items to any media, agency, organization or individual, public or private, with the exception of other federally recognized tribes that may express interest. If it is determined that other parties need to be informed, information may be released upon the approval of all consulting parties.

B. Fort Carson shall not provide details of traditional cultural properties, sacred sites, or other resources of cultural significance to the Tribes to any outside media, agency, organization or individual, public or private, with the exception of Colorado State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (ACHP). If it is determined that other parties need to be informed, information may be released upon the approval of all consulting parties.

C. Both the Tribes and Fort Carson shall comply with the confidentiality provisions of the Archeological Resources Protection Act (ARPA) in 16 U.S.C. 470hh.

D. The Tribes may contact the Fort Carson CRM at any time to request information on cultural resources management activities.

E. Per Section 106 of the National Historic Preservation Act of 1966, as amended, the Tribes will be included in review of Fort Carson undertakings with potential to affect historic properties of cultural significance to the Tribes.

F. Subject to any applicable laws to the contrary, the Tribes may obtain copies of any Fort Carson cultural resources reports of investigations upon request, provided that requests do not exceed the photocopying capacity of the program.

Article V: Terms of the Agreement

A. This agreement shall become binding upon a party when it is signed by an authorized representative of that party. Each party warrants that it has the requisite authority to execute, deliver, and consummate the stipulations this agreement.

B. Any party may terminate its participation in this agreement by providing thirty (30) days written notice to the other parties.

C. This agreement shall remain in effect so long as Fort Carson and at least one Tribe remain as participants under it.

D. Any party to this agreement may propose in writing that it be amended, whereupon the parties will consult to consider such an amendment.

Anti-Deficiency Act Statement

All commitments made under this agreement are subject to the availability of funds. Nothing in this agreement will be construed as limiting or affecting the legal authorities of the U.S. Army or the Tribes as binding upon the parties to assume or expend funds in excess of available appropriations.

Signatures:

FORT CARSON

NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT (NAGPRA) STANDARD OPERATING PROCEDURES (SOP)

1.0 INTRODUCTION

a. Fort Carson is engaged in continuing archeological survey and evaluation of cultural resources on Fort Carson and the Pinon Canyon Maneuver Site (PCMS).

1) Approximately 55% of installation lands have been surveyed (as of October 2002).
2) A total of 5,616 archeological sites have been identified on Fort Carson and the PCMS.
3) A total of 861 sites have been determined eligible for inclusion in the National Register of Historic Places.
4) Prehistoric sites number 4,258; historic sites number 890. A total of 468 are multi-component, *i.e.* have both prehistoric and historic components.

b. Models of site location probability indicate that the lands remaining to be surveyed are likely to contain additional sites and National Register eligible properties. The studies conducted to date indicate that human burials are rare but do occur on Fort Carson administered lands.

c. This SOP is an integral feature of the Fort Carson *Integrated Cultural Resources Management Plan, 2002-2006* (ICRMP), an internal planning document guiding cultural resources management on Fort Carson and the PCMS. This SOP supercedes the interim NAGPRA SOP in Section 6.4 of the ICRMP.

d. Appended to these procedures are:

1) Appendix A: a list of applicable legislation, executive orders, and Presidential memoranda.
2) Appendix B: a template for notification of the Garrison Commander and Indian Tribes.
3) Appendix C: a list of official tribal contacts.

2.0 DEFINITIONS: Reference: Native American Graves Protection and Repatriation Act 25 U.S.C. 3001, Sec. 2, unless indicated otherwise.

- *Burial site* means "any natural or prepared physical location, whether originally below, on, or above the surface of the earth, into which as a part of the death rite or ceremony of a culture, individual human remains are deposited, and includes rock cairns or pyres which do not fall within the ordinary definition of grave site" [43 C.F.R. 10.2(d)(2)].
- *Cultural affiliation* means "that there is a relationship of shared group identity which can reasonably be traced historically or prehistorically between members of a present-day Indian Tribe or Native Hawaiian organization and an identifiable earlier group. Cultural affiliation is established when the preponderance of the evidence, based on geographical, kinship, biological, archeological linguistic, folklore, oral tradition, historical evidence, or other information or expert opinion, reasonably leads to such a conclusion" [43 C.F.R. 10.2(e)].
- *Cultural objects* specifically refers to associated funerary objects, sacred objects, and objects of cultural patrimony.
- *Funerary objects* means "items that, as a part of the death rite or ceremony of a culture, are reasonably believed to have been placed intentionally at the time of death or later with or near individual human remains." [43 C.F.R. 10.2(d)(2)]. *Associated funerary objects* are "those funerary objects for which the human remains with which they were placed intentionally are also in the possession or control of a museum or federal agency" [43 C.F.R. 10.2(d)(2)(i)]. *Unassociated funerary objects* are "those funerary objects for which the human remains

with which they were placed intentionally are nor in the possession or control of a museum or federal agency" [43 C.F.R. 10.2(d)(2)(ii)].

- *Human remains* means the "physical remains of a human body, including but not limited to bones, teeth, hair, ashes, or mummified or otherwise preserved soft tissues, of a person of Native American ancestry. For the purposes of determining cultural affiliation, human remains incorporated into a funerary object, sacred object, or object of cultural patrimony, as defined below, must be considered as part of that item" [43 CFR 10.2(d)(1)].
- *Inadvertent discovery* means "the unanticipated encounter or detection of human remains, funerary objects, sacred objects, or objects of cultural patrimony found under or on the surface of Federal or tribal lands pursuant to section 3(d)" of NAGPRA [43 C.F.R. 10.2(g)(4)].
- *Indian Tribe* means "any tribe, band, nation, or other organized group or community of Indians, including any Alaska Native village or corporation as defined in or established by the Alaska Native Claims Settlement Act [43 U.S.C. 1601 et seq.], which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians" [43 C.F.R. 10.2(b)(2)].
- *Intentional excavation* means "the planned archeological removal of human remains, funerary objects, sacred objects, or objects of cultural patrimony found under or on the surface of Federal or tribal lands pursuant to section 3(c)" of NAGPRA [43 C.F.R. 10.2(g)(3)].
- *Objects of cultural patrimony* means "items having ongoing historical, traditional, or cultural importance central to the Indian Tribe or Native Hawaiian organization itself, rather than property owned by an individual tribal or organization member. These objects are of such central importance that they may not be alienated, appropriated, or conveyed by any individual tribal or organization member. Such objects must have been considered inalienable by the culturally affiliated Indian Tribe or Native Hawaiian organization at the time the object was separated from the group" [43 C.F.R. 10.2(d)(4)].
- *Sacred objects* means "items that are specific ceremonial objects needed by traditional Native American religious leaders for the practice of traditional Native American religions by their present day adherents. While many items, from ancient pottery sherds to arrowheads, might be imbued with sacredness in the eyes of an individual, these regulations are specifically limited to objects that were devoted to a traditional Native American religious ceremony or ritual and which have religious significance or function in the continued observance or renewal of such ceremony" [43 C.F.R. 10.2(d)(3)].
- *Tribal contacts* means the Indian Tribes listed in Appendix C.

3.0 POLICY

a. The Garrison Commander will ensure compliance with the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) [25 U.S.C. 3001-3013, 43 C.F.R. 10]. The Garrison Commander-appointed Cultural Resources Manager (CRM) (Directorate of Environmental Compliance and Management, DECAM) will coordinate with the Staff Judge Advocate (SJA), Criminal Investigation Division (CID), Provost Marshal's Office (PMO), Directorate of Planning, Training and Mobilization (DPTM), and Master Planning (Directorate of Public Works, DPW) to ensure that the CRM is:

1) incorporated in the planning of training and construction in order to assess the potential for the discovery of Native American burials and archeological sites, and
2) identified as the point-of-contact to be notified immediately if a Native American burial or archeological site is inadvertently discovered on installation property.

4.0 PROCEDURES: Reference: NAGPRA 25 U.S.C. 3002 Sec. 3(d), 43 C.F.R. 10.

4.1 Contingency 1: Inadvertent Discovery of Native American Human Remains and Associated Funerary Objects, Sacred Objects, or Objects of Cultural Patrimony

4.1.1. Discovery, Preliminary Assessment, Protection, and Verification

a. Upon discovery of known or suspected human remains or cultural objects on Fort Carson administered lands, all activity within a 30 meter radius of the remains shall stop, no material shall be moved or removed, the area shall be secured, and the Director DECAM ((719) 526-2022) and the CRM ((719) 526-3806) shall be notified immediately. Dig permits and contracts for archeological investigations or construction on installation lands include the requirement to notify the CRM immediately upon discovery of human remains or cultural objects.

b. When notified of the possible discovery of human remains or cultural objects, the CRM will visit the site within twenty-four (24) hours of the notification of discovery. The CRM will make an initial determination whether the remains or objects meet the criteria defined in NAGPRA.

c. If upon examination the remains appear to be human and associated with a crime scene, the CRM will ensure that the Provost Marshal's Office (PMO) and the Criminal Investigation Division (CID) are notified. The CID will assume custody of the area.

d. If upon examination the remains are identified as non-human, the CRM will determine if archeological contexts are present that need to be evaluated pursuant to Section 106 of the National Historic Preservation Act [16 U.S.C. 470-470w].

e. If the remains are determined to be non-Native American (e.g. Caucasian, African American, or Asian American) and not associated with a crime, then NAGPRA will not apply and requirements of this SOP will be complete.

f. If the remains are determined to be Native American and not associated with a crime, the CRM will prepare a preliminary report outlining the circumstances of the discovery, description of the site and/or context of the remains, a description of the remains and objects, and an evaluation of their antiquity and significance.

1) The human remains and cultural objects will be evaluated *in situ* and only descriptive analysis will be permitted at this time.
2) The CRM may consult with a qualified physical or forensic anthropologist if necessary.
3) The site will be protected by temporary fencing and signing as “Off Limits.” Stabilization or covering may be employed if necessary.

g. If preliminary assessment is inconclusive, the CRM will assume Native American affiliation and proceed as described below.

4.1.2 Notification of the Responsible Federal Agency Official (Garrison Commander) [43 C.F.R. 10.4]

a. Upon confirmation of the discovery of Native American human remains and cultural objects, the CRM will immediately notify the Garrison Commander or his/her official designee by the most expeditious means. This notification will be followed within 48 hours by a Memorandum of Notification, a written notification that summarizes the results of the field evaluation and a plan to deal with the consultation tasks and disposition of the discovered objects. A template for the Memorandum of Notification is provided as Appendix B.

b. No later than 48 hours after receipt of the Memorandum of Notification from the CRM, the Garrison Commander or his/her official designee will forward to the CRM confirmation that he/she has received the notification.

4.1.3 Notification of Native American Tribes

a. Within three (3) working days after receipt of confirmation from the Garrison Commander of receipt of the Memorandum of Notification, the CRM shall notify culturally affiliated Indian Tribes of the discovery. Notification will be by telephone and by forwarding a notification packet by certified mail. The notification packet will include:

1) the Memorandum of Notification, this time signed by the Garrison Commander;
2) the report of the preliminary analysis of cultural affiliation; and
3) a proposed time and place for consultation and which other Indian Tribes are being notified.

b. The notification packet shall be sent to the tribal chairpersons and a copy furnished to the designated tribal NAGPRA coordinators.

c. Decisions on which Indian Tribes to notify will be based on information in the Native American contacts list appended to this SOP [Appendix C].

4.1.4 Native American Consultation

a. After the notification packet has been sent to the Tribes or review, the CRM will continue to consult with the Tribes. Representatives of Indian Tribes may decide to visit the site.

b. The Garrison Commander will notify the Installation Management Agency Northwest Region (IMA NWR), POC Rick Sharp, regarding the details of the case.

Determining Custody

c. An Indian Tribe that wishes to make a claim of ownership of human remains or cultural objects must be able to demonstrate an affiliation by a preponderance of evidence according to the criteria for the priority of custody specified in 25 U.S.C. 3002, Sec.3(a) and 43 C.F.R. 10.6.

d. Priority of ownership or control of Native American human remains and cultural objects is: [For details, see 25 U.S.C. 3002, Sec. 3(a)(1)-(2), 43 C.F.R. 10.6]

1) Lineal descendants, as determined pursuant to 43 C.F.R. 10.14(b).
2) Indian Tribe land owner.
3) Culturally affiliated Indian Tribe, as determined pursuant to 43 C.F.R. 10.14.
4) Indian Tribe recognized as the aboriginal owners of the land by a final judgment of the Indian Claims Commission or the United States Court of Claims.
5) Indian Tribe aboriginally occupying the land.
6) Indian Tribe with the strongest demonstrated cultural relationship.
7) Unclaimed.

e. If a single, legitimate claimant cannot be identified, signatories to the NAGPRA Comprehensive Agreements will claim custody of the human remains or cultural objects as allowed for in the agreements. Consultation will continue to consider treatment and disposition.

Plan of Action

f. Consultation must result in a written plan of action in accordance with 43 C.F.R. 10.5(e) between the appropriate Indian Tribes and the Garrison Commander.

1) Development, review, and signature of the plan of action will follow Army protocol specified in AR 200-4 (paragraph 3-3).
2) The CRM may prepare the written plan of action.
3) The Garrison Commander or his/her official designee will approve and sign the plan of action.
4) Copies of the written plan of action will be provided to the consulting Indian Tribes.

g. Information to be gained during the consultation that should be included in the plan of action include the following.

1) Kinds of material to be considered as cultural objects pursuant to 43 C.F.R. 10.2(b).
2) Specific information used to determine custody pursuant to 43 C.F. R. 10.6.
3) Treatment, care, and handling of human remains and cultural objects.
4) Archeological recording of the human remains and cultural objects.
5) Kinds of analysis for identification of human remains and cultural objects.
6) Kind(s) of traditional treatment(s) to be afforded the human remains or cultural objects.
7) Nature of the reports to be prepared.
8) Disposition of human remains and cultural objects in accordance with 43 C.F.R. 10.6.
9) Steps to be followed to contact Indian Tribe officials if there is a future inadvertent discovery or before any intentional excavation of human remains or cultural objects.

h. If no agreement can be reached, refer to dispute resolution in Section 6.0 of this SOP.

1) Unclaimed Native American human remains and cultural objects shall be treated in accordance with the regulations developed by the NAGPRA Review Committee.

4.1.5 Treatment and Disposition of Native American Human Remains, Associated Funerary Objects, Sacred Objects, and Objects of Cultural Patrimony

a. The treatment and disposition of Native American human remains and cultural objects recovered from Fort Carson administered lands will follow the plan of action developed through consultation with Indian Tribes (see above).

b. If the human remains or cultural objects have been removed from their context, they will be maintained in a safe and secure manner agreeable to the consulting parties as required by 43 C.F.R. 10.6(c) and 10.15 until the plan of action is implemented.

Publishing Notice

c. Following 43 C.F.R. 10.6(c), prior to the disposition of human remains and cultural objects to the lineal descendants or the apparent most closely affiliated Indian Tribe/s, the Garrison Commander or his/her official designee must publish notices of the proposed disposition in a newspaper of general circulation in the area in which the human remains and cultural objects were discovered and in which the lineal descendants or affiliated Indian Tribe/s currently reside.

1) The notice must provide information as to the nature and affiliation of the human remains, funerary objects, sacred objects, or objects of cultural patrimony and solicit further claims to custody.
2) The consulting Indian Tribes may review the content of the notice before its publication.
3) Privileged information should not be included in the notice.
4) The notices must be published twice, at least a week apart. A copy of the notice and information on when and in what newspaper/s the notice was published must be sent to the Departmental Consulting Archeologist, Department of the Interior.

Disposition

d. Per 43 C.F.R. 10.6(c), the disposition of human remains and cultural objects must not take place until at least thirty days after the publication of the second notice to allow time for any additional claimants to come forward.

e. If, during the period of publication, additional claimants come forward and the Garrison Commander or his/her designee is unable to determine which claimant is entitled to custody, proceed to Section 6.0, *Dispute Resolution*, of this SOP.

f. Fort Carson will provide an opportunity for appropriate tribal religious ceremony or ceremonies pursuant to the American Indian Religious Freedom Act (AIRFA) [42 U.S.C. 1996-1996a] and E.O. 13007 for burial site restoration and/or re-internment.

4.1.6 Resumption of Activity [43 C.F.R. 10.4(d)(2)]

a. The activity that resulted in the inadvertent discovery of Native American human remains or cultural objects may resume thirty (30) days after certification by the Commanding of the receipt of the Memorandum of Notification, if otherwise lawful.

b. Activity may resume before that time if there is a written plan of action approved by consulting parties that outlines steps for stabilization and protection of the site with no removal of human remains and cultural objects, excavation or removal of the human remains or cultural objects in accordance with 43 C.F.R. 10.3, or their disposition to lineal descendants or Indian Tribe/s with priority of custody as defined in 25 U.S.C. 3002, Sec. 3(a) and 43 C.F.R. 10.6.

4.2 Contingency 2: Intentional Archeological Excavation That May Result in the Discovery of Native American Human Remains, Associated Funerary Objects, Sacred Objects, and Objects of Cultural Patrimony

a. Archeological excavations or other investigations that have a high potential to result in the discovery or removal of Native American human remains, associated funerary objects, sacred objects, or objects of cultural patrimony are permitted only after:

1) Issuance of a permit pursuant to the Archaeological Resources Protection Act [16 U.S.C. 470aa-470ll], if applicable, and
2) Consultation with potential culturally affiliated Indian Tribes to establish provisions for the identification, treatment, and disposition of Native American human remains and cultural objects and meet the requirements of 43 C.F.R. 10.5., and
3) For sites determined eligible for the National Register of Historic Places, compliance with Section 106 of the National Historic Preservation Act [16 U.S.C. 470-470w].

b. Before issuing any approvals or permits for excavations that may result in the discovery of Native American human remains or cultural objects, the CRM must provide written notification signed by the Garrison Commander or his designee to the Indian Tribes listed in Appendix C.

c. The notice to the Indian Tribes of planned excavations must describe the planned activity, its general location, the basis for the determination that human remains and cultural objects may be encountered during excavation, and the basis for the determination of likely custody pursuant to 43 C.F.R. 10.6.

d. If no response is received in fifteen (15) days from a written notification, a follow-up telephone call will be made

by the CRM.

e. The CRM will then consult with the Tribes to ensure that the scope of work for the investigation or activity addresses the concerns of the Tribes.

f. In the event of the discovery of human remains or cultural items during the excavation, the CRM will follow the procedures set forth in Section 4.1 of this SOP.

5.0 TIME CONFLICTS

On those occasions when Fort Carson or the Indian Tribe(s) are unable to meet their commitments pertaining to time schedules for any activity specified herein, the party that is unable to meet the schedule will notify the other party as soon as physically possible to reschedule the activities to the mutual satisfaction of both parties. Emergency actions will be coordinated by telephone or FAX.

6.0 DISPUTE RESOLUTION

a. All disputes regarding the cultural affiliation of discovered human remains and/or cultural objects shall be resolved in accordance with Sections 3 and 7(e) of NAGPRA and the implementing regulations 43 C.F.R. 10.

b. Should any interested Indian Tribe make a conflicting claim of cultural affiliation or dispute the methods of treatment or disposition of human remains and/or cultural objects as delineated herein, the Garrison Commander will notify the Installation Management Agency Northwest Region, POC Rick Sharp, and the Army Environmental Center (AEC).

c. Fort Carson will continue consultation with the disputing parties, suggest that the disputing parties seek resolution among themselves, and, if the disputing parties concur, go before the NAGPRA Review Committee which is given the authority under 25 U.S.C 3006, Sec. 8(c)(4) and 43 C.F.R. 10.16 and 10.17 to make recommendations on the resolution of disputes.

d. If, upon receipt of the recommendations of the Review Committee, the most appropriate claimant still cannot be determined, Fort Carson shall retain the disputed remains or cultural objects until the question of custody is resolved, as stated in 43 C.F.R. 10.15(a)(2).

7.0 ADDITIONAL PARTIES

a. Interested Indian Tribes claiming lineal descent or cultural affiliation may join these procedures at any time should they express a desire to do so.

b. In accordance with 43 C.F.R. 10.15 (a)(1), if an interested party fails to make a written claim prior to the time human remains and cultural objects are duly repatriated or disposed of to a claimant in accordance with 43 C.F.R. 10, the interested party is deemed to have irrevocably waived any right to claim such items pursuant to these regulations.

APPENDIX A to NAGPRA SOP

MANDATES

FEDERAL STATUTES

American Indian Religious Freedom Act of 1978, as amended, 42 U.S.C. 1996-1996a
Archaeological Resources Protection Act of 1979, 16 U.S.C. 470aa-470ll
Native American Graves Protection and Repatriation Act of 1990, 25 U.S.C. 3001-3013
National Environmental Policy Act of 1969, as amended, 42 U.S.C. 4321-4370c
National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470-470w

FEDERAL REGULATIONS

32 C.F.R. 229	Protection of Archeological Resources
36 C.F.R. 60	National Register of Historic Places
36 C.F.R. 63	Determinations of Eligibility for Inclusion in the National Register of Historic Places
36 C.F.R. 78	Waiver of Federal Agency Responsibility under Section 110 of the National Historic Preservation Act
36 C.F.R. 800	Protection of Historic Properties
40 C.F.R. 1500-1508	Regulations Implementing the National Environmental Policy Act
43 C.F.R. 7	Protection of Archaeological Resources
43 C.F.R. 10	Native American Graves Protection and Repatriation Act Regulations

EXECUTIVE ORDERS

E.O. 11593	Protection and Enhancement of the Cultural Environment
E.O. 13007	Indian Sacred Sites
E.O. 13175	Consultation and Coordination with Indian Tribal Governments, November 6, 2000

ARMY REGULATIONS

Army Regulation (AR) 200-4, Cultural Resources Management, 1 October 1998
Army Pamphlet 200-4, Cultural Resources Management, 1 October 1998

APPENDIX B to NAGPRA SOP

TEMPLATE FOR
MEMORANDUM OF NOTIFICATION OF THE GARRISON COMMANDER

1. PURPOSE:

a. To notify the Garrison Commander that Native American human remains and/or cultural objects have been inadvertently discovered on Fort Carson or the PCMS.

b. Recommend an action plan that implements requirements of the Native American Graves Protection and Repatriation Act (NAGPRA) [25 U.S.C. 3001-3013, 43 C.F.R. 10], outlined in the NAGPRA Standard Operating Procedures.

c. Request certification of this notification by the Garrison Commander to be forwarded directly to the CRM.

2. SITUATION:

a. Describe circumstances of discovery: by whom, where, and how were Native American human remains and/or cultural objects discovered on the installation.

b. Describe discovered items: condition and contents of the burial, including any grave goods; the primary and secondary context of the remains and any artifacts, including site location described according to standard Fort Carson archeological practice; probable antiquity and significance of the remains and/or cultural objects.

3. ACTION PLAN

a. Continue to protect the site.

b. Mention that the CRM must receive confirmation of receipt of the Memorandum of Notification within forty-eight (48) hours.

c. Notify the Indian Tribes listed in Appendix C of the discovery by telephone and written report within three working days after receipt of confirmation from the Garrison Commander.

d. Inform each notified Indian Tribe of the names of the other Indian Tribes being consulted.

e. Consult with the Indian Tribes regarding the cultural affiliation, treatment, and disposition of the remains and/or objects.

f. Document the decisions made as a result of consultation in a written plan of action or as specified in Section 4.1 of this SOP.

g. Carry out treatment and disposition of remains and/or objects as agreed upon in consultations according to the process outlined in Section 4.1 of this SOP.

APPENDIX C to NAGPRA SOP

TRIBAL CONTACTS

Apache Tribe of Oklahoma

Apache Tribe of Oklahoma
P.O. Box 1220
Anadarko, OK 73005
(405) 247-9493 fax-2686

Cheyenne and Arapaho Tribes of Oklahoma

Cheyenne and Arapaho Tribes of Oklahoma
P.O. Box 38
Concho, OK 73022
(405) 262-0345 fax - 422-1184

Southern Cheyenne NAGPRA Representative
620 South Wengle Ave.
Watonga, OK 73772
(580) 623-5052

Southern Arapaho NAGPRA Representative
P.O. Box 41
Concho, OK 73022
(405) 422-1725

Southern Arapaho NAGPRA Representative
P.O. Box 836
Canton, OK 73724
(580) 886-2984

Southern Cheyenne NAGPRA Representative
(405) 262-4794 *205 fax - 4865

Comanche Nation of Oklahoma

Comanche Nation of Oklahoma
P.O. Box 908
Lawton, OK 73502
(580) 492-3751 fax - 3796

Office of Environmental Programs
Comanche Nation of Oklahoma
P.O. Box 908
Lawton, OK 73502
(580) 492-3754
fax – (580) 492-3733
cnoep@tds.net

Jicarilla Apache Nation
Jicarilla Apache Nation
P.O. Box 507
Dulce, NM 87528
(505) 759-3242 fax - 3005

NAGPRA Coordinator
Jicarilla Culture Center
P.O. Box 507
Dulce, NM 87528
(505) 759-1343 fax – 1342

Kiowa Tribe of Oklahoma

Kiowa Tribe of Oklahoma
P.O. Box 369
Carnegie, OK 73015
(580) 654-2300 fax - 2188

Kiowa Tribe of Oklahoma
P.O. Box 369
Carnegie, OK 73015
(580) 654-2300 fax - 2188
home + fax – (580) 726-3708

Northern Arapaho Tribe

Northern Arapaho Business Council
P.O. Box 396
Fort Washakie, WY 82514
(307) 332-6120 *835 fax - 3055

Northern Arapaho NAGPRA Coordinator
Box 54 Star Route
Arapahoe, WY 82510
work - (888) 822-5940
fax – (307) 857 - 5932
home – (307) 332-9175

Northern Cheyenne Tribe
Northern Cheyenne Tribe
P.O. Box 128
Lame Deer, MT 59043
(406) 477-6284 fax - 6210

Northern Cheyenne Culture Commission
(406) 477-6035

Oglala Sioux Tribe of the Pine Ridge Reservation
Oglala Sioux Tribe of the Pine Ridge Reservation
P.O. Box H
Pine Ridge, SD 57770
(605) 867-5821 fax - 1788

Shoshone Tribe (Eastern Band)
Shoshone Business Council
P.O. Box 538
Fort Washakie, WY 82514

NAGRPA Representatives
Shoshone Tribe
P.O. Box 538
Fort Washakie, WY 82514
(307) 332-5832 fax – 2074

Southern Ute Indian Tribe
Southern Ute Indian Tribe
P.O. Box 737
Ignacio, CO 81137
(970) 563-0100 fax - 0396

NAGPRA Coordinator
Southern Ute Indian Tribe
P.O. Box 737
Ignacio, CO 81137
phone as above
fax – (970) 563-4823

Ute Mountain Ute
Ute Mountain Ute Tribe
General Delivery
Towoac, CO 81334
(970) 565-3751 *201 fax - 2374

NAGPRA Representative
Ute Mountain Ute Tribe
Farm and Ranch Department
P.O. Box 53
Towaoc, CO 81334
(970) 565-3751 ext. 727 fax - 9473

APPENDIX G

Socioeconomic Resources Supporting Documentation

ATTACHMENT G.1

Fort Carson Socioeconomic Supplemental Data

TABLE G.1-1

Fort Carson ROI, Employment by County, 1995-2005

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
State of Colorado	2,000,022	2,004,741	2,080,012	2,155,740	2,198,147	2,300,192	2,301,155	2,300,065	2,325,210	2,382,873	2,419,241
ROI Counties											
El Paso	222,573	227,408	236,175	242,318	250,226	257,531	256,682	257,736	261,557	267,952	271,630
Fremont	15,304	15,328	15,916	16,672	16,669	17,191	16,190	17,437	17,091	17,564	17,776
Pueblo	53,528	53,603	55,981	57,539	57,253	61,577	61,398	61,338	63,324	63,791	64,089
Teller	12,275	12,224	12,910	13,195	13,001	11,560	11,484	11,536	11,671	11,957	11,970
ROI Total	**303,680**	**308,563**	**320,982**	**329,724**	**337,149**	**347,859**	**345,754**	**348,047**	**353,643**	**361,264**	**365,465**

	Change 1995-2005			Year-to-Year Percent									
	Numeric	**Percent**	**Average Annual Percent**	**1995-1996**	**1996-1997**	**1997-1998**	**1998-1999**	**1999-2000**	**2000-2001**	**2001-2002**	**2002-2003**	**2003-2004**	**2004-2005**	**Average**
State of Colorado	419,219	20.96%	1.92%	0.24%	3.75%	3.64%	1.97%	4.64%	0.04%	-0.05%	1.09%	2.48%	1.53%	1.93%
ROI Counties														
El Paso	49,057	22.04%	2.01%	2.17%	3.86%	2.60%	3.26%	2.92%	-0.33%	0.41%	1.48%	2.44%	1.37%	2.02%
Fremont	2,472	16.15%	1.51%	0.16%	3.84%	4.75%	-0.02%	3.13%	-5.82%	7.70%	-1.98%	2.77%	1.21%	1.57%
Pueblo	10,561	19.73%	1.82%	0.14%	4.44%	2.78%	-0.50%	7.55%	-0.29%	-0.10%	3.24%	0.74%	0.47%	1.85%
Teller	-305	-2.48%	-0.25%	-0.42%	5.61%	2.21%	-1.47%	-11.08%	-0.66%	0.45%	1.17%	2.45%	0.11%	-0.16%
ROI Total	**61,785**	**20.35%**	**1.87%**	**1.61%**	**4.02%**	**2.72%**	**2.25%**	**3.18%**	**-0.61%**	**0.66%**	**1.61%**	**2.15%**	**1.16%**	**1.88%**

Source: State of Colorado, Department of Labor and Employment, 2006.

TABLE G.1-2

Fort Carson ROI, Population by State, County, and Community (1980-2004)

								Change								
								Numeric			Average Annual Percent			Percent		
State, County, and Municipalities	April 1, 1980	April 1, 1990	April 1, 2000	July 2001	July 2002	July 2003	July 2004	1980-1990	1990-2000	2000-2004	1980-1990	1990-2000	2000-2004	1980-1990	1990-2000	2000-2004
COLORADO STATE	2,889,735	3,294,473	4,301,261	4,446,965	4,521,873	4,586,768	4,653,023	404,738	1,006,788	351,762	1.32	2.70	1.98	14.01%	30.56%	8.18%
EL PASO COUNTY	309,424	397,014	516,929	533,534	541,069	547,566	554,585	87,590	119,915	37,656	2.52	2.67	1.77	28.31%	30.20%	7.28%
Calhan	541	562	896	908	914	908	898	21	334	2	0.38	4.77	0.06	3.88%	59.43%	0.22%
Colorado Springs	215,105	281,140	360,890	369,853	373,328	377,006	380,073	66,035	79,750	19,183	2.71	2.53	1.30	30.70%	28.37%	5.32%
Fountain	8,324	9,984	15,197	15,675	16,869	17,561	18,334	1,660	5,213	3,137	1.84	4.29	4.80	19.94%	52.21%	20.64%
Green Mtn. Falls (MCP)	589	634	727	822	832	842	852	45	93	125	0.74	1.38	4.05	7.64%	14.67%	17.19%
Manitou Springs	4,475	4,535	4,980	5,136	5,198	5,264	5,225	60	445	245	0.13	0.94	1.21	1.34%	9.81%	4.92%
Monument	690	1,020	1,971	2,481	3,098	3,478	4,174	330	951	2,203	3.99	6.81	20.63	47.83%	93.24%	111.77%
Palmer Lake	1,130	1,480	2,179	2,247	2,274	2,303	2,355	350	699	176	2.73	3.94	1.96	30.97%	47.23%	8.08%
Ramah	119	94	117	121	122	121	121	-25	23	4	-2.33	2.21	0.84	-21.01%	24.47%	3.42%
Unincorp. Area	78,451	97,505	129,972	136,291	138,434	140,083	142,553	19,054	32,467	12,581	2.20	2.92	2.34	24.29%	33.30%	9.68%
FREMONT COUNTY	28,676	32,273	46,145	47,209	47,431	47,571	47,449	3,597	13,872	1,304	1.19	3.64	0.70	12.54%	42.98%	2.83%
Brookside	178	183	219	221	219	219	217	5	36	-2	0.28	1.81	-0.23	2.81%	19.67%	-0.91%
Canon City	13,037	12,687	15,431	15,648	15,621	15,661	15,683	-350	2,744	252	-0.27	1.98	0.41	-2.68%	21.63%	1.63%
Coal Creek	190	157	303	326	342	378	380	-33	146	77	-1.89	6.80	5.82	-17.37%	92.99%	25.41%
Florence	2,987	2,990	3,653	3,801	3,809	3,809	3,795	3	663	142	0.01	2.02	0.96	0.10%	22.17%	3.89%
Prospect Heights	34	19	NA	NA	NA	NA	NA	-15	NA	NA	-5.65	NA	NA	-44.12%	NA	NA
Rockvale	338	321	426	425	418	413	411	-17	105	-15	-0.51	2.87	-0.89	-5.03%	32.71%	-3.52%
Williamsburg	72	253	714	712	685	696	690	181	461	-24	13.39	10.93	-0.85	251.39%	182.21%	-3.36%
Unincorp. Area	11,840	15,663	25,399	26,076	26,337	26,395	26,273	3,823	9,736	874	2.84	4.95	0.85	32.29%	62.16%	3.44%
PUEBLO COUNTY	125,972	123,051	141,472	144,383	147,057	148,707	149,728	-2,921	18,421	8,256	-0.23	1.40	1.43	-2.32%	14.97%	5.84%
Boone	431	341	323	323	328	326	324	-90	-18	1	-2.32	-0.54	0.08	-20.88%	-5.28%	0.31%
Pueblo	101,686	98,640	102,121	103,030	103,846	104,291	104,031	-3,046	3,481	1,910	-0.30	0.35	0.46	-3.00%	3.53%	1.87%
Rye	232	168	202	201	200	198	196	-64	34	-6	-3.18	1.86	-0.75	-27.59%	20.24%	-2.97%
Unincorp. Area	23,623	23,902	38,826	40,829	42,683	43,892	45,177	279	14,924	6,351	0.12	4.97	3.86	1.18%	62.44%	16.36%
TELLER COUNTY	8,034	12,468	20,555	21,827	21,988	22,156	22,119	4,434	8,087	1,564	4.49	5.13	1.85	55.19%	64.86%	7.61%
Cripple Creek	655	584	1,115	1,129	1,117	1,103	1,082	-71	531	-33	-1.14	6.68	-0.75	-10.84%	90.92%	-2.96%
Green Mtn. Falls (MCP)	18	29	46	47	48	49	49	11	17	3	4.88	4.72	1.59	61.11%	58.62%	6.52%
Victor	265	258	445	447	443	438	438	-7	187	-7	-0.27	5.60	-0.40	-2.64%	72.48%	-1.57%
Woodland Park	2,634	4,610	6,515	6,953	7,014	7,078	7,081	1,976	1,905	566	5.76	3.52	2.10	75.02%	41.32%	8.69%
Unincorp. Area	4,462	6,987	12,434	13,251	13,366	13,488	13,469	2,525	5,447	1,035	4.59	5.93	2.02	56.59%	77.96%	8.32%
ROI Total	**472,106**	**564,806**	**725,101**	**746,953**	**757,545**	**766,000**	**773,881**	**92,700**	**160,295**	**48,780**	**1.81**	**2.53**	**1.64**	**19.64%**	**28.38%**	**6.73%**
El Paso County % Share	65.54%	70.29%	71.29%	71.43%	71.42%	71.48%	71.66%									
Fremont County % Share	6.07%	5.71%	6.36%	6.32%	6.26%	6.21%	6.13%									
Pueblo County % Share	26.68%	21.79%	19.51%	19.33%	19.41%	19.41%	19.35%									
Teller County % Share	1.70%	2.21%	2.83%	2.92%	2.90%	2.89%	2.86%									
Multi-County Places																
Green Mtn Falls	607	663	773	869	880	891	907	56	110	134	0.89	1.55	4.08	9.23%	16.59%	17.34%

(MCP) Indicates Multi County Places

Sources: U.S. Census Bureau; State of Colorado, State Demography Office (http://dola.colorado.gov/demog/demog.cfm)

Table G.1-3
Fort Carson ROI, Selected Housing Characteristics, 2000

	El Paso	Fremont	Pueblo	Teller
Occupied	95.1%	88.8%	92.6%	77.1%
Owner occupied	64.7%	76.0%	70.4%	80.9%
Renter occupied	35.3%	24.0%	29.6%	19.1%
Vacant	4.9%	11.2%	7.4%	22.9%
For seasonal, recreational, or occasional use	16.7%	46.2%	15.6%	72.4%
Median number of rooms	5.9	5.2	5.3	5.5
Single units	69.8%	69.2%	75.8%	81.9%
2-9 units	11.4%	6.0%	9.4%	4.8%
10-49 units	10.2%	2.4%	4.0%	1.6%
50 or more units	3.9%	1.5%	3.3%	0.0%
Mobile home	4.5%	20.2%	7.4%	10.3%
Year Structure Built (1990-2000)	22.0%	21.6%	17.1%	30.7%
Year Structure Built (1980-1989)	22.2%	14.3%	8.1%	24.2%
Year Structure Built (1970-1979)	23.6%	23.3%	19.2%	23.4%
Year Structure Built (1960-1969)	13.1%	10.0%	12.8%	6.2%
Year Structure Built (1950-1959)	9.2%	7.4%	15.8%	3.0%
Year Structure Built (prior to 1959)	9.8%	23.5%	26.9%	12.4%
Median year structure built:				
Total	1978	1974	1966	1982
Owner occupied	1979	1975	1966	1984
Renter occupied	1975	1971	1965	1977
Lacking complete plumbing facilities	0.4%	2.7%	0.9%	3.9%
Lacking complete kitchen facilities	0.6%	2.4%	1.0%	4.0%
Median contract rent	597	434	428	651
Median value	$143,600	$99,400	$93,100	$160,600

Source: Census Bureau, 2000

NA: Not Applicable

Table G.1-4
Fort Carson ROI, County Sources of Revenue

	County			
	El Paso	**Fremont**	**Pueblo**	**Teller**
Total Revenues	$192,674,261	$18,686,540	$78,578,585	$16,028,540
Percent Contribution by Source:				
Total taxes	50.97%	41.51%	51.42%	39.64%
Property	16.05%	15.34%	29.68%	25.77%
Sales and Use	31.97%	22.07%	16.89%	10.08%
Other	2.95%	4.10%	4.85%	3.79%
Licenses and Permits	1.44%	2.30%	0.12%	6.15%
Intergovernmental Transfers	34.64%	46.02%	36.93%	46.79%
Federal	11.08%	4.42%	7.97%	2.38%
State	23.40%	40.70%	28.55%	42.14%
Other	0.17%	0.90%	0.41%	2.27%
Charges for Services	7.89%	7.01%	6.23%	5.87%
Other Sources	5.07%	3.17%	5.30%	1.54%

Source: U.S. Census Bureau, 2006b

Table G.1-5
Fort Carson ROI, County Expenditure Categories

Expenditure Category	County			
	El Paso	Fremont	Pueblo	Teller
Total Expenditures	$188,073,870	$19,770,705	$82,562,858	$16,352,550
Percent Contribution by Category:				
Operating Expenditures	88.52%	87.40%	83.98%	89.12%
General Government	19.84%	15.18%	20.86%	25.26%
Judicial	4.02%	3.64%	3.88%	1.38%
Public Safety	22.18%	19.90%	19.99%	28.54%
Public Works	9.32%	15.00%	5.61%	17.16%
Health	11.56%	2.37%	1.23%	2.90%
Culture & Recreation	1.92%	0.93%	0.65%	0.92%
Social Services	17.66%	29.28%	30.33%	12.38%
Miscellaneous	2.01%	1.09%	1.43%	0.58%
Transfers to Other Governments	2.34%	0.84%	1.75%	0.00%
Capital Outlay	8.01%	3.94%	14.27%	8.87%
Principal Payments	0.80%	3.68%	0.00%	1.67%
Interest Payments	0.34%	4.13%	0.00%	0.34%

Source: U.S. Census Bureau, 2006b

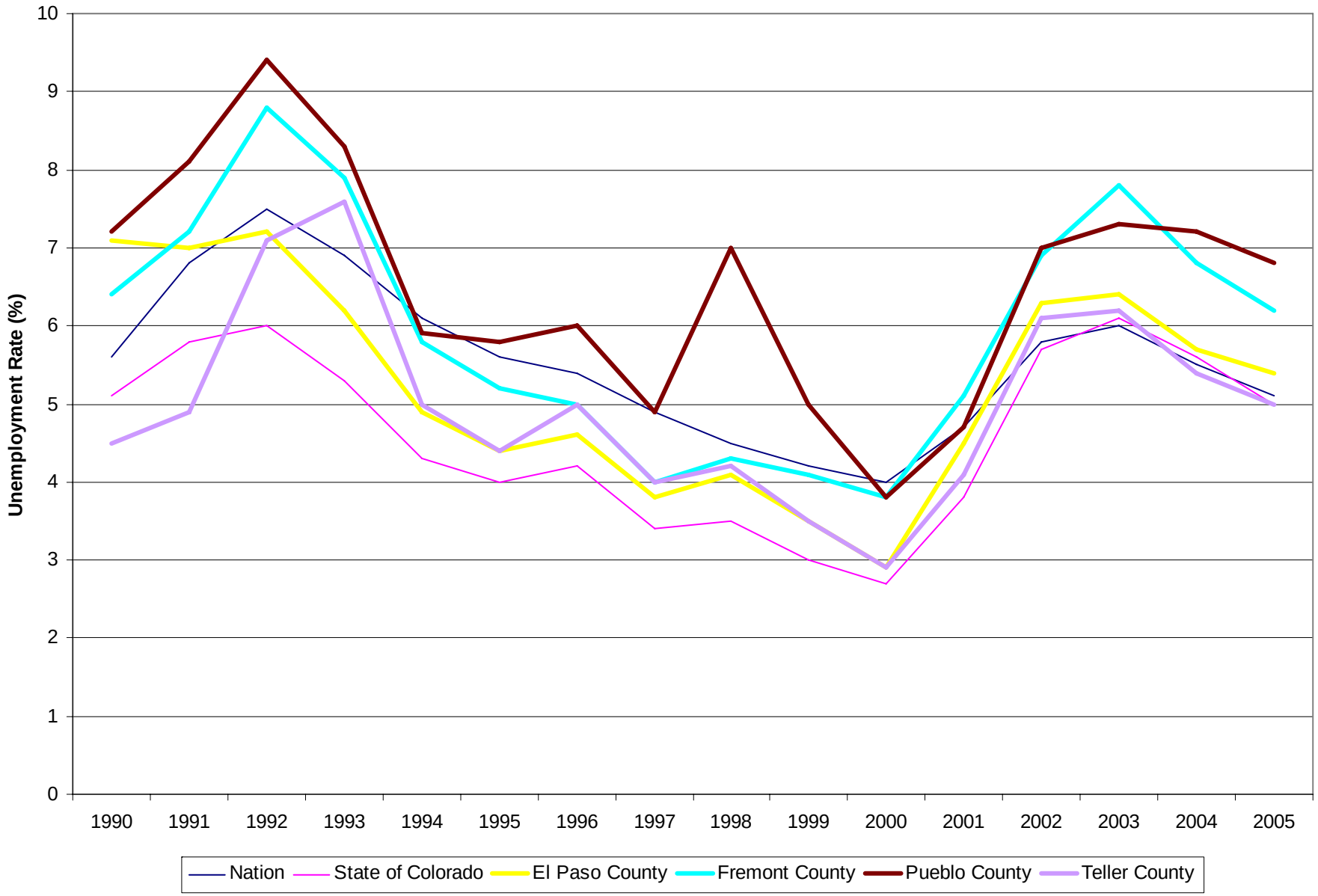


FIGURE G.1-1
Fort Carson ROI Unemployment Rate,
1990-2004

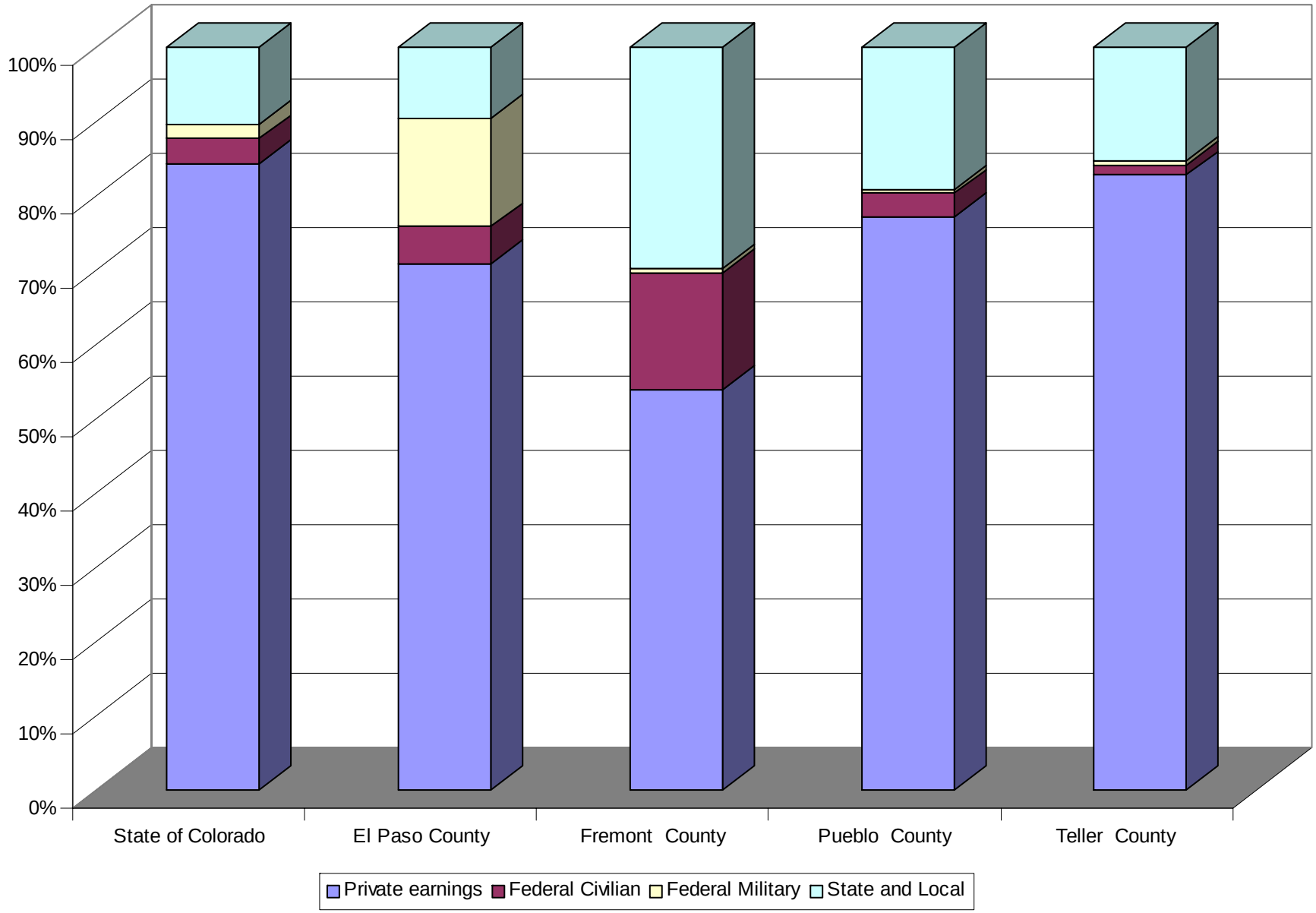


FIGURE G.1-2

Fort Carson ROI, Earnings by Sector

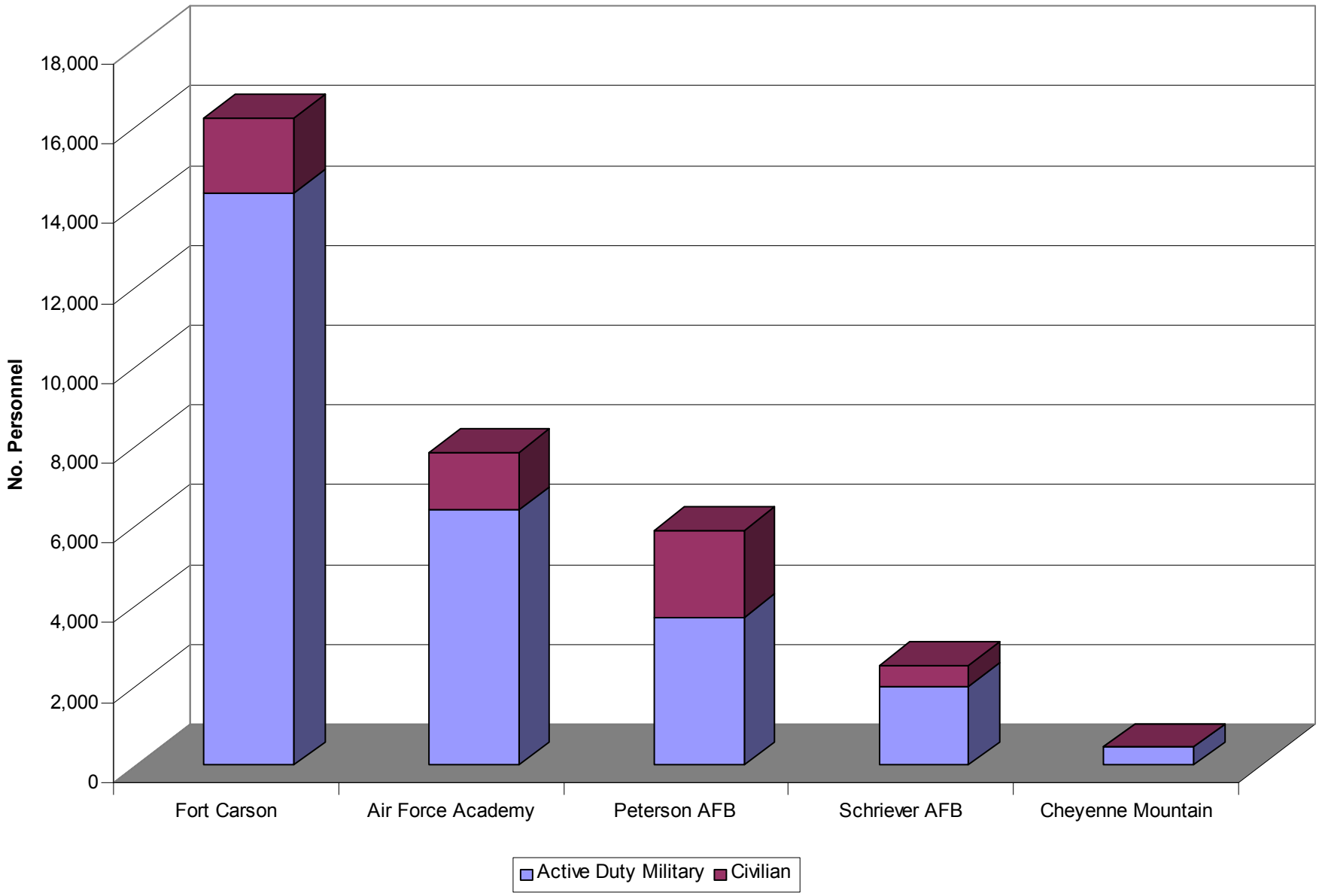


FIGURE G.1-3
Military Personnel by Installation in
El Paso County, 2004

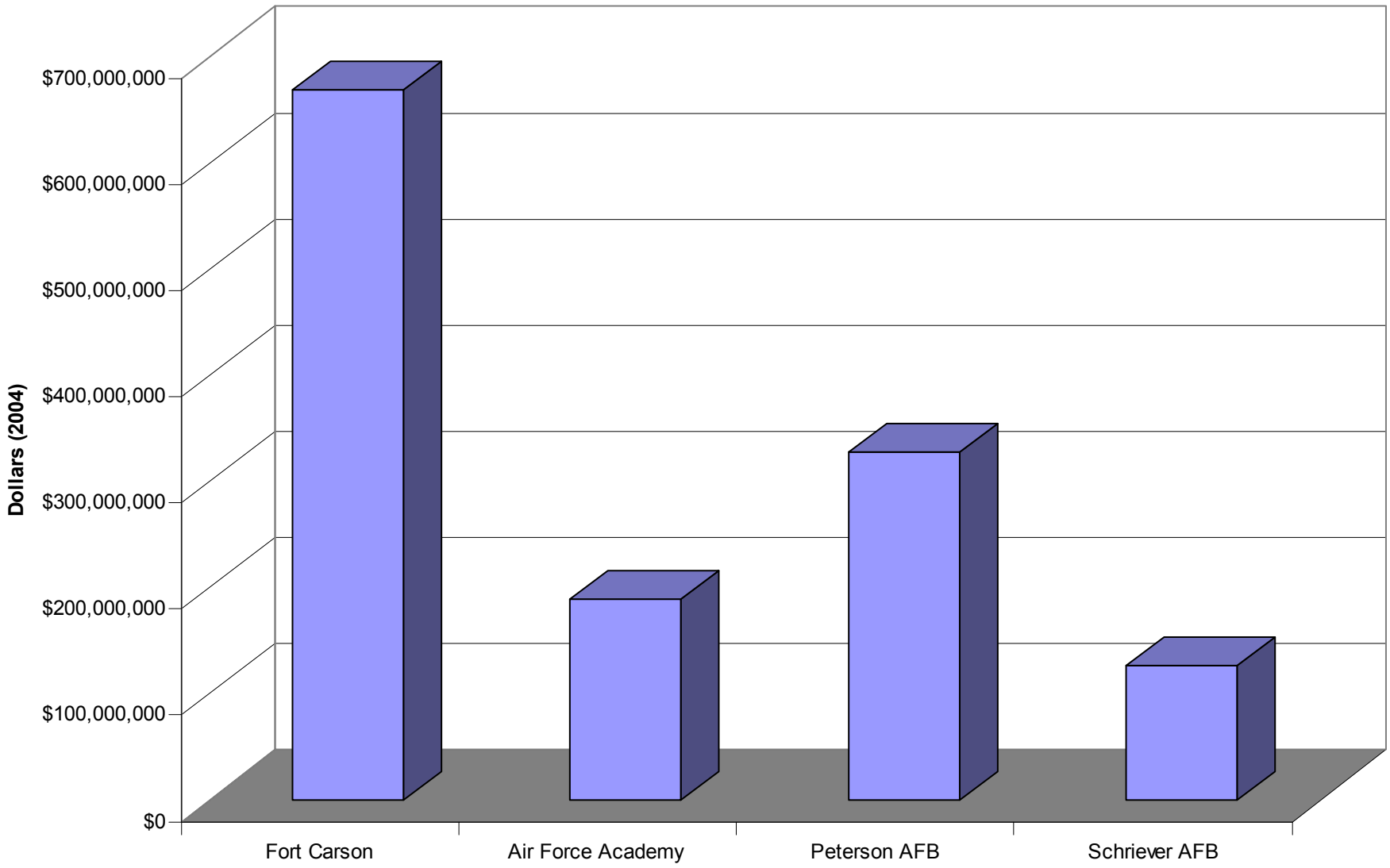


FIGURE G.1-4
Military Payroll by Installation in
El Paso County, 2004

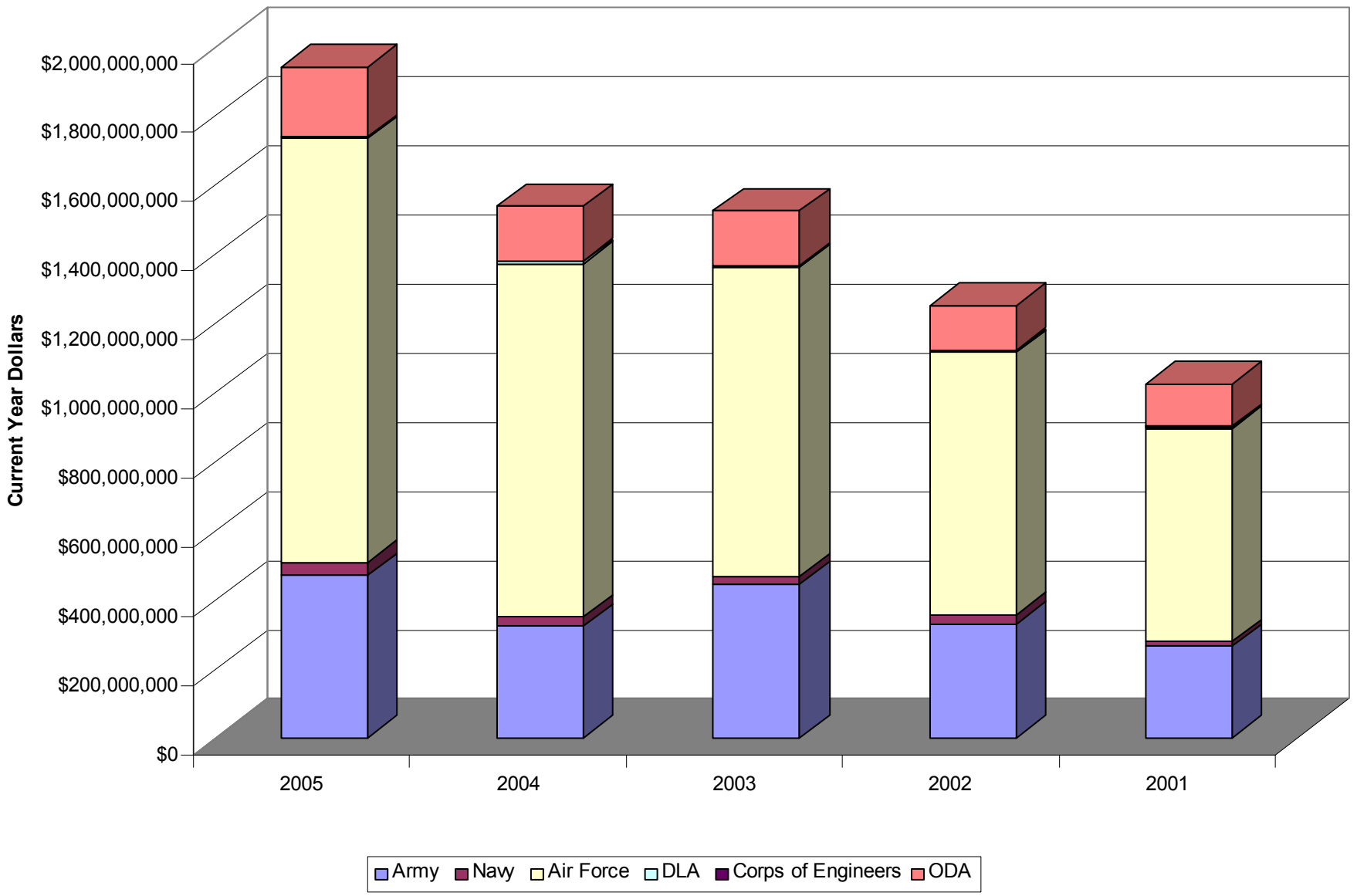


FIGURE G.1-5
DoD Prime Contract Awards in
El Paso County FY2001-FY2005

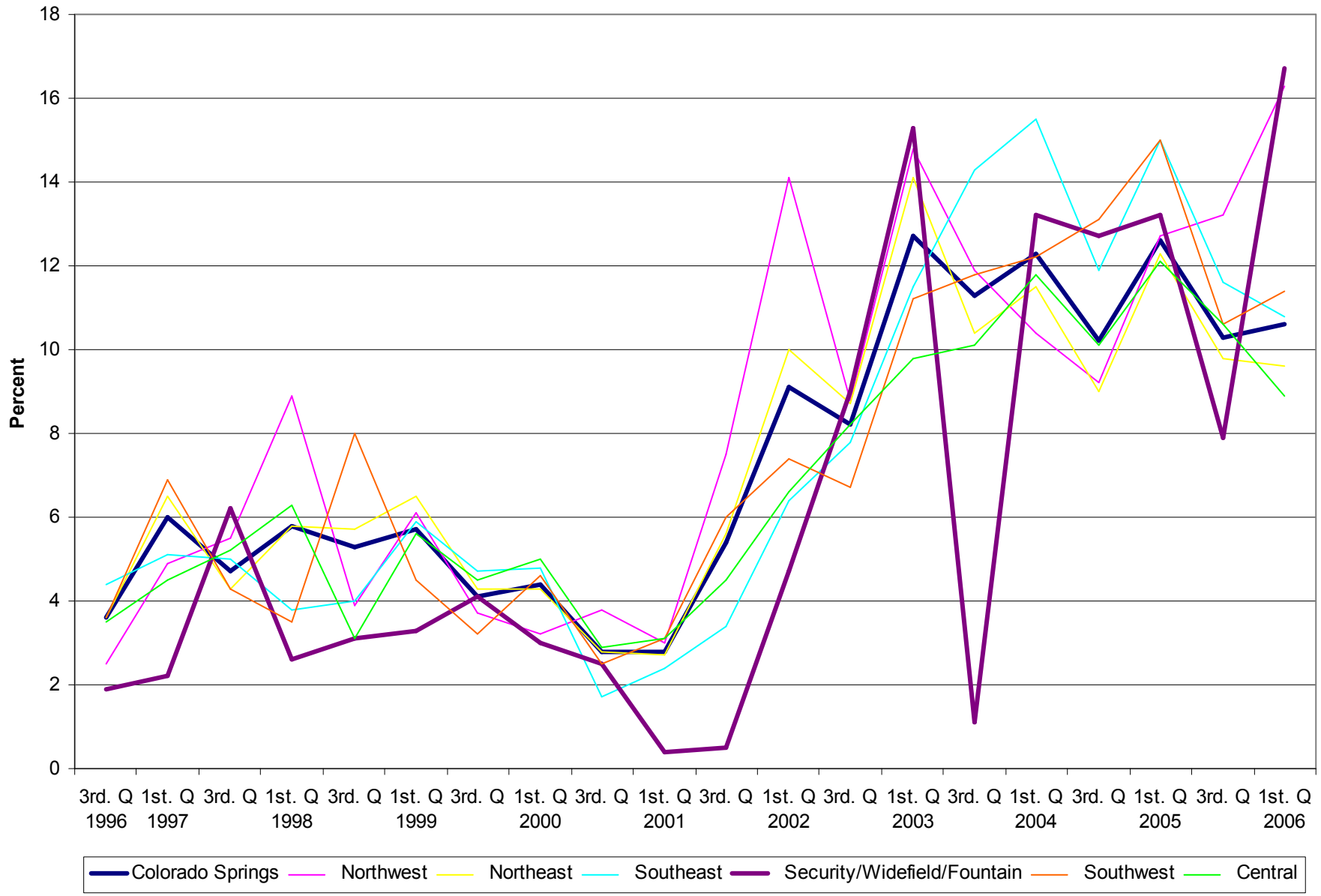


FIGURE G.1-6
Rental Housing Vacancy Rates,
Colorado Springs Metropolitan Area, 1996-2006

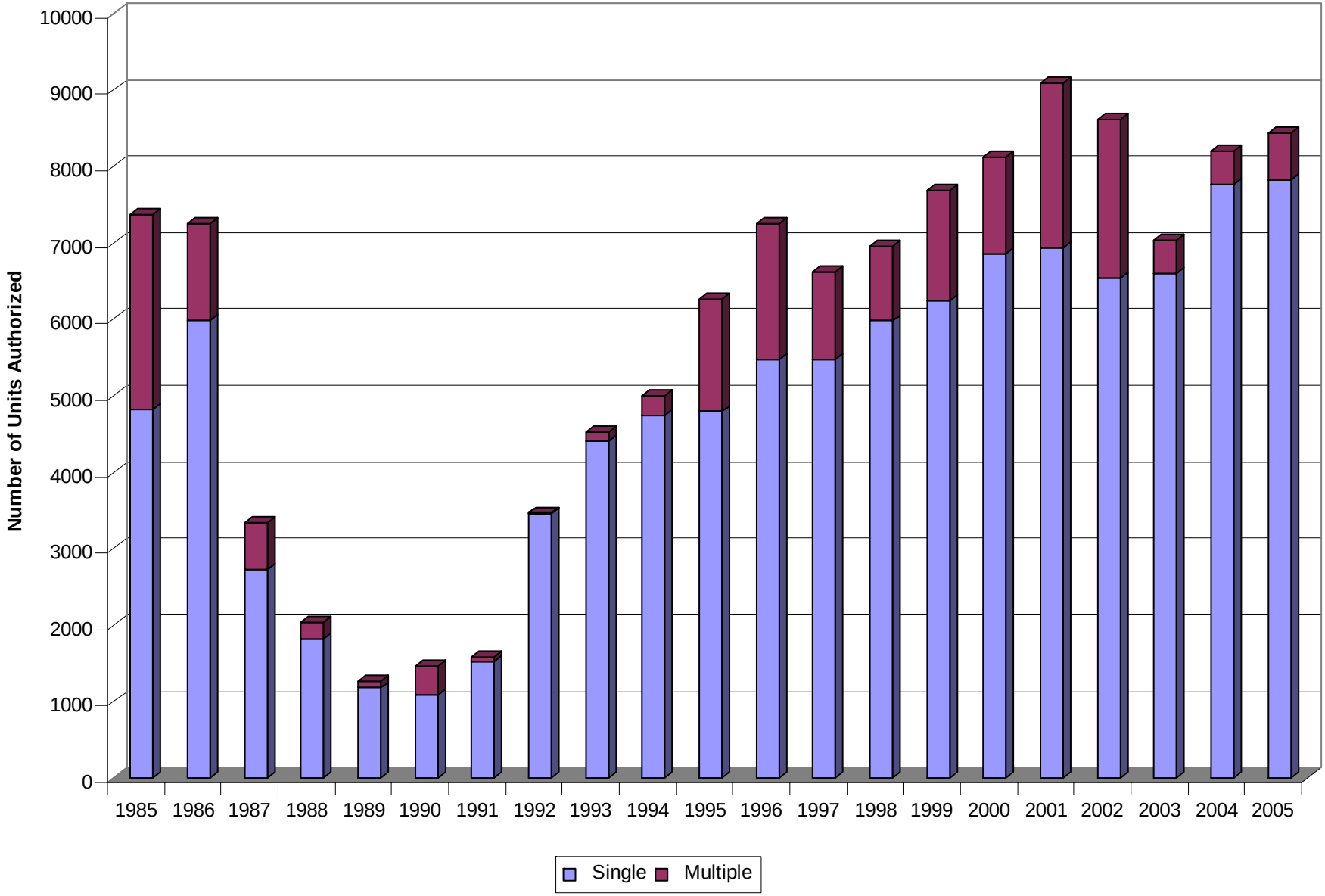


FIGURE G.1-7
Fort Carson ROI Housing Units
Authorized for Construction, 1985-2005

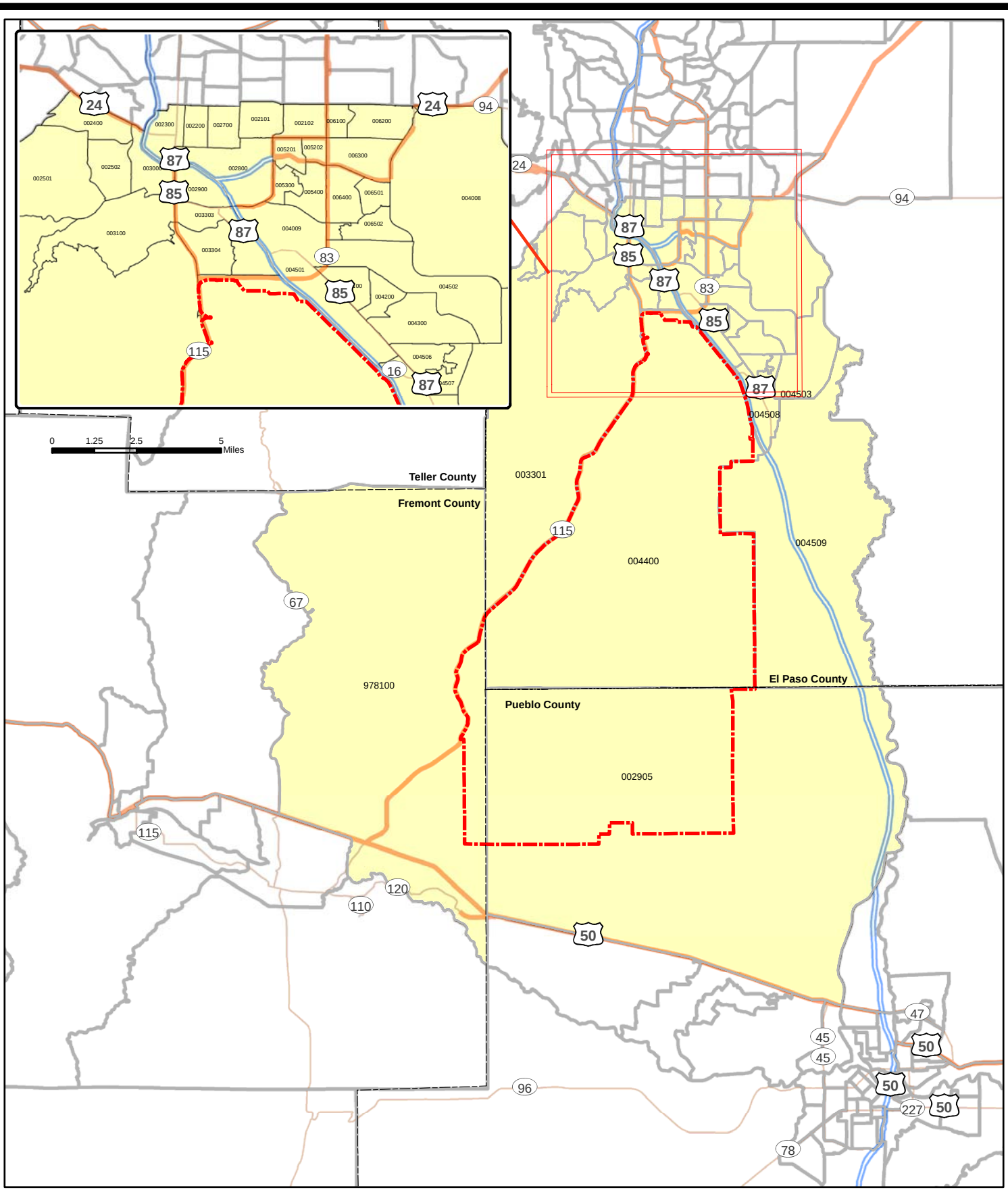


FIGURE G.1-8
Census Tracts Surrounding Fort Carson

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ATTACHMENT G.2

Fort Carson Economic Impact Forecast System Methodology and Results

Attachment G-2

ECONOMIC IMPACT FORECAST SYSTEM

THE NEED FOR SOCIOECONOMIC IMPACT ASSESSMENT

Assessing socioeconomic impacts that result from Army actions can be one of the more controversial issues related to the realignment or closure of an installation. The economic and social well-being of a local community can be dependent upon the activities of the installation, and disruptions to the status quo can become politically charged and emotion-laden. The objective of a socioeconomic analysis of Army actions is an open, realistic, and documented assessment of the potential effects.

The requirement to assess socioeconomic impacts in environmental assessments (EAs) or environmental impact statements (EISs) has been a source of legal discussion since the passage of the National Environmental Policy Act (NEPA). Although NEPA is predominately oriented toward the biophysical environment, court decisions have supported the need for analyzing socioeconomic impacts when they are accompanied by biophysical impacts.

THE ECONOMIC IMPACT FORECAST SYSTEM

The U.S. Army developed the Economic Impact Forecast System (EIFS) with the assistance of many academic and professional economists and regional scientists to address the economic impacts pursuant to NEPA and to measure the significance of the impacts. As a result of its designed applicability, and in the interest of uniformity, the Assistant Secretary of the Army (Installations, Logistics, and Environment) (ASA [IL&E]) mandates using EIFS in the NEPA assessment of base realignment and closure recommendations. EIFS is designed for the scrutiny of a populace affected by the actions being studied. The algorithms in EIFS are simple and easy to understand, but still have firm, defensible bases in regional economic theory.

EIFS, in its current form, exists as a World Wide Web-based application. The application resides on a Web server hosted by the US Army Corps of Engineers, Mobile District. The EIFS model is available to U.S. government employees, contractors, and other people who have an approved login and password. Military planners, analysts and their contractors are authorized to access the EIFS application for the purpose of preparing the 2005 Base Realignment and Closure Act (BRAC) National Environmental Policy Act (NEPA) documentation.

As currently configured, EIFS provides:

- Selected statistics about the socioeconomic characteristics of any county or any multi-county area in the United States, including metropolitan statistical areas, and planning commission regions.
- An analytical process for estimating the magnitude and significance of potential socioeconomic effects of proposed military activities in these areas.

THE EIFS IMPACT MODEL

The basis of the EIFS analytical capabilities is the calculation of multipliers that are used for estimating the impacts resulting from Army-related changes in local expenditures and employment. In calculating the multipliers, EIFS uses the economic base model approach that relies on the ratio of total economic activity to "basic" economic activity. Basic, in this context, is defined as the production or employment engaged to supply goods and services outside the ROI or by federal activities (such as military installations and their employees). According to economic base theory, the ratio of total income to basic income is measurable (as the multiplier) and sufficiently stable so that future changes in economic activity can be forecast. This technique is especially appropriate for estimating "aggregate" impacts and makes the economic base model ideal for the EA/EIS process.

The multiplier is interpreted as the total impact on the economy of the region resulting from a unit change in its basic sector; for example, a dollar increase in local expenditures due to an expansion of a military installation. EIFS estimates its multipliers using a "location quotient" approach, which is based on the concentration of industries within the region relative to the industrial concentrations for the nation.

The EIFS model produces output that includes:

- Change in total sales by local businesses
- Change in total income
- Change in total employment
- Change in total population
- The significance of these changes

THE SIGNIFICANCE OF SOCIOECONOMIC IMPACTS

Once model projections are obtained, the rational threshold values (RTV) enable the user to evaluate the significance of the impacts. This analytical tool shows the historical trends for the defined region and develops measures of local historical fluctuations in sales volume, employment, income, and population. The evaluation identifies a range of positive and negative changes, within which a project can affect the local economy without creating a significant impact.

The techniques have two major strengths: (1) they are specific to the region under analysis and (2) they are based on actual historical time series data for the defined region. The use of the EIFS impact model in combination with the RTV has proven very successful in addressing perceived socioeconomic impacts. The EIFS model and the significance-measuring techniques are theoretically sound and have been reviewed on numerous occasions.

RTVs are positive and negative percent changes that establish an acceptable range around the maximum historic percentage fluctuations in the ROI. The average yearly decreases or increases in the ROI are obtained by analyzing regional data for the last 16 to 19 years, depending on data availability. For each variable (sales volume, employment, income, and population), the current time-series data available from the U.S. Bureau of Economic Analysis (BEA) for the ROI is used. The average annual change is calculated as the difference between the first and last observations in the particular data set, divided by the

number of years in the time series (see RTV tables, following). The maximum percent positive and negative deviations from that average are the basis for the RTVs.

Negative RTVs are percentages of the maximum negative deviations. These percentages are weighted to reflect the severity of potential impacts on individuals. Population changes are the most heavily weighted, at 50 percent, followed by employment and personal income changes (67 percent); changes in sales volume receive the least weight (75 percent). Using population as an example, if the greatest historic negative deviation from the annual average population change in the ROI was -0.952 percent, a population decrease of more than half of that (-0.476 percent) would be considered significant.

Positive RTVs represent the maximum positive historical fluctuation in the ROI, because of the generally positive connotations of economic growth. If the maximum historic positive deviation from annual average employment growth was 2.368 percent, an increase of more than 2.368 percent would be considered significant in the ROI.

Definitions

Change in Local Expenditures: Dollar value of expenditures for all services and supplies that are related to the action. This figure is entered by the user when the local purchases are not known. The system then computes an estimated value for the local purchases. Items supplied by General Services Administration (GSA) or Defense Logistics Agency (DLA) are not normally included in expenditures. A negative value is entered for a decrease in activity and a positive value is used if there is an expansion.

Change in Civilian Employment: Number of civilian personnel affected by the action. These are separated or newly added civilian employees. Personnel shifted from one position to another within the same geographic area should not be included. Enter a positive number for an increase or a negative number for a decrease.

Average Income of Affected Civilian Personnel: Average annual gross (before tax) income of civilian personnel affected by the action. Average income figures are entered as positive numbers. Income, in EIFS, is a broader concept than just the wages and salaries of employees. Consideration should also be given, if possible, to income earned from second jobs, working dependents, unearned income (i.e. interest, dividends, and rents), etc.

Percent of Civilians Expected To Relocate: The actual value will vary depending on work force composition and local availability of labor in the required skill categories. If the employees affected generally are clerical, professional, or highly skilled technical personnel, then it is likely that some of these workers will move to or from other geographic areas. If the action involves a large number of personnel, the proportion of those relocating is also likely to increase.

Change in Military Employment: Number of military personnel affected by the military action. These are the transferred (out of the region) or newly added military personnel. Personnel shifted from one position to another on post or within the same geographic area should not be included. Enter a positive number for an expansion or a negative number for a decrease.

Average Income of Affected Military Personnel: Average annual gross (before tax) income of all military personnel affected by the military action.

Percent of Military Living On-post: Percentage of affected military personnel residing on post.

Employment Multiplier: The export-employment multiplier based on the location quotient methodology.

Income Multiplier: The export-income multiplier based on the location quotient methodology.

Sales Volume – Direct: Direct change in business activity attributable to the military action. This represents the change in sales volume at local retail and wholesale service establishments where civilian and military personnel spend their wages and salaries and where local procurements are make. Housing expenditures are also included in this variable.

Sales Volume – Induced: Induced change in local business volume due to the military action. Defined as the difference between total change and direct change of local business volume.

Sales Volume – Total: Total change in local business volume due to the military action. Business volume is defined as local business activity or sales and is the sum of total retail and wholesale trade sales, total selected service receipts, and value added by manufacturing.

Employment – Direct: Direct change in local employment due to the military action. These are establishments that are initially affected by the military action.

Employment – Total: Total change in local employment due to the military action. This not only includes the direct and secondary changes in local employment, but also includes those military and civilian personnel who are initially affected by the military action.

Income – Direct: Direct change in local wages and salaries due to the military action. This is assumed to be earnings of the employees in local retail, wholesale, and service establishments that are initially affected by the military action.

Income – Total (place of work): Total change in local wages and salaries earned in the area due to the military action. This is the sum of the direct and secondary changes in wages and salaries plus the income of the civilian and military personnel affected by the military action.

Income - Total (place of residence): Total change in local personal income of residents due to the military action. This not only includes the direct and secondary changes in local personal income, adjusted for commuting patterns, but also includes the income of the civilian and military personnel initially affected by the military action.

Source: U.S. Army Corps of Engineers, Mobile District

EIFS REPORT

PROJECT NAME

Ft Carson Construction impacts - Peak Year (run 2)

STUDY AREA

08041 El Paso, CO
08043 Fremont, CO
08101 Pueblo, CO
08119 Teller, CO

FORECAST INPUT

Change In Local Expenditures	$252,186,100	
Change In Civilian Employment	2486	
Average Income of Affected Civilian	$50,648	
Percent Expected to Relocate	0	
Change In Military Employment	0	
Average Income of Affected Military	$0	
Percent of Militart Living On-post	0	

FORECAST OUTPUT

Employment Multiplier	3.43	
Income Multiplier	3.43	
Sales Volume - Direct	$353,418,500	
Sales Volume - Induced	$858,806,800	
Sales Volume - Total	$1,212,225,000	4.63%
Income - Direct	$179,286,000	
Income - Induced)	$181,765,900	
Income - Total(place of work)	$361,051,900	2.32%
Employment - Direct	4308	
Employment - Induced	4428	
Employment - Total	8736	2.16%
Local Population	0	
Local Off-base Population	0	0%

RTV SUMMARY

	Sales Volume	Income	Employment	Population
Positive RTV	7.5 %	8.05 %	3.67 %	3.16 %
Negative RTV	-8.23 %	-7.75 %	-4.25 %	-1.58 %

RTV DETAILED

SALES VOLUME

Year	Value	Adj_Value	Change	Deviation	% Deviation
1969	958716	4189589	0	0	0
1970	1078553	4454424	264835	-16005	-0.36
1971	1182559	4682934	228510	-52330	-1.12
1972	1381131	5289732	606798	325958	6.16
1973	1594619	5756574	466843	186003	3.23
1974	1760221	5720718	-35856	-316696	-5.54
1975	1875604	5589300	-131418	-412258	-7.38
1976	2046537	5771234	181934	-98906	-1.71
1977	2223615	5870344	99110	-181730	-3.1
1978	2541634	6252420	382076	101236	1.62
1979	2910240	6431631	179211	-101629	-1.58
1980	3210520	6228409	-203222	-484062	-7.77
1981	3670506	6460091	231682	-49158	-0.76

1982	3911392	6492911	32820	-248020	-3.82
1983	4177641	6726002	233091	-47749	-0.71
1984	4805799	7400930	674928	394088	5.32
1985	5269082	7850932	450002	169162	2.15
1986	5593692	8166791	315858	35018	0.43
1987	5891748	9132209	965419	684579	7.5
1988	6236376	8481471	-650738	-931578	-10.98
1989	6446076	8315438	-166034	-446874	-5.37
1990	6609361	8129514	-185924	-466764	-5.74
1991	7029564	8294885	165371	-115469	-1.39
1992	7632396	8700931	406046	125206	1.44
1993	8116049	9008815	307883	27043	0.3
1994	8787731	9490750	481935	201095	2.12
1995	9481343	9955410	464660	183820	1.85
1996	10253067	10458128	502718	221878	2.12
1997	10997283	10997283	539155	258315	2.35
1998	12137296	11894550	897267	616427	5.18
1999	12995925	12476088	581537	300697	2.41
2000	14168250	13176473	700385	419545	3.18

(RTV Detailed, continued)

INCOME

Year	Value	Adj_Value	Change	Deviation	%Deviation
1969	1207999	5278955	0	0	0
1970	1369120	5654466	375510	-26334	-0.47
1971	1513795	5994628	340163	-61681	-1.03
1972	1747587	6693258	698630	296786	4.43
1973	2019709	7291149	597891	196047	2.69
1974	2245202	7296906	5757	-396087	-5.43
1975	2440399	7272389	-24517	-426361	-5.86
1976	2675929	7546120	273731	-128113	-1.7
1977	2923009	7716744	170624	-231220	-3
1978	3342933	8223615	506871	105027	1.28
1979	3847606	8503209	279594	-122250	-1.44
1980	4358057	8454631	-48579	-450423	-5.33
1981	5037924	8866746	412115	10271	0.12
1982	5468909	9078389	211643	-190201	-2.1
1983	5883643	9472665	394277	-7567	-0.08
1984	6698536	10315745	843080	441236	4.28
1985	7295841	10870803	555058	153214	1.41
1986	7751879	11317744	446940	45096	0.4
1987	8223011	12745667	1427923	1026079	8.05
1988	8665404	11784950	-960717	-1362561	-11.56
1989	9135902	11785313	364	-401480	-3.41
1990	9458612	11634093	-151220	-553064	-4.75
1991	10052731	11862222	228129	-173715	-1.46
1992	10831499	12347909	485687	83843	0.68
1993	11492589	12756774	408865	7021	0.06
1994	12387053	13378018	621244	219400	1.64
1995	13516452	14192274	814256	412412	2.91
1996	14549614	14840606	648332	246488	1.66
1997	15577161	15577161	736555	334711	2.15
1998	16993631	16653759	1076598	674754	4.05
1999	18038864	17317309	663550	261706	1.51
2000	19503187	18137964	820655	418811	2.31

(RTV Detailed, continued)

EMPLOYMENT

Year	Value	Change	Deviation	% Deviation
1969	165279	0	0	0
1970	170036	4757	-3925	-2.31
1971	171800	1764	-6918	-4.03
1972	185426	13626	4944	2.67
1973	200839	15413	6731	3.35
1974	203635	2796	-5886	-2.89
1975	199633	-4002	-12684	-6.35
1976	204268	4635	-4047	-1.98
1977	208888	4620	-4062	-1.94
1978	217395	8507	-175	-0.08
1979	229563	12168	3486	1.52
1980	234302	4739	-3943	-1.68
1981	241699	7397	-1285	-0.53
1982	246081	4382	-4300	-1.75
1983	251632	5551	-3131	-1.24
1984	270240	18608	9926	3.67
1985	282983	12743	4061	1.44
1986	289300	6317	-2365	-0.82
1987	292179	2879	-5803	-1.99
1988	301750	9571	889	0.29
1989	305952	4202	-4480	-1.46
1990	305306	-646	-9328	-3.06
1991	311455	6149	-2533	-0.81
1992	322819	11364	2682	0.83
1993	336244	13425	4743	1.41
1994	357827	21583	12901	3.61
1995	372125	14298	5616	1.51
1996	388651	16526	7844	2.02
1997	404564	15913	7231	1.79
1998	419114	14550	5868	1.4
1999	431592	12478	3796	0.88
2000	443099	11507	2825	0.64

(RTV Detailed, continued)

POPULATION

Year	Value	Change	Deviation	% Deviation
1969	371114	0	0	0
1970	382239	11125	-30	-0.01
1971	397619	15380	4225	1.06
1972	419290	21671	10516	2.51
1973	444495	25205	14050	3.16
1974	450051	5556	-5599	-1.24
1975	452884	2833	-8322	-1.84
1976	449808	-3076	-14231	-3.16
1977	458850	9042	-2113	-0.46
1978	463101	4251	-6904	-1.49
1979	471594	8493	-2662	-0.56
1980	474996	3402	-7753	-1.63
1981	485389	10393	-762	-0.16
1982	496558	11169	14	0
1983	509902	13344	2189	0.43
1984	520298	10396	-759	-0.15
1985	536670	16372	5217	0.97
1986	550178	13508	2353	0.43
1987	563907	13729	2574	0.46
1988	564705	798	-10357	-1.83
1989	565904	1199	-9956	-1.76
1990	565405	-499	-11654	-2.06
1991	573030	7625	-3530	-0.62
1992	593203	20173	9018	1.52
1993	614598	21395	10240	1.67
1994	640695	26097	14942	2.33
1995	658973	18278	7123	1.08
1996	671900	12927	1772	0.26
1997	684724	12824	1669	0.24
1998	700515	15791	4636	0.66
1999	715177	14662	3507	0.49
2000	728086	12909	1754	0.24

****** End of Report ******

EIFS REPORT

PROJECT NAME

Ft Carson Operation Impacts

STUDY AREA

08041 El Paso, CO
08043 Fremont, CO
08101 Pueblo, CO
08119 Teller, CO

FORECAST INPUT

Change In Local Expenditures	$112,302,100	
Change In Civilian Employment	492	
Average Income of Affected Civilian	$32,414	
Percent Expected to Relocate	39	
Change In Military Employment	8497	
Average Income of Affected Military	$39,936	
Percent of Military Living On-post	28	

FORECAST OUTPUT

Employment Multiplier	3.43	
Income Multiplier	3.43	
Sales Volume - Direct	$270,821,400	
Sales Volume - Induced	$658,096,100	
Sales Volume - Total	$928,917,600	3.55%
Income - Direct	$379,052,600	
Income - Induced)	$139,285,600	
Income - Total(place of work)	$518,338,200	3.33%
Employment - Direct	10385	
Employment - Induced	3393	
Employment - Total	13778	3.41%
Local Population	21635	
Local Off-base Population	15711	3.16%

RTV SUMMARY

	Sales Volume	Income	Employment	Population
Positive RTV	7.5 %	8.05 %	3.67 %	3.16 %
Negative RTV	-8.23 %	-7.75 %	-4.25 %	-1.58 %

RTV DETAILED

SALES VOLUME

Year	Value	Adj_Value	Change	Deviation	% Deviation
1969	958716	4189589	0	0	0
1970	1078553	4454424	264835	-16005	-0.36
1971	1182559	4682934	228510	-52330	-1.12
1972	1381131	5289732	606798	325958	6.16
1973	1594619	5756574	466843	186003	3.23
1974	1760221	5720718	-35856	-316696	-5.54
1975	1875604	5589300	-131418	-412258	-7.38
1976	2046537	5771234	181934	-98906	-1.71
1977	2223615	5870344	99110	-181730	-3.1
1978	2541634	6252420	382076	101236	1.62
1979	2910240	6431631	179211	-101629	-1.58
1980	3210520	6228409	-203222	-484062	-7.77
1981	3670506	6460091	231682	-49158	-0.76
1982	3911392	6492911	32820	-248020	-3.82
1983	4177641	6726002	233091	-47749	-0.71
1984	4805799	7400930	674928	394088	5.32
1985	5269082	7850932	450002	169162	2.15
1986	5593692	8166791	315858	35018	0.43
1987	5891748	9132209	965419	684579	7.5
1988	6236376	8481471	-650738	-931578	-10.98
1989	6446076	8315438	-166034	-446874	-5.37
1990	6609361	8129514	-185924	-466764	-5.74
1991	7029564	8294885	165371	-115469	-1.39
1992	7632396	8700931	406046	125206	1.44
1993	8116049	9008815	307883	27043	0.3
1994	8787731	9490750	481935	201095	2.12
1995	9481343	9955410	464660	183820	1.85
1996	10253067	10458128	502718	221878	2.12
1997	10997283	10997283	539155	258315	2.35
1998	12137296	11894550	897267	616427	5.18
1999	12995925	12476088	581537	300697	2.41
2000	14168250	13176473	700385	419545	3.18

INCOME

Year	Value	Adj_Value	Change	Deviation	% Deviation
1969	1207999	5278955	0	0	0
1970	1369120	5654466	375510	-26334	-0.47
1971	1513795	5994628	340163	-61681	-1.03
1972	1747587	6693258	698630	296786	4.43
1973	2019709	7291149	597891	196047	2.69
1974	2245202	7296906	5757	-396087	-5.43
1975	2440399	7272389	-24517	-426361	-5.86
1976	2675929	7546120	273731	-128113	-1.7
1977	2923009	7716744	170624	-231220	-3
1978	3342933	8223615	506871	105027	1.28
1979	3847606	8503209	279594	-122250	-1.44
1980	4358057	8454631	-48579	-450423	-5.33
1981	5037924	8866746	412115	10271	0.12
1982	5468909	9078389	211643	-190201	-2.1
1983	5883643	9472665	394277	-7567	-0.08
1984	6698536	10315745	843080	441236	4.28
1985	7295841	10870803	555058	153214	1.41
1986	7751879	11317744	446940	45096	0.4
1987	8223011	12745667	1427923	1026079	8.05
1988	8665404	11784950	-960717	-1362561	-11.56
1989	9135902	11785313	364	-401480	-3.41
1990	9458612	11634093	-151220	-553064	-4.75
1991	10052731	11862222	228129	-173715	-1.46
1992	10831499	12347909	485687	83843	0.68
1993	11492589	12756774	408865	7021	0.06
1994	12387053	13378018	621244	219400	1.64
1995	13516452	14192274	814256	412412	2.91
1996	14549614	14840606	648332	246488	1.66
1997	15577161	15577161	736555	334711	2.15
1998	16993631	16653759	1076598	674754	4.05
1999	18038864	17317309	663550	261706	1.51
2000	19503187	18137964	820655	418811	2.31

RTV DETAILED (continued)

EMPLOYMENT

Year	Value	Change	Deviation	% Deviation
1969	165279	0	0	0
1970	170036	4757	-3925	-2.31
1971	171800	1764	-6918	-4.03
1972	185426	13626	4944	2.67
1973	200839	15413	6731	3.35
1974	203635	2796	-5886	-2.89
1975	199633	-4002	-12684	-6.35
1976	204268	4635	-4047	-1.98
1977	208888	4620	-4062	-1.94
1978	217395	8507	-175	-0.08
1979	229563	12168	3486	1.52
1980	234302	4739	-3943	-1.68
1981	241699	7397	-1285	-0.53
1982	246081	4382	-4300	-1.75
1983	251632	5551	-3131	-1.24
1984	270240	18608	9926	3.67
1985	282983	12743	4061	1.44
1986	289300	6317	-2365	-0.82
1987	292179	2879	-5803	-1.99
1988	301750	9571	889	0.29
1989	305952	4202	-4480	-1.46
1990	305306	-646	-9328	-3.06
1991	311455	6149	-2533	-0.81
1992	322819	11364	2682	0.83
1993	336244	13425	4743	1.41
1994	357827	21583	12901	3.61
1995	372125	14298	5616	1.51
1996	388651	16526	7844	2.02
1997	404564	15913	7231	1.79
1998	419114	14550	5868	1.4
1999	431592	12478	3796	0.88
2000	443099	11507	2825	0.64

POPULATION

Year	Value	Change	Deviation	% Deviation
1969	371114	0	0	0
1970	382239	11125	-30	-0.01
1971	397619	15380	4225	1.06
1972	419290	21671	10516	2.51
1973	444495	25205	14050	3.16
1974	450051	5556	-5599	-1.24
1975	452884	2833	-8322	-1.84
1976	449808	-3076	-14231	-3.16
1977	458850	9042	-2113	-0.46
1978	463101	4251	-6904	-1.49
1979	471594	8493	-2662	-0.56
1980	474996	3402	-7753	-1.63
1981	485389	10393	-762	-0.16
1982	496558	11169	14	0
1983	509902	13344	2189	0.43
1984	520298	10396	-759	-0.15
1985	536670	16372	5217	0.97
1986	550178	13508	2353	0.43
1987	563907	13729	2574	0.46
1988	564705	798	-10357	-1.83
1989	565904	1199	-9956	-1.76
1990	565405	-499	-11654	-2.06
1991	573030	7625	-3530	-0.62
1992	593203	20173	9018	1.52
1993	614598	21395	10240	1.67
1994	640695	26097	14942	2.33
1995	658973	18278	7123	1.08
1996	671900	12927	1772	0.26
1997	684724	12824	1669	0.24
1998	700515	15791	4636	0.66
1999	715177	14662	3507	0.49
2000	728086	12909	1754	0.24

****** End of Report

APPENDIX H

Response to Comments

APPENDIX H

Response to Comments

This appendix contains the comments submitted to the U.S. Army (Army) on the *Fort Carson Transformation Draft Environmental Impact Statement* (DEIS) and presents the Army's responses to those comments. The Army prepared the DEIS in accordance with the Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) (Title 40 of the Code of Federal Regulations [CFR] Part 1500-1508) and the Army's NEPA-implementing regulations (32 CFR 651). These procedures and regulations provide for a period of public comment on a DEIS prior to the publication of a Final EIS (FEIS).

The Notice of Availability (NOA) of the *Fort Carson Transformation DEIS* was published in the *Federal Register* on October 13, 2006 (71 FR 60509). The NOA provided for a 45-day public comment period (from October 13 to November 27, 2006), which is in accordance with NEPA regulations (40 CFR 1506.10[c]). In response to public and elected officials' requests, the Army on December 1, 2006, extended the public comment period for the *Fort Carson Transformation DEIS* by an additional 45 days (to January 11, 2007) (71 FR 69652).

The Army held a public meeting on November 1, 2006, to receive comments on the Transformation DEIS, as described in Section 1.4 of the *Fort Carson Transformation FEIS*. Approximately 200 people attended this meeting, and 22 chose to provide oral comments. This meeting was held jointly with the *Pinon Canyon Maneuver Site* (PCMS) *Transformation DEIS* public meeting, and most of the comments received were related to the PCMS Transformation Proposed Action. Many of the individuals who attended this public meeting were concerned about the potential expansion of the PCMS, and focused their comments on this issue rather than on issues related to the *Fort Carson Transformation DEIS* (note that comments related to the PCMS Transformation Proposed Action or to the possible expansion of the PCMS are addressed in the *PCMS Transformation FEIS*).

During the public comment period, approximately 15 individual comment letters, emails, or comment forms and one meeting transcript representing 69 individual comments relevant to the *Fort Carson Transformation DEIS* were received. All comments that were received have been considered in preparing the *Fort Carson Transformation FEIS*.

Section H.1 presents a set of three Master Responses to issues that were raised commonly in the comment letters. Copies of all individual comment letters submitted to the Army on the *Fort Carson Transformation DEIS* and the Army's responses to those letters are presented in Section H.2. Cross-references to the Master Responses are provided in the responses to the individual comments when the individual comment is representative of numerous other similar individual comments received on the *Fort Carson Transformation DEIS* and the responses noted in the Master Responses are applicable. The format for the responses to individual comments is further described in Section H.2.

H.1 Master Responses

To aid the decision makers and the reviewing public, the following Master Responses have been developed to address the comments made on the *Fort Carson Transformation DEIS*. The intent of the Master Responses is to provide background and concise responses on each of the commonly raised issues to support the more specific responses included in the "Response to Individual Comments" (Section H.2). These Master Responses supplement, but do not replace, specific responses to the individual comments submitted and are not intended to address every issue raised in individual letters.

Master Responses to the following issues are presented in this section of the *Fort Carson Transformation FEIS*:

- Segmentation of the Fort Carson and the PCMS Transformation Proposed Actions (Section H.1.1)
- Number of Alternatives Considered (Section H.1.2)
- Requests to Extend the *Fort Carson Transformation DEIS* Public Comment Period (Section H.1.3)

Comments relating to issues at the PCMS are addressed in the *PCMS Transformation FEIS*.

H.1.1 Segmentation of the Fort Carson and the PCMS Transformation Proposed Actions

H.1.1.1 Summary of Comments

Several comments state that preparing separate EISs for the Fort Carson and the PCMS Transformation Proposed Actions constitutes improper segmentation under NEPA.

H.1.1.2 Army's Response to Comments Regarding Segmentation of the Fort Carson and the PCMS Transformation Proposed Actions

As many of the commenters noted, NEPA regulations [40 CFR 1508.25(a)] require that an agency should analyze "connected," "cumulative," and "similar" actions in the same EIS.

- "Connected actions" are those that automatically trigger other actions that may require EISs, cannot proceed unless other actions are taken previously or simultaneously, or are interdependent parts of a larger action and depend on the larger action for justification.
- "Cumulative actions" are those that when viewed with other actions proposed by the agency have cumulatively significant impacts and, therefore, should be discussed in the same EIS.
- "Similar actions" are those that when viewed with other reasonably foreseeable or proposed agency actions have similarities that provide a basis for evaluating their environmental impacts together, such as common timing or geography.

The Army made a reasoned decision to prepare two EISs simultaneously for the Fort Carson and the PCMS Transformation Proposed Actions.

Cumulative and Similar Actions

Because Fort Carson and the PCMS are not located in proximity to one another and do not share geography, resources, or communities, the Transformation Proposed Actions neither have the potential to result in cumulative impacts nor have a basis for evaluating environmental impacts together in the same EIS (i.e., they are not cumulative or similar actions). The potential for the two Proposed Actions to result in cumulative impacts was discussed in both Transformation DEISs (see Sections 3.13 in both the Fort Carson and the PCMS Transformation DEISs).

Connected Actions

Although there are overlapping time frames and related actions for both the Transformation DEISs, the Army prepared the *Fort Carson Transformation DEIS* and the *PCMS Transformation DEIS* as separate documents in recognition of the different geographies and variations in potential impacts of the Transformation Proposed Action at each site. Numerous military installations across the U.S. are preparing EISs that assess actions related to the Base Realignment and Closure (BRAC) Program, and the preparation of separate EISs for Fort Carson and the PCMS is similar to what is being done for other installations.

The impacts of transformation initiatives are different at the two sites because of the different functions and responsibilities between Fort Carson and the PCMS. These differences are discussed in detail in Sections 1.0 and 2.0 of both Transformation DEISs. (See specific references below.) Fort Carson is a garrison with extensive permanent infrastructure to address the operations and training, administration and support, and quality of life needs of Soldiers and their families. The PCMS is an austere and geographically separated augmentation facility for Fort Carson providing a venue for training that is not possible at Fort Carson.

The Army determined that because Fort Carson and the PCMS areas are geographically separate and involve a divergent set of environmental and social issues, the Transformation Proposed Actions for each site merit separate consideration and analysis. Preparing two separate EIS documents allows the Army to focus on disclosing the impacts of the separate sites and aids agency and public reviewers in assessing environmental impacts that could occur at the different sites. To further aid the understanding of the Proposed Actions and allow reviewers to read and comment on both Transformation DEISs if they chose to do so, the Army has prepared the documents concurrently, in a similar format, and provided extensive cross-references between the documents to facilitate review and an understanding of the differences in Transformation Proposed Actions and impacts between the sites. Approval of the separate Transformation Proposed Actions at the two sites is also anticipated to be concurrent.

The idea of preparing two Transformation EISs was presented during the scoping meetings, which is the appropriate venue (under 40 CFR 1501.7) for an agency to determine the scope and issues to be studied. Agency scoping meetings on the two documents were conducted at each installation. At each of these meetings, the Army presented the idea that separate EISs would be prepared for the Transformation Proposed Actions at both Fort Carson and the PCMS. Additionally, scoping notices and meeting notices were prepared and advertised in numerous papers with general circulation. All scoping and meeting notices jointly publicized the Fort Carson and the PCMS activities. No comments were received during the scoping period or at any other time during the preparation of the Transformation DEISs that

expressed opposition to separate analyses of the Fort Carson and the PCMS transformation activities.

Most importantly, the reason CEQ regulations are directed at avoiding segmentation is to prevent an action from being broken into component parts where the impacts of the parts analyzed separately would be less than the whole. Such an argument would, in the case of Fort Carson and the PCMS, result in understating the impacts of the combined Proposed Actions. This, however, is not the case for the Transformation DEISs because environmental impacts resulting from implementing the Transformation Proposed Actions at the two sites are not understated. The extent and magnitude of impacts are different (in accordance with the functions of the two sites). Both Transformation DEISs fully disclose and discuss the impacts of the Transformation Proposed Actions for each site and cross reference each other extensively to facilitate the reader's understanding of the actions. The analysis of increased training is discussed comprehensively in each of the Transformation DEISs, and the differences in the types of training that occur at the two sites are explained throughout both documents. In addition, the cumulative impact assessment in each Transformation DEIS recognizes that the other Proposed Action is subject to being evaluated as a cumulative action (see Sections 1.1 and 1.2 of both Transformation DEISs). Examples of these issues and their locations in the relative documents are noted below.

- "Fort Carson will be discussed throughout this EIS because of the interrelationship between personnel stationing and training needs at Fort Carson and the PCMS. A separate EIS is being prepared to assess environmental impacts of implementing the three major Army transformation programs on Fort Carson. Fort Carson is discussed in this EIS in instances where doing so provides context for alternatives at the PCMS." (page 1-1 of the *PCMS Transformation DEIS*)
- "The PCMS, which is located approximately 150 miles (mi) southeast of Fort Carson, is discussed in this EIS because of the relationship between training activities at Fort Carson and the PCMS. A separate EIS is being prepared to assess environmental and socioeconomic impacts of programs proposed for the PCMS facility. The PCMS is discussed in this *Fort Carson Transformation EIS* in instances where doing so provides context for alternatives at Fort Carson." (page 1-1 of the *Fort Carson Transformation DEIS*)
- "The PCMS would provide training for units or activities that cannot be accommodated on Fort Carson because of its limited size." (page 1-2 of the *Fort Carson Transformation DEIS*)
- "The PCMS supports large training exercises that cannot be accommodated on Fort Carson because of its size limitations." (page ES-2 of the *PCMS Transformation DEIS*)
- "The PCMS would provide a venue for large-scale (for example, company, battalion, and Brigade Combat Team [BCT]) maneuvers for new and existing troops stationed at Fort Carson. Fort Carson would be responsible for housing troops and supporting the needs of the Soldiers and their dependents, including Soldiers involved in training activities at the PCMS." (page 1-2 of the *PCMS Transformation DEIS*)
- "Fort Carson can support the land-area requirements of platoon and limited company maneuver operations but does not have the contiguous maneuver acreage to support doctrinal battalion- or BCT-level training. Training projections for Fort Carson (which

are being evaluated in a separate EIS) establish that Fort Carson can meet platoon-level maneuver requirements, but most company and all battalion and BCT maneuver training will be supported by the PCMS." (page 1-6 of the *PCMS Transformation DEIS*)

- "Fort Carson can support the land-area requirements of platoon and limited company maneuver operations but does not have the contiguous maneuver acreage to support doctrinal battalion- or BCT-level training. The PCMS was established as a satellite area to support these training needs." (page 1-6 of the *Fort Carson Transformation DEIS*)
- "[T]ransformational activities at the PCMS are evaluated in a separate EIS for that action. The PCMS is discussed in this EIS in the context of the function of the PCMS in supporting training of troops that cannot be accommodated on Fort Carson." (page 2-1 of the *Fort Carson Transformation DEIS*)
- "[T]he transformation activities at Fort Carson are evaluated in a separate EIS. Fort Carson is discussed in this EIS because the PCMS is considered as part of Fort Carson for command and administrative responsibilities. Fort Carson is also the home station for all of the AC units that train at the PCMS, and it supports training for smaller units on its ranges." (page 2-1 of the *PCMS Transformation DEIS*)
- "**Training and Maneuvers**. Provide for increased training activity for existing and new units stationed at Fort Carson…. The PCMS is projected to support the majority of maneuver training requirements in excess of platoon-level operations." (page 2-16 of the *Fort Carson Transformation DEIS*)

Although several commenters assert that the impacts at Fort Carson and the PCMS are understated by preparing separate Transformation EISs for each site, commenters have not provided any examples of where such understated impacts are found in the Transformation DEISs. The Army has comprehensively considered environmental impacts associated with the Transformation Proposed Actions at both sites and considered the potential for cumulative impacts to occur from implementation of the actions. Therefore, no change to the environmental analysis in either Transformation DEIS is required.

H.1.2 Number of Alternatives Considered

H.1.2.1 Summary of Comments

Comments have been made that the Army did not consider a reasonable range of alternatives because they considered only the Proposed Action and the No Action Alternative. Other commenters state that the alternatives considered but not carried forward for detailed analysis (as described in Sections 2.4.1, 2.4.2, and 2.4.3 of the *Fort Carson Transformation FEIS*) should have been analyzed in detail in the *Fort Carson Transformation DEIS*.

H.1.2.2 Army's Response

This Master Response comprises three parts:

1. NEPA requirements for alternatives analysis under the CEQ regulations generally and BRAC actions specifically.

2. Clarification on what the Transformation Proposed Action includes and how it was developed to meet NEPA requirements, including meeting the Purpose and Need for the Proposed Action, as described in Chapter 1.0 of the *Fort Carson Transformation FEIS*.

3. Discussion of the number of alternatives evaluated in the *Fort Carson Transformation DEIS*.

NEPA Requirements for Alternatives Analysis

The CEQ regulations implementing NEPA require that agencies preparing EISs shall adopt procedures to ensure that decisions are made in accordance with the policies and purposes of NEPA. For alternatives, the regulations require that "the alternatives considered by the decision maker are encompassed by the range of alternatives discussed in the relevant environmental documents and that the decision maker consider the alternatives described in the environmental impact statement" [40 CFR 1505.1(e)]. Furthermore, the CEQ regulations require that agencies assess in an EIS "all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated" (40 CFR 1502.14).

The CEQ's NEPA regulations do not, however, prescribe a specific number of alternatives determined to be a reasonable range of alternatives. In Question 2 of the CEQ's "40 Frequently Asked Questions," the CEQ clarifies that "[w]hat constitutes a reasonable range of alternatives depends on the nature of the proposal and the facts in each case."

In the case of the *Fort Carson Transformation EIS*, Congress limited the scope of NEPA for BRAC actions to exempt stationing decisions from alternatives analysis under NEPA. Under the Department of Defense (DoD) Base Closure and Realignment Act of 1990, NEPA shall apply to the DoD only "(i) during the process of property disposal, and (ii) during the process of relocating functions from a military installation being closed or realigned to another military installation after the receiving installation has been selected but before the functions are relocated" [Public Law 100-526, Section 2905 (c)(2)(A)(ii)]. The *Fort Carson Transformation DEIS* has been prepared in accordance with part (ii) of that law regarding relocating functions of a military installation. Under the Act, the DoD is not required to consider alternative military installations in the conduct of implementing NEPA. Section 2905 (c)(2)(B)(iii) of Public Law 100-526 states that "the Secretary of Defense and the Secretary of the military departments concerned shall not have to consider….military installations alternative to those recommended or selected."

Mission Needs and Factors that Define the Proposed Action

It is important to preface the discussion of what comprises a reasonable range of alternatives by discussing the transformation objectives, as outlined by the Army's restrictions on implementing BRAC decisions. Because the realignment is not subject to alternatives analysis, it restricts the Army's options regarding phased or limited execution of the Transformation Proposed Action (although the timing of restationing is phased over the 5-year implementation period, as illustrated in Figure 2-4 of the *Fort Carson Transformation DEIS*). The "reasonable range" of alternatives considered under a BRAC action differ from the typical NEPA process (and the CEQ regulations) because the Purpose and Need is to implement a defined program, and the range of alternatives to meet the Purpose and Need applies only to the spectrum of reasonable implementation scenarios of the prescribed action (i.e., the BRAC recommendations).

In the context of the restrictions on alternatives analysis under the BRAC Program and the need to respond to changing conditions (which are discussed in detail in Section 2.3 of the *Fort Carson Transformation DEIS* and summarized below), the Transformation Proposed Action was developed to accommodate maximum flexibility for implementation, even if Garrison Commander does not adopt the most intensive mission training strategy available to them. Construction and operation of Soldier support facilities is phased according to the needs of the phased stationing. The anticipated construction schedule for individual projects is noted in Appendix B of this FEIS. The process for implementing the training mission is discussed in Section 2.3.4.3 of the *Fort Carson Transformation DEIS*.

The Transformation Proposed Action assumes that training "could occur at any location on the installation (in accordance with the appropriate training uses, for example, maneuver areas). The specific scenarios, however, will be known only as the training needs are evaluated in the real-world context of identified needs (based on when troops are realigned to Fort Carson during the implementation period, what troops are present at Fort Carson for home-station training, and other operational consideration) and on assessment of land and environmental conditions." On the basis of the need for maximum flexibility, the Transformation Proposed Action includes the potential that an intensive level of training could occur over broad geographies or not at all. The "worst-case" condition is bounded by the Army's requirements to sustain training lands for continued use and its need to balance training requirements and land sustainability, as described in Section 1.2.5 of the *Fort Carson Transformation DEIS*.

A comprehensive Transformation Proposed Action that encompasses the full range of ways in which the mission could be achieved is more realistic and reflective of the way that transformation can and will be implemented. Defining separate alternatives that would address component features of the Transformation Proposed Action would compromise the Army's ability to meet its mission needs and address sustainability. Doing so would either be redundant of the Proposed Action description or would not meet the defined Purpose and Need. The selection of a single preferred alternative could result in a range of unsatisfactory options for meeting the Army's mission requirements. For example, selecting an alternative defined by limited training and support facilities could preclude a viable way to achieve the Army's mission. Conversely, selecting a training alternative that prescribed greater intensity of training activities than required at a given time could result in unnecessary environmental impacts.

Other Alternatives Considered

Other alternatives considered by the Army but determined to be not feasible are described in Sections 2.4.1, 2.4.2, and 2.4.3 of the *Fort Carson Transformation DEIS*. (Also see "Expansion Is Not an Alternative to the PCMS Proposed Action" in the "Expansion of the PCMS" Master Response [Section H.1.1 of Appendix H in the *PCMS Transformation FEIS*] for additional discussion of expansion as an alternative to the PCMS Transformation Proposed Action.)

Section 2.4.1, "Train Troops at Other Locales," addresses the potential of training troops at other locations. As noted in the "NEPA Requirements for Alternatives Analysis" above, permanent stationing of troops at a location other than Fort Carson was not considered in accordance with the Base Closure and Realignment Act.

Section 2.4.2 discusses expanding Fort Carson's boundaries via land acquisition. This alternative was dismissed from detailed consideration because there are no undeveloped areas surrounding Fort Carson that would be suitable for acquisition, and "[t]he Army does not have the authority, funding, or plans to expand Fort Carson."

Section 2.4.3, "Training Scenarios Based on Deployment Conditions," represents a set of options to vary training scenarios based on deployment conditions. As the Army proceeds with transformation planning, the total unit strength might vary throughout the implementation period, and Fort Carson Soldiers will continue to be deployed overseas. On the basis of these variables, the Army does not have a firm timetable for when units will return and train at Fort Carson. The Transformation Proposed Action assumes that all units are training at their home station; however, this situation might not materialize for several years, depending on the frequency of operational deployments. When this situation does occur, Fort Carson would not be able to support the training load required, and the Army would have to make decisions to balance the need to maximize training and support combat readiness. Adding incremental training scenarios as alternatives would not be reasonable because doing so would be redundant of the defined Transformation Proposed Action, which has been determined to accommodate the required mission-ready flexibility. (Also see "Mission Needs and Factors that Define the Proposed Action" above.)

Some commenters suggest that Fort Carson maximize the use of its land area and either reduce or eliminate training at the PCMS. As noted in Section 2.3.4.1, Fort Carson does not have adequate maneuver space to support large-scale maneuvers. Also noted in Section 2.3.4.1, the use of training areas at Fort Carson are maximized under the Transformation Proposed Action, and training at Fort Carson will have to be balanced with land constraints. Training at Fort Carson would occur according to the primary function of its training lands: small area maneuver training and live-fire training. As in Section 1.1 of the *Fort Carson Transformation DEIS*, the PCMS is a "separate maneuver training facility under the command and administrative control of Fort Carson," and the PCMS was established specifically to meet large-area maneuver needs of Fort Carson's Soldiers.

No additional alternatives were suggested by commenters during either the scoping or review of the *Fort Carson Transformation DEIS*.

H.1.3 Requests to Extend the *Fort Carson Transformation DEIS* Public Comment Period

H.1.3.1 Summary of Comments

The Army received several requests from members of the public and elected officials to extend the public comment period. Verbal requests were made at the public hearings, and written requests were received in the form of e-mail and letters.

H.1.3.2 Response to Comments on Extending the Public Comment Period on the Transformation DEISs

The public comment period on the *Fort Carson Transformation DEIS* was 45 days (from October 13 to November 27, 2006), which is in accordance with NEPA regulations [40 CFR 1506.10(c)]. In response to public and elected officials' requests, the Army subsequently extended the public comment period for both the Transformation DEISs by an

additional 45 days (to January 11, 2007). The Army has determined that the 90-day comment period was sufficient for the public to review the *Fort Carson Transformation DEIS*.

H.2 Responses to Individual Comments

This section includes copies of the individual comment letters and the associated responses. All public comments that were received have been included in the Administrative Record and have been considered during the preparation of the *Fort Carson Transformation FEIS*. Responses related to comments on the *PCMS Transformation DEIS* or potential expansion of the PCMS are provided in the *PCMS Transformation FEIS*. Some of the comment letters received contain comments on both the *Fort Carson Transformation DEIS* and the *PCMS Transformation DEIS*. Responses are provided in this Transformation FEIS for the applicable Fort Carson comments, and responses are provided in the *PCMS Transformation FEIS* for PCMS comments. As discussed in Section 1.4 of this Transformation FEIS, the comment letters are organized in the following way:

EO	Elected Officials
FA	Federal Agencies
I	Individuals
LC	Local Community Organizations or Interest Groups
LRA	Local/Regional Agency
SA	State Agency

The comment documents are organized in this appendix alphabetically by commenter type (e.g., the order presented in the above bullets, with EO first and SA last) and presented by assigned document number. Table H-1 provides an index of the names of the commenters and the page number where the comments and responses can be found. A document number was assigned to each comment document according to when the document was entered into the database. Each letter or e-mail received has been assigned a separate document number. Transcripts from the *Fort Carson Transformation DEIS* public review meeting were assigned one number (document number LC3) but contain the full text of comments and responses for each of the speakers at the meeting. Table H-2 provides an index to the names of commenters providing oral comments at the public meeting and the page number where the comments and responses can be found. As noted previously, comments on the *PCMS Transformation DEIS* or other PCMS-related issues are addressed in the *PCMS Transformation FEIS*. This *PCMS Transformation FEIS* is organized similarly to the *Fort Carson Transformation FEIS*. Copies of the FEIS can be obtained by contacting the PCMS NEPA Coordinator, Directorate of Environmental Compliance and Management, 1638 Elwell Street, Building 6236, Fort Carson, Colorado 80913-4000; phone: 719-526-0912; fax: 719-526-1705, or e-mail: carsdecampcmsnepa@conus.army.mil. The PCMS FEIS is available online at the following web address: http://www.hqda.army.mil/acsim/brac/nepa_eis_docs.htm.

Responses for each document are presented following the original comment letter and are presented numerically according to the multiple comments within each document. One document may contain multiple comments. Each comment is assigned a sub-number that follows numerically from the beginning to the end of the document. For instance, the document containing comments from the Trinidad public review meeting held for review of

the *PCMS Transformation DEIS*, contains 43 separate comments beginning with LC4-1 through LC4-43. Responses to the individual comments identified within each document are presented at the conclusion of each comment document.

Table H-1 provides an index of the comment letters and the agencies, organizations, or individuals that submitted them.

TABLE H-1
Index of Comments Received on the *Fort Carson Transformation DEIS*

Name	Document ID Number	Beginning Page Number
Federal Agency Comments		
Albuquerque District, Corps of Engineers	FA2	H-15
U.S. EPA, Region 8	FA7	H-17
U.S. Department of the Interior	FA3	H-31
U.S. Forest Service	FA1	H-35
Individuals Comments		
	I269	H-37
	I7	H-39
	I3	H-41
	I351	H-43
	I353	H-49
	I383	H-51
	I299	H-53
Local Community Organizations or Interest Groups Comments		
Colorado Council of Professional Archaeologists	LC10	H-89
Meeting Transcript, Fountain, Colorado Public Meeting November 1, 2006 (Multiple Speakers)	LC3	H-95
Local/Regional Agency Comments		
Otero County, Office of the Commissioners	LRA1	H-159
State Agency Comments		
Colorado Division of Wildlife	SA2	H-161
Colorado Historical Society	SA3	H-169

Table H-2 provides an index of commenters and their respective comments received from public meeting transcripts relevant to the *Fort Carson Transformation DEIS*.

TABLE H-2
Index of Comments Received in Public Meeting Transcripts on the *Fort Carson Transformation DEIS*

Name	Comment Number(s)	Beginning Page Number
Meeting Transcript, Fountain, Colorado Public Meeting November 1, 2006 (Document ID Number LC3)		
	LC3-1	H-110
	LC3-18 to LC3-20	H-121
	LC3-22	H-123
	LC3-23	H-125
	LC3-51	H-145
	LC3-57 and LC3-58	H-151

FEDERAL AGENCY

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
SOUTHERN COLORADO REGULATORY OFFICE
720 NORTH MAIN STREET SUITE 300
PUEBLO CO 81003-3047

November 13, 2006

Operations Division
Regulatory Branch

ATTN: Fort Carson NEPA Coordinator
[redacted]
1638 Elwell Street, Building 6236
Fort Carson, CO 80913

Dear [redacted]

This replies to your October 18, 2006 letter regarding your draft Environmental Impact Statement (DEIS) for Transformation Programs at Fort Carson, El Paso County, Colorado. We have assigned Action No. 2006 00188 to this DEIS. We have reviewed the DEIS and studied the proposed action descriptions, other records, and documents available to us. We have the following comments.

FA2-1 a. Figure 3-1. This figure shows the major streams on Fort Carson. We are in the process of aiding Fort Carson in identifying all waters of the United States within the cantonment. The waterways labeled B-Ditch, I-Ditch (Clover Ditch) and U-Ditch are all considered waters of the U.S., despite their name of "ditch". Waters of the United States are regulated under provisions of Section 404 of the Clean Water Act and a Department of the Army permit may be required for the discharge of dredged or fill material into these waters.

FA2-2 b. Section 3.6.1.1. It is stated that all streams in Fort Carson are intermittent. I-Ditch (Clover Ditch) is perennial in most, it not all, of it's reaches and supports an abundant and thriving small fish population. Sections of other "ditches" or streams may be perennial.

FA2-3 c. Section 3.6.2.2. There is no discussion of direct impacts to watercourses from changes to roads. It is anticipated that many of the cantonment roads will be realigned or enlarged. Road modifications have the potential for substantial impacts to aquatic resources, wetlands, and fisheries.

If you have any questions, please feel free to contact me at (719) 543-6914 or by email at anita.e.culp@usace.army.mil.

Sincerely,

[redacted]

Senior Project Manager

Comment Responses for Letter FA2, U.S. Army Corps of Engineers, Albuquerque District

Response to FA2-1

Comment noted. Construction projects in the Cantonment will be sited to avoid discharge of dredged or fill material into B-Ditch, I-Ditch, U-Ditch, or any other jurisdictional waterways if possible. If avoidance is not possible, a Department of the Army permit under Section 404 of the CWA will be obtained as necessary, and any required mitigations from the Section 404 permit will be implemented. This information has been added to Section 3.6.2.2 of the FEIS as appropriate. This additional information does not change the findings of the DEIS.

Response to FA2-2

Comment noted. Waterways on Fort Carson are perennial, intermittent, and ephemeral. This has been corrected in the FEIS. This correction does not change the findings of the DEIS.

Response to FA2-3

New or widened roads crossing watercourses would be designed and built to span the watercourse and avoid placement of structures in the watercourse. As described in Section 3.6.2.2 of the DEIS, erosion control and other BMPs, as well as Stormwater Pollution Prevention Plans for projects with more than 1 acre of disturbance, would be implemented to minimize stormwater runoff and protect water courses during construction activities. All potential impacts will be coordinated with the USACE, Albuquerque District and mitigations will be implemented as necessary. This information on regulatory coordination has been added to the FEIS. This additional information does not change the findings of the DEIS.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
999 18TH STREET- SUITE 300
DENVER, CO 80202-2466
Phone 800-227-8917
http://www.epa.gov/region08

JAN - 3 2007

Ref: 8EPR-N

Fort Carson NEPA Coordinator

[redacted]

Fort Carson, Colorado 80913-4000

RE: Fort Carson Transformation DEIS
CEQ# 20060415

To Whom it May Concern:

The Environmental Protection Agency (EPA) Region 8 has reviewed the Fort Carson Transformation Draft Environmental Impact Statement (DEIS). Our comments are provided in accordance with our authorities under the National Environmental Policy Act (NEPA), 42 U.S.C. 4231, and Section 309 of the Clean Air Act. The U.S. Department of The Army (Army) proposes to implement transformation programs at Fort Carson in the State of Colorado. The transformation program includes three primary components: troop-level increase of 8,500 Soldiers by 2011, facility demolition and construction, and increase live-fire maneuvering training. In addition, the DEIS is being used to support the continual withdrawal of 3,133.02 acres of public land and 11,415.16 acres of public lands with mineral rights. The withdrawal of these lands and mineral rights was extended until 2011 by Public Law 104-201, the National Defense Authorization Act for Fiscal Year 1997. The law requires the Army to reevaluate the need for these withdrawals to continue after 2011. The public meeting for this DEIS is serving as the required public hearing for this extension of withdrawal. Fort Carson is bordered on the east by State Highway 115 and on the west by Interstate 25 and is located directly south of the City of Colorado Springs, Colorado. The DEIS has identified two alternatives: one, the no action alternative and the second, the preferred alternative.

The EPA appreciates the significant efforts of the Army in preparing this DEIS, and we want to offer our comments and recommendations in regard to alternatives, environmental impact analysis, and proposed mitigation measures. We have other concerns and comments that are addressed in the detailed comments that follow this cover letter; however our main concerns are outlined below. Specifically, the FEIS should include:

FA7-1

- A clearer description in the preferred alternative of what specific construction activities will be occurring at Fort Carson and where. This would serve two specific needs in the FEIS. The first would be to better evaluate the specific impacts of these facilities (construction impacts

FA7-1 and their long-term operational impacts) and the second would be in developing mitigation for expected impacts.

FA7-2 • A more quantitative approach in identifying short and long term impacts that would occur on and off the base in the implementation of the preferred alternative.

FA7-3 • A clearer description of what and how mitigation will occur to offset environmental impacts identified in the DEIS.

FA7-4 • A more detailed explanation in the FEIS of the coordination that is occurring between resource agencies and transportation agencies, and an explanation of the outcome of these meetings.

FA7-5 Based on the procedures EPA uses to evaluate the adequacy of the information and the potential environmental impacts of the proposed action and alternatives in an EIS, EPA rates this DEIS as EC-2 (Environmental Concerns-Insufficient Information). An "EC" signifies that EPA's review of the DEIS has identified potential environmental impacts that should be avoided in order to provide adequate protection for the environment. A "2" rating signifies that the DEIS does not contain sufficient information for the EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment. A copy of EPA's rating criteria is attached.

We appreciate the opportunity to provide comments at this stage of the project. If you have any questions or would like to discuss our comments, please contact me (303 312-6004) or Dick Clark (303 312-6848) of my staff.

Sincerely,

[redacted]

Director, NEPA Program
Ecosystems Protection and Remediation

Enclosures: Detailed Comments
EPA's Rating System Criteria

Detailed Comments
Fort Carson Transformation EIS, CEQ# 20060415

Scope and intent of the EIS

FA7-6 In our review of the DEIS, we found the document to be more of a programmatic EIS on what the Army intends to accomplish in meeting the needs to reposition an additional 8,500 soldiers a Fort Carson. This determination was supported in our meeting on December 7, at Fort Carson with Army environmental staff. During this meeting it was clear that portions of work that were outlined in the DEIS were currently under construction in the Cantonment and down range area. It was explained at the meeting, that NEPA environmental assessments were completed on these actions in 2005- 2006. This was not made clear in the DEIS. The FEIS should clearly explain the reason for the work to occur prior to the ROD, outline the sequencing of these projects and explain what additional type NEPA documentation and environmental studies will be done.

Additional Construction and Training Options under the Preferred Alternative

FA7-7 The Army should identify in the FEIS what other construction and location option(s) were evaluated, prior to the selection of the preferred alternative that would have met the purpose and need of the EIS. Some examples of these would be an option that would locate some of the required base housing/support construction outside of Fort Carson in the adjacent community and an option of shifting some of the additional live fire training requirement to Pinon Canyon Maneuver Site. Then clearly explain why each one was eliminated from further consideration.

Project Description

FA7-8 As stated in our cover letter, there needs to be a clear understanding of the construction actions are being covered by this EIS and where and when these actions will occur on Fort Carson. This information is needed to fully evaluate the impacts the ecological resources and social impacts in and surrounding Fort Carson in the FEIS. Once this information is developed and analyzed, the Army should be able to develop adequate mitigation measures and monitoring plans that will be needed to offset the identified impacts.

Water Resources

FA7-9 2.3.3.2 Downrange Area Construction – Within this section it is stated that one of the down range improvement activities would be the upgrading of the communication line.

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FA7-9

In looking at Figure 2-5, this communication line appears to nearly encircle the downrange area. The document does not explain what type of construction would be needed for the upgrade. This is important in understanding the impacts associated with this action, since there are a number of streams shown on Figure 3-1 that will be crossed. In addition, there may be some impacts to wetlands located within the communication line corridor. We are not able to clearly identify this impact, because a drawing showing the general location of wetlands on the base was not provided in the DEIS.

FA7-10

3.6.2.2 Proposed Action, Construction and Operation, Floodplain- As stated in this section, stormwater conveyance systems within the Cantonment area may not be able to handle the increase in stormwater discharge associated with the construction and the new facilities. It is further stated that a USACE (2005) study would address these increases. EPA has two questions on this issue. First, will construction be held up until the study is completed and corrective actions are in place? Second, does this study address impacts downstream of the base (e.g. increased potential for flooding)?

Utilities

FA7-11

3.11.1.2 Wastewater System – As stated in this section, the Colorado Water Quality Control Commission has adopted new EPA ammonia discharge standards (EPA-823-F-99-024), which will become effective on March 2007 for all Colorado river basins (e.g. Fountain Creek). The DEIS needs to identify if the current ammonia discharge standards are being met and furthermore, that the Army will assure that once new standards are established these standard requirements will include the additional wastewater that will be generated by the preferred alternative.

Biological Resources

FA7-12

3.7.1.4 Wetlands – This section states that there are approximately 1,050 acres of wetlands within the boundaries of Fort Carson. In the following Section 3.7.2 Consequences – It states, "Wetlands on Fort Carson are not discussed in detail in this section because no direct impacts to wetlands are anticipated from the proposed construction or training activities. It is our experience that projects of this size will cause an overall reduction in wetland functions and values. We would like to see a section explaining the indirect impacts to wetlands and what mitigation efforts will be implemented to offset these impacts. This should include impacts to wetland and stream buffers. The document does discuss potential impacts due to siltation, but the extent of that impact is unclear. In addition, if The Army is monitoring the status and trends of wetlands on the base, a summary of the current finding should be included.

FA7-13

3.5.2.2 Proposed Action. In the section "Maneuver Training" and "Live-Fire Training"- Direct and indirect impacts to soil and associated vegetation cover are said to increase by the preferred alternative. This is based on an increase in frequency of training exercises and the Army personnel. It would be helpful to explain in more detail, how much more area would be impacted by the preferred alternative, and the extent of the impacts on

FA7-13

existing training areas. In addition, what mitigation measures will the Army be implementing to offset this increase in soil and vegetation impacts. One mitigation action that we would like to see in the management of these impacts is the establishment of buffer areas around sensitive areas e.g. wetlands, riparian areas and highly erode able soils.

FA7-14

Wildlife – In this section of the DEIS, the Army provides a good description on what activities, in the no action alternative and in the preferred alternative will impact transient and permanent wildlife on the base. However, because of the lack of quantitative information in the DEIS and Appendix E on wildlife impacts EPA is not able to evaluate the impacts of the current activities occurring at Fort Carson or those being proposed under the preferred alternative. The Army should include a more quantitative study of impacts to wildlife on the base so an accurate determination of the direct and indirect impacts of the preferred alternative can be made. An example of this would be the short and long term effects of the increased noise levels and disturbance on bird nesting, feeding and roosting. In our meeting with Fort Carson's environmental staff, we became aware that there are a number of long term wildlife studies being undertaken on the base. These studies need to be referenced in the FEIS and an explanation on how these studies will be used to monitor wildlife impacts as increased trainings occur on the down range facilities. Once this information is provide The Army will be able to determine what mitigation efforts and BMPs need to be incorporated to address ongoing and future wildlife impacts.

FA7-15

2.2.4.5 Environmental Considerations and Safety Measures – The last paragraph in this section references the existence of several long-term environmental monitoring programs that are occurring at Fort Carson. These on going studies are important in tracking wildlife trends on the base as training activities change. The Army needs to include a summary of these long term monitoring programs in the FEIS and include the positive and negative trends of the resources being monitored.

Air

FA7-16

In reviewing the air analysis, EPA has determined that the proposed actions at Fort Carson meet the general conformity requirements. The state of Colorado generated a letter making a finding of general conformity. This should be included with the FEIS. In addition, during EPA's discussion with the Army on this EIS, it was agreed that there would be some analysis or discussion of why the analysis was unnecessary to complete a carbon monoxide hot spot analysis for intersections where congestion was increased as a result of the project. Intersections at base security gate/entrances were identified as possible locations. Please explain why this analysis was determined to be unnecessary if that is in fact the case.

FA7-17

While the National Ambient Air Quality Standards (NAAQS) conformity requirements, and PSD are all satisfied for this project, increases in emissions are expected, which is a negative impact of this project. The Army should consider committing to means of

FA7-17

reducing emissions such as use of alternative fuel vehicles (natural gas and electric), retrofitting or requiring contractors to use diesel on-road and off-road engines and vehicles with EPA/CARB verified technologies.

Transportation

FA7-18

In reviewing the transportation evaluation of the preferred alternative, it is difficult to determine if the increase in traffic, due to the preferred alternative identified in Table 3-22 is a significant increase. It would be useful to know the current *level of service* of each highway segment referenced in the DEIS and compare that with the increases that would occur under the preferred alternative over time. The current information on the level of service and the projected increases in traffic, should be available from CDOT and other local transportation agencies.

Refer to following table on how the Federal Highway Agency (FGWA) rates traffic flow.

Level of Service	Description
A	Free flow with low volumes and high speeds.
B	Reasonably free flow, but speeds beginning to be restricted by traffic conditions.
C	In stable flow zone, but most drivers are restricted in the freedom to select their own speeds.
D	Approaching unstable flow; drivers have little freedom to select their own speeds.
E	Unstable flow; may be short stoppages
F	Unacceptable congestion; stop-and-go; forced flow.

U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements

Definitions and Follow-Up Action*

Environmental Impact of the Action

LO - - Lack of Objections: The Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC - - Environmental Concerns: The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO - - Environmental Objections: The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU - - Environmentally Unsatisfactory: The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 - - Adequate: EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 - - Insufficient Information: The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 - - Inadequate: EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

Comment Responses for Letter FA7, U.S. Environmental Protection Agency, Region 8

Response to FA7-1

Section 2.3.3 provides a discussion of the 25 planned construction projects. The construction activities are discussed for each functional area including the number and location (Figure 2-5) of projects. More detail on the scope and timing of the construction activities is provided in Appendix B. Temporary and permanent disturbance is quantified by location in Table 2-3 and construction practices to avoid or minimize impacts are identified along with sustainable construction standards. These parameters are the key items for the assessment of impacts. Further, the DEIS recognizes that siting of facilities is done in accordance with the FC Regulation 200-1, the Master Planning Strategy Smart Growth principles (summarized in Appendix A), which avoids sensitive environmental resources, such as wetlands, historic sites, or environmentally contaminated areas. By following the siting principles, the impacts can be assessed without precise locations because the potential locations will ultimately all have equivalent known characteristics defined by the siting principles.

Approximately two thirds of the construction projects will occur within the cantonment area, which contains few environmental resources that could be affected. Additional detail on the construction is not necessary for the analysis nor would it improve the quality of the information used in the decision-making process. The assessment of both construction and operational impacts is included within the analysis for each resource area (e.g., air quality includes consideration of the fugitive dust from construction and operational emissions from the additional buildings). Where significant impacts are identified or where required by policy, mitigation is identified for both short and long-term impacts.

Also see responses to comments FA7-7 and FA7-8.

Response to FA7-2

For each resource area, the DEIS discusses the current environmental conditions, identifies the types of current impacts, and analyzes how these impacts would change under the Proposed Action. Where possible, the DEIS is quantitative in describing existing conditions and assessing of impacts (e.g., noise contours discussed in Section 3.4.2.4 and presented in Appendix D). The assessment of impacts includes consideration of both the duration and magnitude of direct and indirect impacts. Where significant adverse impacts are identified, mitigation measures that could reduce those impacts are also identified. Consequently, the DEIS provides a thorough comparative analysis of the merits of the alternatives.

Response to FA7-3

For impacts attributable to training and maneuvers, the level of impact will vary depending upon the level of use, and thus, appropriate mitigations will be applied as needed depending upon the level of training and the anticipated impacts. The types of mitigation measures that could be applied are provided in the DEIS throughout Section 3.0 and are summarized in Table 3-25. The timing of when to apply mitigation will be contingent on the anticipated level of training necessary to implement mission goals. The Army has committed to a proven program for resource management, its ITAM program and will continue its land and resource stewardship under the Proposed Action. This commitment is documented in this EIS and includes mitigation measures that can be applied by range managers to reduce impacts during training. Specific mitigation measures are developed at the time of training to accommodate the Army's need for flexibility to accomplish the training mission. As described in Section 2.3.4.3 of the DEIS, the Army has established a process for management of Fort Carson's resources that considers possible impacts to these resources during the development of training exercises. This process considers the location of training, the timing of training, and the size and intensity of a training exercise.

As noted in Section 2.3 of the DEIS, the Proposed Action comprises three components: 1) Troop-Level Increases, 2) Facility Demolition and Construction, and 3) Training and Maneuvers. In addition to the analysis by resource area discussion in Section 3.0 of the DEIS of mitigation measures and how they will occur, Table 3-25 of the DEIS provides a focused summary of the mitigation measures for each of the resource areas evaluated in the EIS for troop-level increases; facility demolition and construction; and training and maneuvers. The impacts and mitigation measures for each identified impact for each of the Proposed Action components are concisely summarized in Table 3-25 for ease of reading and are intended to be considered in concert with the analysis and identified mitigation measures throughout

Section 3.0 of the DEIS. For example, air quality impacts and mitigation measures for troop-level increases are identified in Section 3.3 and are summarized in Table 3-25. Noise impacts from facility demolition and construction for the Proposed Action are presented in Section 3.4 of the DEIS and are summarized in Table 3-25.

See also response to comment FA7-13.

Response to FA7-4

The FEIS has been modified to include a discussion of agency coordination that has occurred as part of development of the *Fort Carson Transformation EIS*.

Response to FA7-5

The Army appreciates EPA's review and rating of the DEIS. As noted in response to the specific comments raised by EPA in its review of the DEIS, the FEIS addresses EPA's concerns.

Response to FA7-6

In 2006, Fort Carson prepared an EA analyzing the construction of a variety of facilities, including the IBCT complex, the HBCT complex, and the 4th Infantry Division Headquarters Complex, at the installation. A FNSI was signed for this EA (February 2006), and construction of several of these projects is underway. This information has been added to Sections 1.3.2 and 2.3.3.1 in the FEIS to explain the context of current and planned construction at Fort Carson as requested by EPA.

Response to FA7-7

The DEIS provides a breakdown of construction projects in the cantonment and downrange area (see Appendix B). The locations for construction within the cantonment was not specified but rather discussed as a comprehensive package. Because the Army would site facilities to avoid environmentally sensitive resources, such as wetlands, and be compatible with surrounding development, where in the Cantonment facilities are constructed does not change the environmental impacts of construction or operation of facilities. Issues such as increased impervious cover and increased air emissions were evaluated in sufficient detail to provide an accurate assessment of impacts. Further description of the siting of facilities is not required to describe the environmental impacts. Likewise, an analysis of alternative locations for construction projects, including off-base locations, is not warranted because the facilities can be constructed within the Cantonment at Fort Carson without significant impacts.

Response to FA7-8

The construction actions are identified and described in Section 2.3.3 with additional details provided in Appendix B. The area of construction is identified for each of the projects. Section 3.7.2.2 includes a discussion of the ecological impacts specifically associated with construction and operation of the new buildings and infrastructure. Section 3.9.2.2 contains a detailed analysis of the socioeconomic impacts of construction activities associated with the Proposed Action. Mitigation has been evaluated for both of these resource areas. Tables ES-1 and 3-25 summarize that ecological impacts from construction are minor and would require mitigation while socioeconomic impacts are generally beneficial and do not require mitigation.

Response to FA7-9

The communications line referenced by the commenter was erroneously included as part of the Proposed Action for the *Fort Carson Transformation EIS*. This communication line, known as the Installation Information Infrastructure Modernization Program (I3MP), was already undergoing NEPA analysis as a separate action at the time the Draft EIS was released. An Environmental Assessment (DECAM, 2006d) for I3MP was completed shortly after the *Fort Carson Transformation DEIS* was released, a Finding of No Significant Impact was issued, and construction commenced. The FEIS notes the citation for the separate Environmental Assessment in Section 1.3.1 and in the list of construction projects at Appendix B. I3MP was included in the consideration of cumulative impacts, as part of the facilities and infrastructure work mentioned at Section 3.13.1.1. The corrections noted above do not change the findings of the DEIS.

Response to FA7-10

The USAEC (2005) study was a preliminary review of Fort Carson's stormwater system. The results of the study indicated that without the implementation of BMPs for new development, the Cantonment's stormwater conveyance system might not have the capacity to support the Proposed Action. The study compared system capacities to estimates of peak runoff flow rates (based on the areas of new impervious

surfaces) but did not involve data collection or modeling. The study found that increased stormwater runoff from new development (attributable to increased impervious surface area) associated with the Proposed Action could cause localized flooding, overflow of ditches, and increased erosion if BMPs were not used to treat stormwater runoff. The stormwater treatment for new facilities was not included in the runoff calculations of the 2005 study (that is, increases were based on no treatment of stormwater). The construction projects included in the Proposed Action will be phased over the Transformation implementation period of 2006 to 2011. As noted in Section 3.6.2.2 of the DEIS, permanent treatment of stormwater runoff is required as part of the installation's MS4 permit, and stormwater BMPs (i.e., detention ponds, diversion structures, BMPs, etc.) will be selected for each project.

Fort Carson has contracted for follow-up data collection and development of a hydrologic model for the stormwater system within the Cantonment. The first phase of this work is currently being executed. The scope of work for the current stormwater evaluation does not look at issues beyond the boundaries of Fort Carson (although a comprehensive study of the Fountain Creek watershed from Colorado Springs to Pueblo [USACE, 2005] is being conducted, and Fort Carson is included in the study boundaries). Depending on the results of Fort Carson's follow-up study, Fort Carson may expand future phases of the study to evaluate both quality and quantity impacts off the installation. It is noted, however, that offsite impacts are not expected to change because all construction under the Proposed Action will include post-construction stormwater BMPs.

Response to FA7-11

The Army understands that a rulemaking hearing is scheduled for March 13, 2007, for the purpose of adopting the new EPA ammonia criteria. It is anticipated that the new standards will be in effect by October 2007. Fort Carson's sewage treatment facility is regulated by EPA (NPDES Permit No: CO-0021181. Based on a review of the current permit limits for the Fort Carson facility, it is concluded the facility is in compliance with the current ammonia effluent limits. The annual average total ammonia concentration in the effluent is 0.50 mg/L. In addition, it is anticipated, based on the low levels of ammonia in the effluent, that the wastewater treatment plant can reasonably be expected to meet new ammonia effluent limitations even with the increase in wastewater that will be generated under the Proposed Action (although, as noted in the DEIS, overseas deployments have reduced the number of personnel physically present at Fort Carson). If required, the facility will be modified to provide additional treatment to attain compliance with the new limits. In such a case, the Water Quality Control Division has acknowledged that some time may be needed for the facility to evaluate how it can meet the limits and make any required changes. Furthermore, according to discussions with EPA Region 8 NPDES section personnel, Fort Carson will have until 2012 to make any facility upgrades required to achieve compliance with the reused ammonia standards. Fort Carson commits to comply with any regulatory schedule imposed by EPA in regard to meeting the new permit discharge standards. This additional information has been incorporated in the FEIS in Section 3.11 and Tables ES-1 and 3-25.

Response to FA7-12

Section 3.7.2 of the DEIS currently states that "Increased training could result in indirect impacts to wetlands from erosion and sedimentation processes in drainages upstream of the many man-made erosion control dams on Fort Carson." Effects of erosion and sedimentation and the mitigation measures taken to reduce these effects are described in Sections 3.5 and 3.6 of the DEIS.

As described in the INRMP (DECAM, 2002a), wetland and riparian areas buffers are generally protected from vehicular and mechanized training at Fort Carson because these areas are protected from mechanized training (and most are not in areas that are suitable for mechanized training because of topography). Section 3.7 of this FEIS has been revised to include a broader description of the mitigation measures used to protect wetlands and riparian areas. In addition, cross references to Sections 3.5 and 3.6 have been included, where appropriate, to clarify the interconnections of the DEIS sections. Because of the avoidance and minimization efforts the Army currently implements as part of its INRMP and ITAM procedures, direct effects to wetlands would not occur and indirect effects, if any, would be minimal. Any project with the potential to affect wetlands is evaluated in consultation with the USACE for compliance with Section 404 of the CWA. These modifications do not change the findings of the DEIS.

Response to FA7-13

The actual conduct of training, as noted in Section 2.2.4.3, is dependent on a number of factors. Because Fort Carson does not have adequate training areas to execute full doctrinal training, the EIS recognizes

that compromises will need to be made and that maximum flexibility is needed for the Army to balance the training needs with land management and environmental stewardship (both of which are noted as key missions of the Army). Therefore, specific numbers of days, hours, or level of use cannot be precisely defined. The level of use, as disclosed in the EIS, will, however, be greater than has occurred historically. Without the ability to specifically quantify these training parameters, it is not possible to precisely quantify the impacts in all resource areas that are associated with the increased training.

Section 3.7.2.2 of the DEIS discusses that data directly relating effects on the resources from past training activities at Fort Carson are not available. Because the quantitative relationship of training activities and impacts to resources is not known (and is difficult to predict because of the variety of factors that influence environmental conditions), the DEIS discloses that more of the same types of impacts predicted from past activities would occur in the future. Despite the lack of direct correlative data, the Army does carefully monitor and mitigate the effects of its training activities on the environment and will continue to do so under either the No Action or the Proposed Action.

For each resource area, the DEIS discusses the current environmental conditions, identifies the types of current impacts, and analyzes how these impacts would change under the Proposed Action. Where possible, the DEIS is quantitative in describing existing conditions and assessing of impacts (e.g., noise contours discussed in Section 3.4.2.4 and presented in Appendix D). The assessment of impacts includes consideration of both the duration and magnitude of direct and indirect impacts. Where significant adverse impacts are identified, mitigation measures that could reduce those impacts are also identified. Consequently, the DEIS provides a thorough comparative analysis of the merits of the alternatives. Quantifying the impacts to the level suggested by the commenter for each resource area would be a monumental undertaking and cost prohibitive. This information is not necessary for the Army to make an informed decision regarding the Proposed Action.

As described in Section 2.3.4.3 of the DEIS, the Army has established a process for management of Fort Carson's environmental and cultural resources, including wildlife, that considers possible impacts to these resources during the development of training exercises. This process considers the location of training, the timing of training, and the size and intensity of a training exercise. Sections 2.2.4.4 and 2.2.4.5 of the DEIS describe the process whereby the G-3 coordinates with DECAM wildlife biologists to devise training plans that minimize potential impacts to wildlife. Buffers and BMPs will be used to the extent practicable to avoid and minimize impacts to wildlife. The Army may limit training and/or avoid specific areas during critical times for wildlife (fawning/calving season and winter) to further minimize and avoid impacts to wildlife.

Response to FA7-14

Numerous studies have been conducted on Fort Carson investigating the biology of several species of management concern. Theses studies include, among others, *Mule deer response to military activity* (Stephenson 1989); *Changes in coyote movements due to military activity* (Gese 1989); *Response of nesting red-tailed hawks to helicopter overflights* (Andersen et al 1989); *Management and final report: Birds of prey on the Pinon canyon maneuver Site* (Andersen and Rongstad 1989); *Final report: response of breeding avifauna to Army training* (Youkey and Meslow 1989); *Evaluation of the effects of military training on vegetation in southeastern Colorado* (Shaw and Diersing 1989); *Fish and wildlife management recommendations: Pinon Canyon Maneuver Site* (Andersen and Rosenlund 1991); *The effects of tactical vehicle training on the lands of Fort Carson, Colorado: an ecological assessment* (Diersing and Severinghaus 1984); *Effects of Army maneuvers on the Population Dynamics of pronghorn on the Pinon Canyon Maneuver Site, Colorado, Quarterly Report* (Gerlach and Vaughan 1988); *Evaluation of the Short-term Effects of Jet Aircraft on Mountain Plovers Nesting Adjacent to the Airburst Range, Fort Carson, Colorado during the 1996 Breeding Season* (Bunn et. al. 1996).

In addition, several distribution studies have been conducted for birds, small mammals, and the mountain plover, burrowing owl, and the black-tailed prairie dog. These studies provide a core of information about distribution and habitat use for species of management concern on Fort Carson, and provide a basis for developing best management practices (BMP) for these species on Fort Carson. Species or species groups of current management concern are identified below along with suggested appropriate management/mitigation practices for ensuring their persistence on Fort Carson. Not included here are federally-listed species, which require consultation and agreement with the USFWS.

Mule Deer: Fort Carson is in the third year of conducting aerial surveys for deer on Fort Carson in partnership with the CDOW. The counts suggest the population is relatively stable, constituting

approximately 1000 deer, but trends cannot be established with the data available. These surveys have revealed that the areas of greatest deer density are in the northern regions of Fort Carson. Differences in density between the north and south regions of the installation could be the result of relatively low off-road vehicular use in the north compared to southern areas, but the difference is more likely the product of different habitats found in the two regions. Deciduous shrub and riparian plant communities are much more abundant in northern Fort Carson. These habitats support dense vegetation and have significant grass, shrub, and tree cover important for hiding and thermal cover, and have permanent water. Most of the wooded areas in the southern half of Fort Carson support open stands of pinyon-juniper having less grass and shrub cover. BMP for Fort Carson include retaining juniper and pinyon-juniper forested patches (2-5 acres in size) with greater than 60% crown cover for thermal cover; using prescribed burns to rejuvenate foraging areas; reducing recreational use of northern riparian and shrubby areas during the critical fawning season June-August, limiting resource management activities, e.g. burning and forest thinning during the fawning period; judicious use of prescribed fire in fawning areas i.e. rotate fires through multiple sites with long burning interval between fires on each site; and use prescribed burns in late winter to protect adjacent fawning areas from wildfire during the fawning season. Develop habitat improvement areas on the margins of areas supporting frequent vehicular training. Develop water resources in drier regions of Fort Carson adequate for supporting deer forced to move in response to training maneuvers.

Elk: A declining harvest rate and fewer elk observed on surveys suggest that the number of elk present on Fort Carson is much lower today than it was 6 or 7 years ago; much of this decline is believed to be associated with the drought that significantly reduced the number of permanent water sites on the installation and available forage. A telemetry study conducted on Fort Carson in the mid 1990's indicated that many of the elk found on the installation at that time were part of a resident population and spent all or most of the year on Fort Carson. Fort Carson is currently working with the CDOW to develop statistically valid elk survey methodology for Fort Carson and development of habitat improvement projects to increase and retain the elk population of Fort Carson. Specifically, we are developing water resources and recovering/reseeding grasslands adjacent to known elk wintering areas.

Sensitive Grassland Birds: Grasshopper Sparrow, Cassin's Sparrow, Lark Bunting: Managing for the persistence of breeding avifauna communities supporting these three sensitive species on Fort Carson directly conflicts with military training that tends to create large areas of bare soil and reduced grass and shrub cover. Surveys conducted on Fort Carson show that these species are fairly widespread. These birds nest in grassland sites, a habitat that also supports most of the maneuver off-road training on the installation. BMP include the use of prescribed fire to maintain open grasslands with scattered shrubs (8-10 year rotation); reseed recovery/rest areas with a mix of short, mid, and tall grass species with shrubs such as cholla or saltbush; prevent breeding season fires from encroaching on breeding habitats by burning adjacent areas in late winter or early spring.

Black-tailed Prairie Dog: The numbers of this species have steadily increased in recent years on Fort Carson. However, due to plague, the number of colonies and total occupied acreage can vary significantly between years. The results of Fort Carson surveys suggests that plague exerts greater control over prairie dog populations than mechanized and off-road vehicular training. BMP include exercising control only in areas to protect health and property; using pesticides in select northern colonies to encourage/retain use by the burrowing owl and to support wintering eagles and ferruginous hawk; using pesticides to control plague fleas in the TA 54 colony to ensure prairie dogs are present to maintain mountain plover habitat.

Burrowing Owl: This species has never been common on Fort Carson and the number of prairie dog colonies annually occupied by this species is low. Much more habitat exists annually than that used by this species. Although the plague does not directly impact nesting burrowing owls, owls generally do not nest in colonies where all the prairie dogs are killed by plague, but large colonies partially killed by plague are frequently for nesting by burrowing owls on Fort Carson. Because colony occupation by owls is so low (generally fewer than 10% of the Fort Carson colonies are used by nesting owls), the most effective BMP would include controlling fleas with pesticides in colonies supporting owls to prevent extirpation of the prairie dogs, especially those not generally subjected to off-road and mechanized military training. Maintaining plague-free colonies in areas support less off-road training traffic is probably essential for maintaining this species at current levels on Fort Carson in the future under heaver training loads.

Mountain Plover: This species is rare on Fort Carson and only a small percentage of available habitat is

occupied; it is known to only occupy black-tailed prairie dogs on Fort Carson during the breeding season. In 2006 plovers were located in areas previously not occupied during the breeding season. This small range expansion is most likely attributable to intense ground-disturbing training at the site during the previous year, vegetation killed by the drought creating more patches of bare soil, and an increase in the size of the prairie dog colony in the newly occupied plover area. It is not likely this species will persist in the newly occupied site because it is more of a mid-grass prairie reduced to a very early seral stage, e.g. bare ground, that is not likely to be maintained, particularly if it is reseeded with native species. Field observations on Fort Carson suggest pedestrian traffic during the egg stage and off-road traffic constitute the greatest threats to nesting plovers. The 4-8 plover nests generally known annually on Fort Carson can be protected by creating no drive zones April-June in the primary breeding area of training area 54. The no-drive zone could be a colony-wide restriction or a 100 m diameter circular exclusion zone centered on each nest. The prairie dog colony in training area 54 is extensive and is generally partially killed by plague annually. Conservation of the plover can be enhanced by controlling plague in fleas in training area 54 to ensure the persistence of prairie dogs to maintain plover habitat. Maintain native rangeland by controlling non-native plants. If reseeding required in TA 54, seed only with shortgrass species such as blue grama or buffalo grass.

Golden Eagle: Eyrie occupation surveys are conducted for the purpose identifying areas used by nesting golden eagles that should be closed during the nesting season. Currently 10 extant and historical eyries are known to exist on Fort Carson, representing perhaps 3 or 4 territories. Generally 1 or 2 territories are occupied annually. BMP include temporarily closing training areas supporting an active eyrie to all non-training activities and advising military trainers of the presence of the active eyrie in efforts to reduce pedestrian and bivouacking activities in the vicinity of the nest; no prairie dog eradication except to protect health and property; using flea pesticides to prevent the spread of plague and loss of prairie dogs in select colonies.

Buteos: Surveys and anecdotal data collected on Fort Carson identify large mature deciduous trees in riparian or small isolated stands, cliffs, and the pinyon-juniper/grassland ecotone as the most important large birds of prey nesting habitats. The most frequently used trees are plains cottonwood and Siberian elm. BMP include developing a plan to ensure that replacement trees will be available as currently used trees die; close access to nests at sites vulnerable to disturbance as warranted; and provide education to Soldiers.

This additional information regarding ongoing studies and wildlife monitoring has been included in Section 3.7.2.1 of the FEIS, as requested by EPA.

Response to FA7-15

Section 2.2.4.5 has been expanded to include the requested information. The addition of this information does not alter the findings of the FEIS.

Response to FA7-16

It was determined that hot spot modeling was not needed at the post security gates by the following reasoning. The Colorado Department of Transportation's Air Quality Analysis and Documentation Procedures (CDOT AQ Procedures) summarizes that LOS analysis serves as a screening method to determine if a carbon monoxide hot spot analysis is needed. Specifically “For individual projects, if the LOS for the build, or preferred alternative is C or better for all signalized [emphasis added] intersections affected by the project for all years and peak hours analyzed, then hot spot modeling is not required.” The EPA hot spot modeling guidance states that this is because intersections that operate at LOS C or better are not likely to cause a violation of carbon monoxide standards and therefore do not need to be modeled. Coordination with PPACG and EPA during preparation of the conformity determination confirmed hot spot modeling was not required for LOS C or better.

A LOS analysis was completed as part of the *Fort Carson Comprehensive Transportation Study* (DPW, 2005) within the post boundary for the current average daily traffic (ADT) and the future ADT under the Proposed Action. Under the Proposed Action (including roadway improvements implemented as part of the mitigation for the Proposed Action) will result in intersections on Fort Carson operating at LOS C or higher. Additionally, according to the traffic analysis, located in Section 3.10, it is anticipated that the intersection with the greatest LOS change would occur at Barkeley Avenue and Prussman Boulevard. There, under the Proposed Action, the existing LOS of A would go to a future LOS of C for both the AM and PM peak hours. Barkeley Avenue, an arterial highway, is expected to undergo a 121 percent

increase in ADT to 6,545 under the Proposed Action. Under the Proposed Action, Prussman Boulevard, a collector roadway, is expected to undergo a 129 percent increase in ADT to 12,832. At the entrance gates under the Proposed Action the largest percent volume increase in vehicles would be at entrance Gate 5, were the projected growth is 66 percent. However, the largest volume of vehicles would be entrance Gate 20, where the projected peak volume is 1,570 vehicles. Under the Proposed Action neither Gate 5 nor Gate 20 would see an increase in vehicle volume close to the increase in peak traffic observed at the on-base intersection with the greatest change in LOS. Since all the on-base intersections would be expected to have a LOS of C or higher (and therefore no hot spot analysis was necessary) it is reasonable to conclude that a hot spot analysis is not necessary at the post security gates.

Response to FA7-17

Fort Carson will continue to meet applicable federal, state, and local air quality requirements. In addition, Section 1.2.5 of the DEIS provides information about Fort Carson's commitment to installation sustainability. Section 1.2.5 of the FEIS has been modified to provide additional information about Fort Carson's various voluntary programs, which are subject to funding limitations, to reduce emissions. The addition of this information does not alter the findings of the DEIS.

Response to FA7-18

Additional information, as requested by EPA, has been added to the FEIS to define in greater detail the existing traffic conditions and the regional impacts on traffic that would occur from implementing the Proposed Action. Table 3-20 of the FEIS has been modified to include the existing LOS for each highway segment referenced. The LOS under the No Action and Proposed Action alternatives have been added to Table 3-22 of the FEIS. As shown in Table 3-22, the LOS would decrease on three of the 26 roadway segments in the traffic area of influence. None of these decreases would result in a LOS lower than C. Therefore, the increase in traffic as a result of the Proposed Action would be less than significant.

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Denver Federal Center, Building 56, Room 1003
Post Office Box 25007 (D-108)
Denver, Colorado 80225-0007

TAKE PRIDE IN AMERICA

November 22, 2006

9043.1
ER 06/1009

[redacted]
1638 Elwell Street, Building 6236
Fort Carson, Colorado 80913–4000

Dear [redacted]

The Department of the Interior (Department) has reviewed the Transformation Draft Environmental Impact Statement and Draft Clean Air Act General Conformity Determination and Evaluation of Continued Land Withdrawal Under Public Law 104-201 at Fort Carson, Colorado (DEIS), and offers the following comments.

SPECIFIC COMMENTS

Page 3-4, Chapter 3, Surrounding Offsite Land Use

FA3-1

There is no mention of the Beaver Creek Wilderness Study Area (Study Area) managed by the Bureau of Land Management (BLM). The Study Area consists of 27,020 acres whose eastern boundary lies approximately 3-4 miles from the western boundary of Fort Carson. The potential impacts to air quality in the Study Area should be analyzed as well the potential effects of noise.

Pages 3-56 and 3-57, Chapter 3, Affected Environment and Consequences, Pronghorn and Mule Deer

FA3-2

The DEIS recognizes that large mammals, such as pronghorn and mule deer, are sensitive to noise and that fawns are particularly vulnerable. Although the physiological effects of noise on wildlife are not thoroughly known, the U.S. Geological Survey (USGS) suggests for consideration a recent citation discussing effects of noise on wildlife endocrine disruption, affecting stress response. The research (Creel et al., 2002) addresses potential stress caused by snowmobile noise by monitoring fecal glucocorticoid (GC) levels in both elk and wolves. This data found rises in GC concentrations correlated with snowmobile usage. The potential significance of this finding is that elevated GC levels are associated with physiologic

[redacted]

FA3-2

suppression of mammalian immune systems and reproductive hormones. This result may provide insight into the potential welfare of mammals, for example, pronghorn and mule deer, at the project site.

Thank you for the opportunity to review and comment on this DEIS. The Department has a continuing interest in working with the staff at Fort Carson to ensure that impacts to resources of concern to the Department are adequately addressed. For questions related to these comments, [redacted]

Sincerely,

[redacted]

Regional Environmental Officer

REFERENCE

Creel, Scott, Jennifer E. Fox, Amanda Hardy, Jennifer Sands, Bob Garrott, and Rolf O. Peterson. 2002. Snowmobile Activity and Glucocorticoid Stress Responses in Wolves and Elk, Conservation Biology 16(3):809-814.

Comment Responses for Letter FA3, U.S. Department of the Interior

Response to FA3-1

The Beaver Creek Wilderness Study Area has been included in the discussion of surrounding offsite land use (Section 3.2.1.3). Refer to Sections 3.3.2 and 3.4.2 of the DEIS for the analysis of air and noise impacts, respectively. As discussed in these sections, impacts would be localized primarily to the boundaries of Fort Carson. Emissions would not affect the Beaver Creek Wilderness Area. The addition of the Beaver Creek Wilderness Study Area to the EIS does not change the findings of the EIS.

Response to FA3-2

As noted by the commenter, the DEIS does acknowledge the sensitivity of some species to noise. Section 3.7 of the DEIS summarizes various studies that have been conducted correlating effects of military training, particularly maneuver training, on mammals, including pronghorn, mule deer, and coyotes. Noise from live-fire activities at Fort Carson has a minimal effect on wildlife because there is no wildlife habitat in or around the impact areas, and mammals generally avoid these areas of frequent high noise. Maneuver training at Fort Carson is also limited, as explained in Section 2.2.4.2, because: "Areas appropriate for maneuver are present throughout Fort Carson; however, many areas are disconnected and, therefore, cannot support movement of many troops or vehicles." The Army reviewed the Creel et al. (2002) study and noted that although the study recorded stress responses in wolves and elk to vehicular traffic, there was no evidence that under the prevailing conditions of the study, the stress contributed to the population dynamics of either species, indicating the population compensated for the related physiological effects. It is unknown whether the conditions and results of the study could be applied to conditions at Fort Carson. Army biologists, however, are evaluating the methodologies used in this study for potential application at Fort Carson.

van den Akker, Ty

From: [redacted]
Sent:
To: [redacted]
Subject: FW: Question - Fort Carson Transformation DEIS (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

-----Original Message-----
From: [redacted]
Sent:
To:
Cc:
Subject: Question - Fort Carson Transformation DEIS

FA1-1 I'm interested in finding/viewing a map that displays the publicly owned land withdrawn by Public Law 104-201. I do have a CD of the recently released FC Transformation DEIS, but could not locate a map that displays the 11,415.16 acres of public land currently withdrawn and proposed for continued withdrawal. If a withdrawal map is contained in the DEIS, please let me know where it's at.

FA1-2 Also, could you please update me on the NEPA status for the "potential land acquisition for the PCMS" noted in bold in your October 18th Notice of Availability letter.

Appreciate the assistance.

[redacted]

Pike & San Isabel NF
Cimarron & Comanche NG
2840 Kachina Dr.
Pueblo. Co 81008

[redacted]

Classification: UNCLASSIFIED
Caveats: NONE

Comment Responses for Letter FA1, U.S. Forest Service

Response to FA1-1

The text in Section 1.2.6 of the DEIS states, “Public Law 104-201, the National Defense Authorization Act for Fiscal Year 1997, extended the withdrawal from all forms of appropriation under the public land laws 3,133.02 acres of public land and 11,415.16 acres of federally owned minerals.” The DEIS also states in Section 1.2.6, “The lands consist of discontiguous parcels located primarily in the southern one third of the installation.” The 3,133.02 acres of land and 11,415.16 acres of mineral rights are located entirely within the existing boundaries of Fort Carson. The environmental effects of continued land and mineral withdrawals are evaluated in this EIS. Maps available from the BLM are dated and displayed on a small scale, and therefore do not accurately display the withdrawal. For these reasons, the Army has decided to not include the map in the EIS.

Response to FA1-2

Issues related to the potential expansion of the PCMS, including an update on the NEPA process for that action, are addressed in the *PCMS Transformation FEIS*.

FORT CARSON INDIVIDUAL

[redacted]

From: [redacted]
Sent:
To:
Subject:

I269-1 I highly disagree with the expansion of Ft Carson in Colorado. Doesn't the military already have enough land in the country? The U.S. Military-Industrial Complex has grown completely out of control. This is an unnessessay overreaching expression of Donald Rumsfled's Transformation Doctrine which has failed in Iraq. The Military doesn't need to turn Southeastern Colorado into a huge militarized zone, it already has 25 million acres of maneuver lands that could be used.

In sincere hope that you will reconsider,

[redacted]

Need a quick answer? Get one in minutes from people who know. Ask your question on Yahoo! Answers <http://answers.yahoo.com/;
_ylc=X3oDMTFvbGNhMGE3BF9TAzM5NjU0NTEwOARfcwMzOTY1NDUxMDMEc2VjA21haWxfdGFnbGluZQRzbGsDbWFpb
F90YWcx> .

1

Comment Responses for Letter I269, [redacted]

Response to I269-1

As stated in Section 2.4.2 of the DEIS, expansion of lands surrounding Fort Carson was an alternative considered for analysis, but dismissed due to incompatible surrounding land use.

Issues related to the transformation action at the PCMS are addressed in the *PCMS Transformation FEIS*.

US Army

Transformation Environmental Impact Statement

Pinon Canyon Maneuver Site, Colorado

Public Comment Sheet

Please Print Clearly

Name: [redacted] 11/1/06

Affiliation (o[redacted]

Mailing Address: [redacted]

Email Address: [redacted]

Comments: I see little option for the Army but to expand its use as planned. While this DEIS specifically excludes added land, that obviously is the major concern of the bulk of rights attendees. America is full of BANANA and NIMBY attitudes, and I don't share them. The Army does, however, need to address specific concerns of those reasonably commenting on biological and archeological impacts. I see detailed surveys of resources followed by mapping and physical exclusion of training activities from appropriate amounts of land. This means well marked, fenced exclusion zones for wildlife and archeological protection. EOT

I7-1

I7-2

Please Note:

The Public Comment Period Ends November 27, 2006

Submit Your Comment Sheet at this Meeting by Placing it in One of the Comment Boxes

or

Fold/Staple/Stamp and Return by Mail, or Fax to (719) 526-1705

Comment Responses for Letter I7[redacted]

This comment letter was submitted for the *PCMS Transformation DEIS*, however, one comment, I7-2, pertains to the *Fort Carson Transformation DEIS*, which is addressed here. Issues related to the transformation action at the PCMS are addressed in the *PCMS Transformation FEIS*.

Response to I7-2

The DEIS outlines impacts that could occur as a result of implementing the Proposed Action, including those for biological resources and cultural resources. Further, the DEIS describes ongoing Army policies and programs, as well as future measures that will be implemented to avoid, minimize, or mitigate impacts.

As described in Section 3.8.2 of the DEIS, any undertaking associated with either the No Action or the Proposed Action at Fort Carson that could result in impacts to cultural resources would be evaluated by the Fort Carson cultural resources program prior to initiation of the undertaking. If potential impacts to cultural resources were identified, mitigation measures would be proposed for the protection of those resources in accordance with the NHPA, Section 106 consultation process, working in conjunction with the Colorado SHPO, and Native American tribal representatives if applicable, resulting in a plan for the protection or mitigation of the resource.

As described in Section 3.7.2 of the DEIS, the Army maintains a list of plant and wildlife species found at Fort Carson. Buffers and BMPs, as described in the DEIS, will be used to the extent practicable to avoid and minimize impacts to biological resources. Also see Sections 2.3.4.3 and 2.3.4.4 of the DEIS for a description of the coordination process.

Attention: Fort Carson NEPA Coordi [redacted]

US Army Transformation Environmental Impact Statement
Fort Carson, Colorado
Public Comment

Name: [redacted]
Affiliat
Mailin

Comments:

I3-1 The environmental impact statement provided for public comment is a rather poorly written document which suggests that the impact studies done were not complete, not thorough, and not performed in a manner consistent with standard procedures for scientific evaluations.

I3-2 While the researchers may have been very competent and professional in their work, this is not reflected in the report as written. In general, the report gives no alternatives for the expansion. The military policies currently in force might accept this as standard practice, but the public at large expects actual viable alternatives to be presented.

Next, the statement is sadly lacking in its assessment of the social, environmental, and economic impacts it is supposed to be addressing, and for the few issues cursorily addressed, the supposed mitigation measures are laughable at worst, and are inadequate at best.

I3-3 Most of the mitigation measures mentioned consist of "continuing to implement" such policies as are already in place per military and government regulations. There is nothing in the statement which addresses the very real possibility that these policies are already inadequate; let alone the fact that the expansion will cause poor measures to fail more rapidly.

I3-4 Specifically, there is a failure to look adequately at noise and emissions. These is little attention to permanent damage to land and vegetation, and to irreplaceable loss of cultural resources which continue to take place, and this report completely ignores the potentially negative impacts that the addition of several thousand soldiers and their dependents will have on the job market, rental market, schools, and infrastructure of the Colorado Springs area.

I3-5 Finally, in addition to the omissions and failures of the report itself, the fact that this is a large document addressing a complex issue, it seems requisite that there be a longer period for evaluation and comment that 30 days, and when a new, and hopefully better studied and amended report is given, there should be a second similar period for public reevaluation.

-end-

Comment Responses for Letter I3, Peggy Colgate

Response to I3-1

The DEIS and the FEIS have been prepared in accordance with the CEQ's regulations and guidance for preparing environmental documents under NEPA. The comment that the EIS is "poorly written" is not substantiated. Potential environmental impacts were evaluated using various methodologies, depending on the resource area evaluated. The EIS discloses these methodologies, all of which are standard methodologies conducted in accordance with established and accepted regulatory and scientific procedures.

Response to I3-2

It is unclear from the comment whether the commenter is referring to the increased training at Fort Carson that would occur as part of the Proposed Action or whether it is referring to the expansion (e.g., land acquisition) of Fort Carson or the PCMS. If the comment refers to the increased training at Fort Carson that would occur as part of the Proposed Action, Section 1.0 of the DEIS provides the purpose and need for the Proposed Action, and Section 2.0 provides alternatives analyzed that meet the purpose and need. As described in Section 2.4 of the DEIS, other alternatives were considered, but were dismissed from further analysis because they did not meet the purpose and need. If the comment refers to the expansion (e.g. land acquisition) of either Fort Carson or the PCMS, these were alternatives considered but dismissed from further analysis, as described in Section 2.4 of the *Fort Carson Transformation DEIS* and Section 2.4 of the *PCMS Transformation DEIS)* for the reasons provided in those sections. Please also refer to Master Response regarding the "Number of Alternatives Considered."

Response to I3-3

The DEIS follows CEQ and Army regulations and guidance for preparing environmental documents under NEPA. The commenter makes a general statement of the adequacy of the DEIS and mitigation measures but offers no specific examples to support that opinion. Fort Carson operates in compliance with all applicable federal and state environmental regulations, and will continue to do so under the Proposed Action. The Army also implements many programs to improve sustainability of Fort Carson. The Army's commitment to sustainability at Fort Carson has been recognized and honored by many external organizations.

Response to I3-4

Potential air and noise emissions, cultural resources, and land use and vegetation were evaluated using standard methodologies in accordance with established regulatory and scientific procedures, as described in Sections 3.2, 3.3, 3.4, 3.7, 3.8, and Appendix C of the DEIS.

The EIS discloses that military training can result in damage to land and vegetation, and commits to implementing feasible BMPs, such as buffer areas, reseeding, annual monitoring, land repair under the ITAM program, and others to avoid irreversible impacts. Unavoidable impacts to vegetation, wildlife, and soils is acknowledged in Section 3.16 of the DEIS.

Known cultural resources are protected, and training that could damage those resources is restricted. Inadvertent damage to cultural resources is acknowledged in Section 3.16 of the DEIS.

In Sections 3.9, 3.10, and 3.11 of the DEIS, the effects of the 8,500 new Soldiers and their dependents on the work force (Economic Development), rental market (Housing), schools (Schools), and infrastructure (Traffic and Utilities) are included.

Response to I3-5

The Army extended the original 45-day comment period required under NEPA to a 90-day comment period. See also the Master Response regarding "Requests to Extend the Fort Carson Transformation DEIS Public Comment Period" in this FEIS.

February 2, 2007

[redacted]

PCMS NEPA Coordinator

[redacted]

Fort Carson, Colorado 80913

Dear Sirs:

I want to thank you for extending the public comment period concerning the Pinon Canyon Maneuver Site. It is appreciated as the weather at this time has been quite drastic on everyone in the area concerned and their time and effort has been directed to saving their livestock and also efforts to get back into a normal operating situation. I351-1

As I understand it, the Army wants more land area to train soldiers in mechanized warfare with the I351-2

use of tanks and other mechanized vehicles. For some unknown reason, the areas that would be more suited for this type of action are not included in the request. I am speaking of the millions of acres in Utah and Nevada that are not usable for much else. This brings me to a question that I have been asking myself, over and over again. Has not the powers that be, in Washington and the Pentagon looked at the lessons learned with the initial war in Iraq? From all of the information, pictures and other material, that I have seen, rockets destroyed the majority of the Iraq's mechanized units, including their tanks. Yes, rockets from planes and helicopters rather

I351-2

than from any other source. It would seem that the importance of tanks in modern warfare are about to take a back seat.

In addition to the action that took place during the above stated war with planes and helicopters, it has come to my attention that other types of unmanned units are being tested to do exactly the same thing of destroying tanks by rocket fire, then returning to base for additional flights. They are helicopters and small planes operated by remote control and with the use of computers.

Consequently, I am asking why the Army wants thousands and thousands of additional acreage

I351-2

for the training of Tank Battalions? I am sure that if the taxpayers of this country knew all of the facts, they would ask the same question. In addition, if the Army is planning on stationing an additional 3000 soldiers, plus families, in the Colorado Springs area, they had better look at the water and sanitation situation in that city. They are in a situation where water is a problem and the sewer system cannot handle the volume that is there now. That is why there are continual spills

I351-2
I351-3

of sewage into the Fountain River and I cannot understand why the proper agencies have not put a stop to it.

I351-3

Thank you and Most sincerely,

[redacted]

Comment Responses for Letter I351, James Fox

This comment letter was submitted for the *PCMS Transformation DEIS*, however, one comment, I351-3, pertains to the *Fort Carson Transformation DEIS*, which is addressed here. Issues related to the transformation action at the PCMS are addressed in the *PCMS Transformation FEIS*.

Response to I351-3

The impacts to utilities, specifically the potable water supply and wastewater systems at Fort Carson, were detailed in Sections 3.11.2.1 and 3.11.2.2 of the DEIS, which was released for public review concurrently with the *PCMS Transformation DEIS*.

It is very unjust for the US Army to come in and forcefully take our land, homes and destroy our communities. The US government already owns thousands of acres in Arizona, California, Utah and Nevada. No families would be affected by building a training site in those states.

I353-1 Our land is our life, and our livelihood. It will be devastating to loose it. Farm and Ranch life is a way of life that few people understand. The government could not pay us enough to replace our heritage, our culture or memories that we have made on our land.

Money generated from the sale of cattle and crops in Southeastern Colorado runs into the millions of dollars. Our land tax dollars help fund our schools. Without that money our schools would have to close.

I353-2 My grandfather, George R. Mayo, and his wife, Hattie Almeda Graham Mayo, came to Southeastern Colorado in May of 1920. They bought 320 acres of land 20 miles Northeast of Kim. My Dad, Buddy L. Mayo, was 3 months old and rode on a pillow in the bed of their wagon. They built a house, drilled a well, raised cattle and farmed. They survived the 1930 drought and dust storms. My grandfather died in 1938, but the family continued to live on the place. My father and mother, Anna Eileen Mayfield, lived on the place when my sister, Carolyn Mayo Doherty, and I, Joanne L. Mayo Goodrich, were born. Daddy's brother, Earl E. Mayo , and family lived on the place for a while. Earl sold it to a sister, Nellie J. Mayo Slavens. My husband, L. Leland Goodrich, and I bought it from Nellie in 1958. We moved here in Dec. of 1960. We built a house and raised our four daughters, Dianne Clark, Denise Morlan, Lea Goodrich, and Lynda Day. We lost a son, Mark, in 1967. We have worked hard and added more land as we could afford it. We have a nice place that we planned to pass on to our kids and grandkids. We have no plans for retirement. We plan to live on our place until we die. Then we plan to be buried in the Kim Cemetery next to our son,.

I353-3 If the Army takes our land, we would only have a short time to reinvest or the IRS would take a big part of our money. Where would we go to find land as good as we have for the price the Army will give us? There is no place.

I353-4 If 8500 troops and their families are brought into Colorado Springs, what are they going to do for schools and health care? Colorado Springs is overloaded now without bringing in more people. There would also be more people from southern Colorado going to the city to find jobs.

Our troops are in Iraq fighting so their people can be free. Who is going to fight for us so we can be free????

Submitted by [redacted]

Comment Responses for Letter I353, [redacted]

This comment letter was submitted for the *PCMS Transformation DEIS*, however, one comment, I353-4, pertains to the *Fort Carson Transformation DEIS*, which is addressed here. Issues related to the transformation action at the PCMS are addressed in the *PCMS Transformation FEIS*.

Response to I353-4

The impacts resulting from the additional stationing of troops and dependents at Fort Carson under the Proposed Action alternative were detailed in the EIS, released for public review concurrently with the *PCMS Transformation EIS*. Socioeconomic impacts were addressed in Section 3.9 of the DEIS.

Fort Carson Comments:
To Whom It May Concern:

I383-1

You people put on a cute dog and pony show in asking for public opinion and you go through all the motions acting like you are concerned about any thing we might have to say but when it comes right down to it, it's business as usual and you don't take anyone's opinions or ideas in to account at all, just your own selfish, self-serving, destroy American and all she stands for, self indulging ideas.
If this were not true explain to me why our country is run by drug pushing doctors, and pharmaceuticals, insurance companies, and big oil industries all representing supposedly in OUR best interest. We even ship billions of dollars over seas to rebuild Iraq after we liberated them only to find out, know one even knows where the money went, just like so much of what our government does. No one seems to be accountable for anything in Washington, it's always the other party's fault, and the only thing most politicians are really interested in is their retirement fund and their little moment of fame on their way to fortune. Why can't all politicians retire on social security just like everyone else, what makes them so special as to be awarded their own retirement funds which seem to be bottomless and never get robbed quite like the people's fund does? If we don't have self-serving politicians then why did we sell our National Parks to foreign countries, and why do we have foreign owned "toll roads", and why are more farm subsidies paid out to more foreign owners than to Americans, why do foreign countries own our shipping ports? So you think we as land owners, want to give up our lives and lively hoods for more government debacle to ruin more of America in the name of "whats good for the security of the people", doesn't sound like you've had much American "Best Interest" in mind so far does it? If government really cared about securing American Interests why do we imprison our border patrol agents for doing their jobs? If stealing more land in Southeast Colorado is really in the best interest of all Americans then I think you had better come up with some credible reasons why. If we weren't training so many foreign troops in bases now we would have enough room for the training of our troops without additional land needed. As I see it, you've done quite enough for "the betterment of America already. Colorado doesn't need any more of your greedy, selfish, self-serving remedies for governmental embarrassments. NO FORT CARSON EXPANSION NEEDED!!!!
If anyone really wants to make a difference in setting America back on coarse check out "THE NEW AMERICAN" magazine put out by the John Birch Society, they care about our Constitution and what it really stands for!!!!!



Comment Responses for Letter I383, Donna Sneller

Response to I383-1

Please refer to the Master Response regarding “Segmentation of the Fort Carson and PCMS Transformation Actions.”

As stated in Section 2.4.2 of the DEIS, expansion of lands surrounding Fort Carson was an alternative considered for analysis, but dismissed due to incompatible surrounding land use.

[redacted]

January 11, 2007

TRANSMITTED BY E-MAIL AND
U.S. MAIL (RETURN RECEIPT REQUESTED)

PCMS NEPA Coordinator
[redacted]

Fort Carson NEPA Coordinator
[redacted]

[redacted]

Dear Department of the Army:

On behalf of JE Canyon Ranch, LLC ("JE Canyon" or "the Ranch"), we respectfully submit these comments on the Pinon Canyon Maneuver Site Transformation Draft Environmental Impact Statement ("PCMS EIS") and the Fort Carson Transformation Draft Environmental Impact Statement ("Fort Carson EIS"). JE Canyon has expended substantial time and effort in preparing its comments, and we ask that you give careful consideration to them. Please add these comments, and the accompanying exhibits, to the administrative records for both environmental impact statements.

3200 WELLS FARGO CENTER | 1700 LINCOLN STREET | DENVER COLORADO 80203-4532
TELEPHONE 303-607-3500 | FACSIMILE 303-607-3600 | WWW.FAEGRE.COM

I. [redacted]

I299-1

The Ranch is one of the last, best places in the Rocky Mountain West. It is located in Las Animas County in southeastern Colorado, approximately 150 miles southeast of Fort Carson, Colorado. JE Canyon spans a dramatic and undeveloped landscape that includes approximately ten miles of the Purgatorie River Canyon, a scenic red rock canyon with perennial water sources, sandstone formations and miles of side canyons. Approximately five miles of the eastern boundary of the Ranch is comprised of the Chacuaco Canyon, a picturesque canyon with exceptional wildlife habitat, dinosaur tracks and bones, and Indian paintings, dwellings, and artifacts. This area is unlike anything on the eastern slope of the Rocky Mountains and the seventy square miles within the Ranch make up the heart of it. See Exhibit A, JE Canyon Maps.

The Ranch includes at least three ecological zones made up of riparian habitats along the Purgatorie River and other tributaries, intermediate elevation montane Ponderosa and Pinon pine habitats, and high grasslands with some Ponderosa and Pinon pine on the Canyon rim and bench lands. JE Canyon Ranch elevations range from 4600 feet on the floor of the Canyon to 5450 feet on the high bench lands. See Exhibit A, JE Canyon Maps. The Ranch and the area support a rich and diverse natural environment with large numbers of big and small game, non-game wildlife, forests, rangeland, and mineral resources. JE Canyon is also home to a number of listed and sensitive species, including bald eagles, mountain plover, long-billed curlew, and the kit fox, which is a subspecies of the larger swift fox.

Cultural and archaeological resources found on the Ranch and in the immediate area are of national and international importance. Archaeologists have stated that the number and richness of sites in the canyons are matched only by sites in the Four Corners region. The Ranch (and other locations in the area canyons) include hundreds of identified and unidentified archaeological sites, pictographs, petroglyphs, and other cultural resource sites.

Ranching has continued in this area for over 150 years. JE Canyon is a working cattle ranch today with approximately 535 head of cattle. Two full time employees, a foreman and a head cowboy, work and live on the ranch with their families. The Ranch also supports a manager, two repairmen, and an accountant located in Powell, Wyoming. These individuals rely on the Ranch for their employment and livelihood. Ranching operations on the Ranch preserve the natural environment, just as ranching has for over a century in the West.

Mr. Jerry A. Wenger, owner of the JE Canyon Ranch, and other Ranch employees, are good stewards of the natural environment and the cultural resources on the Ranch. On December 6, 2000, Mr. Wenger placed approximately 25,000 acres of the Ranch under a conservation easement with the Colorado Cattlemen's Agricultural Land Trust. The

easement preserves the unique natural resources, wildlife habitat, archaeological sites, cultural resources, and historic places within the Ranch. The State of Colorado has formally recognized the recreational and economic value of the Ranch. JE Canyon actively participates in the Colorado Division of Wildlife's ("CDOW") Ranching for Wildlife program. Under this program, JE Canyon and neighboring ranches have entered into a wildlife management partnership with the CDOW to provide public hunting access on the Ranch. Individuals who draw a license through the Division's public process are permitted to hunt on private lands within the Ranch. Wildlife species on the Ranch include elk, deer, pronghorn antelope, bear, turkey, and bighorn sheep. Historically, JE Canyon has 25-30 public and private hunters that take advantage of this recreational opportunity on the Ranch's land each year.

The Ranch is a direct neighbor to the Army's Pinon Canyon Maneuver Site ("PCMS"). The PCMS borders the Ranch along approximately ten miles of the Purgatorie River Canyon. See Exhibit A, JE Canyon Maps. As a neighbor, the Ranch is directly affected by present activities at the PCMS. The Army's flight corridor crosses directly over JE Canyon's lands. The Army regularly flies helicopters, transport planes, and fighter jets up and down the Purgatorie River Canyon as part of the Army's training exercises. In addition, the Ranch's location across the Canyon makes JE Canyon Ranch particularly susceptible to any noises associated with training maneuvers conducted in this region of the PCMS. See id. The Army's intent to train substantially more soldiers at PCMS, and to conduct maneuvers there during more of the year, will have impacts upon the Ranch. I299-1

I299-2

The Ranch has another concrete stake in the Army's plans at PCMS. The Army has identified the Ranch (and other private lands in the area) as targets for acquisition for a planned expansion of the PCMS. Army land use plans, maps, reports, proposals, and comments to the press all show that the Army has concluded that it wants to expand the PCMS to include the Ranch and other private lands in the area. See Exhibit B, Army's Land Use Requirements Study Pinon Canyon Maneuver Site Colorado ("Land Use Study") at 34; Exhibit C, U.S. Department of the Army Major Land Acquisition Proposal to Expand PCMS ("Major Land Acquisition Proposal") at 4; Exhibit D, National Defense Authorization Act Section 2827(a) Report on Pinon Canyon Maneuver Site ("PCMS Report") at 17; Exhibit E, Army's Expansion Maps ("Expansion Maps").

These Army documents show that the Army has tangible, actual plans to expand the PCMS. For example, the Army has stated that there is a "fleeting window of opportunity to acquire large tracts of training land [at the PCMS] at very competitive prices, [therefore] it becomes obvious that the Army must move quickly on this acquisition effort." Exhibit B, Land Use Study at 7. Army maps identify the Ranch as an acquisition target. See Exhibit E, Expansion Maps. The Ranch is referenced on that map as "Parcel 1B and 2A." Id. A version of the Army's map was enhanced and published in color in a local newspaper, La

Junta Tribune Democrat, which makes it easier to see the extent of the PCMS Expansion. Exhibit F, La Junta Map. Another Army document recognizes that JE Canyon and other owners of private lands are not stepping up to sell their properties to the Army. That document states that "it is highly unlikely that expansion of the PCMS to meet the training requirements outlined in [the PCMS Report] could be conducted solely through transactions with willing sellers." Exhibit D, PCMS Report at 23.

The Ranch is not for sale to the Army, or to anyone else. JE Canyon is concerned that the Army has made a significant policy decision behind closed doors to expand the PCMS without consulting the land owners whose property the Army covets, or elected officials who oversee military activities. I299-2

As a neighbor to the PCMS, and owner of the land that the Army plans to take, JE Canyon has a unique and concrete interest in the two environmental impact statements addressed in these comments. The Fort Carson EIS and the PCMS EIS address the transformation of Fort Carson and its consequent effect on the training grounds at the PCMS. The Army has arbitrarily, and illegally, segmented its review of the transformation of Fort Carson and PCMS into two separate documents, thereby understating environmental consequences of those connected actions. I299-3 The Army has also failed to fulfill its legal obligation to address the expansion of the PCMS. The National Environmental Policy Act ("NEPA") mandates that the Army disclose the reasonably foreseeable direct, indirect, and cumulative effects of transforming Fort Carson, and of transforming the PCMS. The Army's own documents show that the PCMS expansion is reasonably foreseeable. The expansion will produce significant adverse environmental, economic, and socioeconomic impacts on JE Canyon and southeastern Colorado. Yet neither the PCMS EIS nor the Fort Carson EIS address the expansion. The draft EISs are inadequate and violate NEPA.

II. Summary of Comments

The PCMS EIS is so inadequate that it precludes meaningful review. The EIS ignores the principal issue that JE Canyon and the public are concerned about – the planned expansion of the PCMS. The Army appears to be taking the position that because it has not made the final decision within the walls of the Pentagon to actually take the Ranch and other private lands and expand the PCMS, it does not have to disclose its plans or analyze them in the PCMS EIS. I299-4 The Army is wrong. Even though the Army has not formally "approved" the PCMS expansion, the Army is required to disclose and analyze the environmental impacts of any plans to expand. The PCMS EIS is completely silent as to the adverse environmental effects and significant impacts to JE Canyon that will occur if the Army expands PCMS.

I299-5

Whatever the Army's official position, the Army's own documents – including those attached to these comments – show that it has concrete plans to expand the PCMS. The Army's plans to expand will significantly affect the surrounding environment and they must be disclosed and analyzed in the EISs. NEPA requires that the Army analyze the significant cumulative effects of its proposed actions at Fort Carson and PCMS in conjunction with the Army's plans to expand.

I299-6

The Army's failure to disclose or analyze the environmental effects of expanding PCMS falls woefully short of the Army's obligations under NEPA. NEPA requires the Army to engage the public in an "early and open process" to thoroughly analyze the environmental and economic impact of transforming the PCMS and Fort Carson. 42 U.S.C. § 4321 et seq.; 40 C.F.R. § 1501.7. This includes the obligation to consider the impacts of any reasonably foreseeable actions, such as the future expansion of the PCMS. 42 U.S.C. § 4332(2)(E); 40 C.F.R. § 1502.14. The Army cannot downplay the significance of the transformation programs' impacts on the PCMS and Fort Carson by evaluating the two sites separately. To obtain a realistic picture of all of the forces acting on these sites, the Army must analyze the two connected actions together in the same EIS.

I299-7

The Army is also required to consider the cumulative impacts of *any* reasonably foreseeable action, regardless of whether it has been officially "approved." The cumulative impacts analysis must include *all* past, present, and reasonably foreseeable future actions that occur in the same area. 40 C.F.R. § 1508.7. However, the Army artificially limited its analysis to "similar" actions. The Army also failed to analyze the cumulative impacts of the PCMS and Fort Carson transformation together in the same EIS. The Army's abridged analysis of cumulative impacts violates NEPA.

I299-8

The Army has not fulfilled its obligation under the John Warner National Defense Authorization Act for Fiscal Year 2007 ("National Defense Act"), Pub. L. No. 109-364, 120 Stat. 2083. The National Defense Act requires the Secretary of the Army to disclose its plans concerning the PCMS and to submit a report to the congressional defense committees that analyzes the environmental impacts of any potential expansion of the PCMS. See Exhibit G, National Defense Act § 2827(a)(1). However, the Army has taken the position that because it has not been authorized to expand onto adjoining lands like JE Canyon Ranch, it does not have to disclose its plans. Exhibit D, PCMS Report at 21-23; see PCMS EIS at 2-26. That position is a charade, and makes a mockery of the direct Congressional mandate in the National Defense Act.

The Army has failed to disclose and analyze its own proposals for the PCMS and Fort Carson as required by federal law. The Army's analysis in the EISs is inadequate and it precludes meaningful review. The Army must prepare and re-circulate revised draft EISs for review and comment. 40 C.F.R. § 1502.9(a).

III. Comments

A. The Army Has Ignored the Public's Vital Role in the Scoping Process

The Army has utterly failed to engage in a meaningful "early and open" scoping process to identify the issues related to the proposed action. The Army violated NEPA when it publicly denied that it has any meaningful plans to expand, while simultaneously preparing documents arguing the need for, and planning, a significant expansion of the PCMS onto the Ranch and other private lands. See Exhibit B, Land Use Study; Exhibit C, Major Land Acquisition Proposal.

Federal law requires keeping the public informed during the NEPA process. The Council of Environmental Quality ("CEQ") regulations require the Army to engage in an "early and open process" to determine the scope of relevant issues and to identify the "significant issues related to a proposed action" before an EIS is prepared. 40 C.F.R. § 1501.7; see Exhibit D, PCMS Report at 6. This scoping process is designed to identify issues that "are likely to have an effect on the environment, or to be controversial. In most cases, local citizens and/or existing advisory groups should assist in identifying potentially controversial issues during the planning process." 32 C.F.R. § 651.14(a)(1). The Army must
I299-9 use the "scoping and public involvement processes to limit the analysis of issues to those which are of interest to the public and/or important to the decision-making at hand." 32 C.F.R. § 651.5(d)(4); 40 C.F.R. § 1500.5(d). Ultimately, the process is designed to give definition to the proposed action and range of alternatives and to identify the "significant issues related to the proposed action." 32 C.F.R. § 651.14(d); 40 C.F.R. § 1501.7.

"An EIS is intended to provide a full, open, and balanced discussion of significant environmental impacts that may result from a proposed action and alternatives, allowing public review and comment on the proposal and providing a basis for informed decision-making." 32 C.F.R. § 651.40(a). The goal of an EIS is to "provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." 32 C.F.R. § 651.47; 40 C.F.R. § 1502.2. When a court reviews the adequacy of an EIS it analyzes whether the "form, content and preparation foster both informed decision-making and informed public participation." Colo. Envtl. Coalition v. Dombeck, 185 F.3d 1162, 1172 (10th Cir. 1999).

I299-10 The Army has fallen short of the public participation requirements set forth in the CEQ regulations, the Army's regulations, and applicable case law. It has prevented the public from identifying significant issues related to the future expansion of the PCMS. Neither the notice of intent to prepare the PCMS EIS, nor the notice of availability of the

draft PCMS EIS, mention the planned expansion. See 70 Fed. Reg. 70,793 (2005) (Notice of Intent); 71 Fed. Reg. 60,482 (2006) (Notice of Availability). By remaining silent, the Army has effectively stripped the public of its opportunity to comment.

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The scope of the environmental analysis in the PCMS EIS is limited to the "new construction and training activities that are associated with supporting realigned and relocated troops" at the PCMS. PCMS EIS at 1-8. The PCMS EIS simply states that "this EIS may be used as a basis on which to tier subsequent environmental documentation for currently *unforeseen future actions* proposed in the mission, Cantonment, training areas, or environmental management programs." Id. The proposed action, as written in the PCMS EIS, does not acknowledge the potential expansion of the PCMS. The PCMS EIS acknowledges the expansion, but states that it is not a reasonable alternative because it is not yet approved. See id. at 2-26.

I299-11

The Army is ignoring the principal issue of public concern, and even taking the position that it is not foreseeable. Far from being "unforeseen," the future expansion of the PCMS is "reasonably foreseeable" which is the touchstone of the Army's obligation to consider the effects of the expansion. See 40 C.F.R. §§ 1508.7, 1508.8. NEPA requires the Army to include the possibility of future expansion in its scoping notice and its analysis in the PCMS EIS so that it can engage in a meaningful review with the public of how the expansion relates to the proposed transformation of the PCMS. The Army acknowledged that it has not engaged in an "early and open process" with the public regarding PCMS expansion in its Major Land Acquisition Proposal:

I299-12

- "Some local resistance has developed in communities around PCMS due to the perceived threat that this acquisition poses to the ranching economy and because Ft Carson is restricted by [Office of Secretary of Defense ("OSD")] policy from engaging in a full dialogue with the public until OSD approves the acquisition." Exhibit C, Major Land Acquisition Proposal at 6.

I299-13

The Army cannot violate federal law. Public participation is an integral component of this NEPA review process given the highly controversial nature of the future expansion of the PCMS. To date, the Army has tried to have it both ways. It is internally planning to expand onto the Ranch and other private lands, see Exhibits B, C, D, E, and F, yet publicly the Army has not disclosed its plans to expand the PCMS, nor has it analyzed the adverse environmental effects of any expansion. It has taken the position that because it has not actually authorized the expansion, it does not have to reveal the expansion plan. The Army must disclose this information to facilitate a full, open and balanced discussion with the public so that the Army is equipped to make an informed decision as required by NEPA. The Army should reinitiate the scoping process on the PCMS EIS and Fort Carson EIS after it discloses its plans to expand PCMS. The Army must re-circulate a draft PCMS EIS and

I299-13 Fort Carson EIS so that the public has an opportunity to review and comment. 40 C.F.R. § 1502.9(a).

B. The EISs are Inadequate Because Fort Carson and PCMS Are Connected Actions that Must be Analyzed Together in the Same EIS

I299-14 Fort Carson and the PCMS are inextricably linked. Soldiers at Fort Carson train at the PCMS. To effectively analyze the significance of environmental impacts of the Army's transformation programs, the Army must combine its environmental analysis of Fort Carson and the PCMS into one EIS.

The scope of an individual EIS depends on its relationship to other environmental impact statements. 40 C.F.R. § 1508.25. To determine the appropriate scope of an EIS an agency is required to analyze three types of actions: (1) connected actions; (2) cumulative actions; and (3) similar actions. 32 C.F.R. § 651.51; 40 C.F.R. § 1508.25(a).

First, actions that are "connected" must be analyzed together in the same EIS. 40 C.F.R. §§ 1508.25(a)(1); 1502.4(a); Earth Island Inst. v. U.S. Forest Service, 351 F.3d 1291, 1305 (9th Cir. 2003); Churchill County v. Norton, 276 F.3d 1060, 1076 (9th Cir. 2001). The purpose of the connected action rule is to prevent agencies from segmenting a single action into individual components, thereby understating the overall environmental impacts. Wetlands Action Network v. U.S. Army Corps of Eng'rs, 222 F.3d 1105, 1108 (9th Cir. 2000). "An area-wide or overview EIS may be particularly useful when similar actions, viewed with other reasonably foreseeable or proposed agency actions, share common timing or geography." Forty Most Asked Questions Concerning CEQ's NEPA Regulations, Question 24b, 46 Fed. Reg. 18,033 (Mar. 23, 1981).

Actions are connected if they: "(i) Automatically trigger other actions which may require environmental impact statements; (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously; (iii) Are interdependent parts of a larger action and depend on the larger action for their justification." 40 C.F.R. § 1508.25(a)(1); Thomas v. Petterson, 753 F.2d 754, 758 (9th Cir. 1985) (agencies are required to "consider several related actions in a single EIS when, if considered together, they will have a collectively significant impact.").

The Army acknowledges that PCMS and Fort Carson are "connected" entities:

- "*PCMS is an extension of Fort Carson and does not operate independently*. An expanded PCMS would likely continue in the same relationship. Therefore, closing Fort Carson would likely terminate the viability of PCMS." Exhibit C, Major Land Acquisition Proposal at 8 (emphasis added).

- The PCMS "is a subpost of Fort Carson and a primary training area for units stationed at Fort Carson . . . ." Notice of Intent to prepare the PCMS EIS, 70 Fed. Reg. 70,795 (Nov. 23, 2005).
- "The PCMS is a training center area administered and used by military units stationed at, or otherwise under the responsibility of, Fort Carson, Colorado." Notice of Availability of the draft PCMS EIS, 71 Fed. Reg. 60,482 (Oct. 13, 2006).
- The PCMS is "responsible for supporting the large-scale ground maneuver and small arms live-fire training needs of the approximately 23,000 active duty Soldiers stationed at Fort Carson . . . ." Id.
- "The Army combines Fort Carson and PCMS when calculating unit training requirements and available training lands. Fort Carson and PCMS share the mission of providing Fort Carson's Soldiers with the facilities, infrastructure, and training space needed to complete doctrinally required training." Exhibit D, PCMS Report at 8.
- "Fort Carson can support the land-area requirements of platoon and limited company maneuver operations but does not have the contiguous maneuver acreage to support doctrinal battalion- or BCT-level training. The PCMS was established as a satellite area to support those training needs." Fort Carson EIS at 1-6.
- "The PCMS is the maneuver site for Fort Carson. It is administered and used by military units stationed at, or otherwise under the responsibility of, Fort Carson, Colorado." PCMS EIS at ES-2.
- "Fort Carson is discussed throughout this EIS because of the interrelationship between personnel stationing and training needs at Fort Carson and the PCMS." Id.
- "Fort Carson is discussed in this EIS because the PCMS is considered as part of Fort Carson for command and administrative responsibilities." Id. at 2-1.
- "The mission of the PCMS is to prepare soldiers for operational deployments and mission by providing training areas for units stationed at, or otherwise under the control of, Fort Carson." Id. at 2-14.

I299-14

The Army must analyze the PCMS and Fort Carson transformations in one EIS. The PCMS and Fort Carson are interrelated sites. The PCMS is Fort Carson's backyard, in which Fort Carson soldiers train. The Fort Carson EIS and the PCMS EIS address connected actions because the transformation proposed at Fort Carson will be felt at PCMS, and will have significant environmental effects there. Further, the transformation of Fort Carson, and the transformation of PCMS are connected actions because they are interdependent parts of a single larger action, and each separately depend on that larger action for their justification. See 40 C.F.R. § 1508.25(a)(1).

The PCMS is the primary maneuver site for troops stationed at Fort Carson. PCMS EIS at ES-2. Any increase in troop levels at Fort Carson will be felt at the PCMS, therefore transformations at both locations must be analyzed together in the same EIS. See 40 C.F.R. § 1508.25(a)(1). The Army cannot separate the environmental analysis of one site from the other because the overall and combined impacts will be understated.

I299-14

Second, the CEQ regulations require that "cumulative actions" be considered together in a single EIS. 40 C.F.R. § 1508.25(a)(2); Earth Island Inst., 351 F.3d at 1304-05. "Cumulative actions" are defined as actions "which when viewed with other proposed actions have cumulatively significant impacts." 40 C.F.R. § 1508.25(a)(2). "Thus, when several proposals . . . that will have cumulative or synergistic impact *upon a region* are pending concurrently before an agency their environmental consequences must be considered together. Only through comprehensive consideration of pending proposals can the agency evaluate different courses of action." Kleppe v. Sierra Club, 427 U.S. 390, 410 (1976) (emphasis added).

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The Army itself concedes that Fort Carson and the PCMS will have cumulatively significant impacts when viewed together:

- "The Army determined the new construction and training activities that are associated with supporting realigned and relocated troops [at Fort Carson] have the potential to result in adverse environmental impacts to air quality, biological resources, cultural resources, and geology and soils at the PCMS." PCMS EIS at 1-8.

I299-17

- "The Fort Carson BRAC action has the potential to significantly impact natural resources at the PCMS since the approximately 10,000 new personnel to be stationed there will now be training at the PCMS on a regular basis." 70 Fed. Reg. 70,795 (Nov. 23, 2005).

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- As a result of the increased number of personnel at Fort Carson, "activities at the PCMS could have an impact on archaeological resources, natural resources, air and water quality, and soil erosion." Id.

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Transformation of the PCMS and Fort Carson will have significant cumulative impacts. Both EISs are concurrently pending with the Army. The Army must analyze the environmental impacts caused by the transformation at both sites in one EIS to effectively analyze the overall impacts. 40 C.F.R. § 1508.25(a)(2). The combined analysis is crucial for the Army to effectively evaluate the impacts of different proposed actions.

Third, Fort Carson and PCMS are similar actions that should be analyzed together in the same EIS. Actions are "similar" when they are "viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography." 40 C.F.R. § 1508.25(a)(3). The best way to evaluate the combined and total impacts of similar actions and any reasonable alternatives is to treat both actions together in the same statement. Id.

However, the Army has pledged to do the opposite. The Army states:

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- The Army will evaluate the "environmental effects of implementing the No Action alternative and the Proposed Action at Fort Carson. A separate EIS is being prepared to assess potential environmental effects of the proposed realignment and transformation activities on the PCMS." Fort Carson EIS at 2-1.

- "A separate EIS is being prepared to assess the environmental impacts of implementing the three major Army transformation programs on Fort Carson. Fort Carson is discussed in this EIS in instances where doing so provides context for alternatives at the PCMS." PCMS EIS at 1-1.

The Army repeatedly acknowledges the connectedness of the proposed actions at Fort Carson and the PCMS. The best way to effectively analyze the overall impact of these related actions is to combine the environmental analysis into one EIS. At that point the Army will have a comprehensive picture of the forces acting on the region and will be able to make a reasoned choice among alternatives. The Army cannot manipulate the NEPA review process to avoid disclosing the impact of its actions. Federal law requires the Army to consider the PCMS and Fort Carson together in the same EIS.

C. The Planned Expansion of the PCMS Constitutes a "Proposed" Agency Action that Must Be Analyzed in the PCMS EIS.

The Army is required to include an analysis of the potential adverse environmental effects of expanding the PCMS in the EIS, regardless of whether the expansion has been officially "approved."

I299-22 An environmental impact statement is required for "major Federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4332(2)(C). "Actions" include "new and continuing activities, including projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies." 40 C.F.R. § 1508.18(a).

The purpose of an EIS is to assess the impact of "proposed" agency actions. 40 C.F.R. § 1502.2(g). A "proposal" exists when an agency "*has a goal and is actively preparing to make a decision on one or more alternative means of accomplishing that goal* and the effects can be meaningfully evaluated." 40 C.F.R. § 1508.23 (emphasis added). Whether a proposal exists depends on the facts, not on whether the agency declares that a proposal exists. Id.

I299-23 The expansion of the PCMS amounts to a proposed federal action that must be analyzed now because the Army is actively preparing to make a decision on the issue. See 40 C.F.R. § 1508.23. The Army "recognizes that it faces a large doctrinal training land shortfall at Fort Carson and PCMS, necessary to fully implement training of the transforming Army." Exhibit D, PCMS Report at 17. Section 2.3 of the PCMS Report, which is entitled "Proposed Plan for Addressing Training Requirements Shortfalls," lists expansion of PCMS as a viable alternative to provide the additional land needed. Id. at 18-19. Army documents state:

- "The alternative to purchase private lands and/or transfer public lands in the proposed area surrounding the PCMS offers increased training options that could potentially meet the training requirements of units stationed at Fort Carson. This alternative could potentially allow units to train over doctrinal distances for units up to the modular BCT level. There are large parcels of relatively undeveloped land of a nature similar to the lands already used for training at PCMS. Acquiring lands adjacent to PCMS would allow efficiencies, including the use of Fort Carson for the necessary housing, administrative, and quality of life infrastructure for assigned Soldiers." Exhibit D, PCMS Report at 19.

- "The existing maneuver land and range capacity does not meet this requirement. This analysis recommends the acquisition of additional training land adjacent to

the Pinon Canyon Maneuver Site in order to alleviate the existing maneuver area shortfall of [ ] acres and requisite live fire ranges." Exhibit B, Land Use Study at 34 (brackets in original).

- "By demonstrating vision now and acting on a window of opportunity to acquire land at very attractive prices, the Army has a unique opportunity to set conditions for successful training for decades into the future." Id. at 6.

- "Consideration should be given to exploiting the window of opportunity to acquire land now when it is available at relatively reasonable prices rather than postponing acquisition to a future date when land will almost certainly be harder to obtain." Exhibit C, Major Land Acquisition Proposal at 10.

I299-23

- "[T]here is a window of opportunity to acquire maneuverable land adjacent to an existing, unencroached maneuver area. This land is sparsely populated, low-cost, and reasonably available." Id. at 11.

The above-referenced Army documents, and the Army's statements, show that it is actively preparing to make a decision whether to expand the PCMS. However, the Army has repeatedly stated that because the plans to expand the PCMS have not been officially "approved," the expansion is not a "proposal" that must be analyzed in an EIS.

- "When, or if, the OSD will provide approval for land acquisition is unknown and, therefore, this cannot be considered a reasonable alternative at this time." PCMS EIS at 2-26.

- "The Army is assessing the potential need for expanding the PCMS. Should a decision be made to expand the PCMS, it would be evaluated through a separate NEPA process." Id. at 1-1 (internal parenthetical omitted).

- "Other action alternatives were considered and discussed in the EIS but were not analyzed further because they . . . were not '*ripe for decision.*'" 71 Fed. Reg. 60,482 (Oct. 13, 2006) (emphasis added).

- "[A]ction to gather information and solicit public input to analyze and develop alternatives to expand the PCMS is not possible at this time and remains purely speculative in nature. If OSD were to grant the Army the authority to investigate PCMS expansion alternatives in the future, the Army would proceed by developing informed alternatives . . . ." Exhibit D, PCMS Report at 21-22, 18, 23.

The Army is wrong. The Army must analyze expansion of the PCMS now because the Army is "actively preparing" to make a decision about expanding. See 40 C.F.R. § 1508.23. Even though expansion has not been officially "approved," the Army has already initiated the process of acquiring land surrounding the PCMS. Army documents state:

- "The submission of this AMLAP [Army Major Land Acquisition Proposal] and its accompanying key documents, Land Use Requirements Study (LURS) and Analysis of Alternatives (AAS), *initiates the formal part of the land acquisition process.*" Exhibit C, Major Land Acquisition Proposal at 4 (emphasis added).

I299-23

- The PCMS Report states that "[i]n the Spring of 2006, the Army submitted a request to OSD for a waiver from the [Department of Defense's] major land acquisition moratorium to pursue Alternative C, land expansion at the Pinon Canyon Maneuver Site." Exhibit D, PCMS Report at 20.

- "Recognizing that the acquisition of this land will take years, the Army is approaching the effort with a detailed campaign plan that methodically addresses the process. Candidate land has been divided in large parcels, which will support functional framing purposes, and, where possible, have common owners. Exhibit B, Land Use Study at 6.

By the time the Army initiated the land acquisition process in 2006, and made plans to expand and articulated the rationale for doing so, see Exhibits B, C, D, E, and F, the expansion of the PCMS became a proposed agency action the Army must evaluate in the PCMS EIS. See 40 C.F.R. § 1508.23. The Major Land Acquisition Proposal, which "initiate[d] the formal part of the land acquisition process," confirms that expansion of the PCMS constitutes a "proposal" triggering the requirements imposed by NEPA. See Exhibit C, Major Land Acquisition Proposal at 4.

Agencies are required to integrate the NEPA process into the early planning stages to "insure that planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts." 40 C.F.R. §§ 1501.2; 1501.1(a); 32 C.F.R. §§ 651.5(d)(6); 651.9; 651.14(a); Andrus v. Sierra Club, 442 U.S. 347, 350 (1979). The Army is expected to "comprehensively integrat[e] environmental policy objectives into planning and decision-making." 32 C.F.R. § 651.5(a); 40 C.F.R. § 1502.1. The entire purpose of preparing an EIS is to help "plan actions and make decisions", 40 C.F.R. 1502.1, rather than to write an EIS to "justify decisions already made." 40 C.F.R. §§ 1502.5, 1500.1(c) ("Ultimately, of course, it is not better documents but better decisions that count.").

In this case, the Army cannot wait until after the Department of Defense approves the land acquisition proposal to start its environmental analysis. The fact that a proposal exists mandates that the Army undertake the requisite environmental review now. By failing to analyze the expansion, the Army is segmenting its review of the transformation and expansion of the PCMS in a manner that violates NEPA. I299-23

D. The Army's Analysis of Cumulative Impacts in the PCMS EIS and the Fort Carson EIS is Inadequate

The Army is required to analyze cumulative impacts in an EIS. 32 C.F.R. §§ 651.5(d)(3), 651.16; 40 C.F.R. § 1502.16(a), (b). A "cumulative impact" is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions." 40 C.F.R. § 1508.7. The Army is required to take a "hard look" at the reasonably foreseeable cumulative impacts of the proposed action. 32 C.F.R. § 651.9(c); Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 350 (1989); Fuel Safe Wash. v. F.E.R.C., 389 F.3d 1313, 1323 (10th Cir. 2004). I299-24

An EIS must provide "a reasonably thorough discussion of the significant aspects of the probable environmental consequences" of the proposed action. Edwardsen v. U.S. Dep't of Interior, 268 F.3d 781, 791 (9th Cir. 2001). The Army "must give a realistic evaluation of the total impacts and cannot isolate a proposed project, viewing it in a vacuum." Grand Canyon Trust v. FAA, 290 F.3d 339, 342 (D.D.C. 2002).

The Army's analysis of cumulative impacts in the PCMS EIS and the Fort Carson EIS is inadequate for the following reasons.

I299-25

1. The Army's Decision to Analyze Only "Similar" Cumulative Impacts Violates Federal Law

Under NEPA, the Army must consider all "other past, present, and reasonably foreseeable future actions." 40 C.F.R. § 1508.7. However, in both the PCMS EIS and the Fort Carson EIS the Army did apply this standard. It stated that it limited the analysis to impacts that are *similar* to the proposed action. The PCMS EIS and the Fort Carson EIS state:

- "For an impact to be considered cumulative, there must be past, present, or reasonably foreseeable future actions that have the potential for incremental and potential impacts to occur that are *similar* to those of the Proposed Action (that is, other actions that have the potential to result in impacts *similar* to those impacts caused by the PCMS Proposed Action). No *similar* actions to the Army's

Proposed Action have occurred or are planned in the [region of influence]. As discussed below, there is little development in the vicinity of the PCMS and little, if any, development is planned. Therefore, there are no cumulative impacts to environmental or socioeconomic resources in addition to the Proposed Action impacts." PCMS EIS at 3-90 (emphasis added).

- "For an impact to be considered cumulative, there must be past, present, or reasonably foreseeable future actions that have the potential for incremental and potential impacts to occur that are *similar* to those of the Proposed Action (i.e., other actions that have the potential to result in impacts *similar* to those impacts caused by the Fort Carson Proposed Action)." Fort Carson EIS at 3-115 (emphasis added).

The Army is applying the wrong standard to its cumulative impacts analysis. The Army cannot limit its analysis to actions or impacts that are "similar" to the proposed action. The regulations mandate that the Army analyze all "past, present, and reasonably foreseeable future actions." 40 C.F.R. § 1508.7. That includes actions that may not have any similarity to the Army's proposed action but have, do, or may result in an environmental impact. By artificially limiting its analysis to "similar" actions the Army is providing an incomplete picture of all of the forces acting upon the region in an attempt to minimize the overall impact of the Army's transformation activities at the PCMS and Fort Carson. I299-25

I299-26

2. The PCMS EIS's Cumulative Impacts Section is Inadequate Because it Fails to Address Future Expansion of the PCMS

The Army's less than two-page analysis of cumulative impacts in the PCMS EIS is shockingly inadequate. The Army claims that it does not have to examine the cumulative impacts of future expansion in the PCMS EIS because the expansion has not been officially approved. See PCMS EIS at 2-26, 3-90.

The Army is wrong, and its rationale is arbitrary and capricious. The Army is required to analyze the impacts of any and all "*reasonably foreseeable* future actions." 40 C.F.R. § 1508.7 (emphasis added). A "reasonably foreseeable" action is not the same as a "proposed" action. The Army's cumulative impacts analysis must include a discussion of all reasonably foreseeable actions that may impact the region. This includes actions that the Army plans to take in addition to other federal and non-federal actions. Id. Thus, the scope of actions the Army must analyze as "reasonably foreseeable" is far broader than the scope of actions that constitute a "proposal."

The future expansion of the PCMS is a "reasonably foreseeable" action. The Army is actively working to acquire land surrounding the PCMS. See Exhibits B, C, D, E, and F.

The Army has stated that it is "assessing the potential need for expanding the PCMS." PCMS EIS at 1-1. Not only is the Army assessing the need, the Army has already requested a waiver from the Office of the Secretary of Defense so that it can acquire land surrounding the PCMS. Exhibit C, Major Land Acquisition Proposal at 4; Exhibit D, PCMS Report at 20. The fact that the expansion has not been officially approved is irrelevant. The Army's overt and stated goal is to get authorization to expand the PCMS. The future expansion of the PCMS is reasonably foreseeable, therefore the cumulative impact of the expansion must be analyzed in this PCMS EIS. Committing to prepare a future EIS on the expansion does not relieve the Army of its present obligation under NEPA to analyze the cumulative effects of transforming *and* expanding the PCMS.

I299-26

3. The Fort Carson Cumulative Impacts Section is Inadequate

The cumulative impacts section in the Fort Carson EIS is insufficient. The Army organized the cumulative impacts section "by resource rather than alternative." Fort Carson EIS at 3-115. The Army analyzed air quality, cultural resources, water resources, biological resources, and transportation. Fort Carson EIS at 3-116-18. However, the Army's analysis is silent regarding the cumulative impacts associated with noise, geology and soils, socio-economics, utilities, and hazardous and toxic substances. See Fort Carson EIS 3-114-19. There is no explanation as to why the Army failed to analyze half of the factors it considered earlier in the EIS. The Army has failed to take the requisite "hard look" at the reasonably foreseeable cumulative impacts of the proposed transformation of Fort Carson.

I299-27

I299-28

4. The Army Must Analyze the Cumulative Impacts of the Transformation and Expansion of the PCMS and Fort Carson Together

The Army must analyze the cumulative impacts of the transformation of the PCMS and Fort Carson and any future expansion of the PCMS in the same EIS.

The Fort Carson EIS and the PCMS EIS fail to adequately address the cumulative impacts of the Army's transformation activities at both sites. Each document focuses its analysis on the impacts associated with the site in isolation and does not take into account its connectedness with the other. The Fort Carson EIS completely ignores the impacts at the PCMS and states:

- "[T]he effects of the PCMS transformational activities are being addressed in the PCMS Transformation EIS in accordance with NEPA to assess the incremental social, economic, and environmental resources impacts of that action. The PCMS, however, is located distant from Fort Carson and the impacts attributable to the PCMS are not anticipated to affect the resources assessed in the *Fort Carson Transformation EIS*." Fort Carson EIS at 3-115 (emphasis in original).

Likewise, the PCMS EIS fails to address the cumulative impacts of the Army's proposed action at Fort Carson. The PCMS EIS states:

- "The effects of transformation activities on the Fort Carson military installation are being addressed in the *Fort Carson Transformation EIS*. Although the Proposed Action for Fort Carson is an action that is currently being evaluated in accordance with NEPA, it is located distant from the PCMS and the incremental social, economic, and environmental resources impacts attributable to Fort Carson are not anticipated to affect the resources assessed in this EIS." PCMS EIS at 3-91 (emphasis in original).

- "Although the Proposed Action for Fort Carson is an action that is currently being evaluated in accordance with NEPA, it is located distant from the PCMS and the incremental social, economic, and environmental resources impacts attributable to Fort Carson are not anticipated to affect the resources assessed in this EIS." PCMS EIS at 3-91.

I299-28

The Army's conclusion that there are no impacts that are cumulative with the actions at Fort Carson and at PCMS is highly doubtful given its erroneous decision to only consider "similar" impacts rather than "reasonably foreseeable" impacts. The Army's failure to consider the cumulative impact of the transformation on the PCMS and Fort Carson together violates NEPA. The PCMS and Fort Carson are connected actions that are inextricably linked. "PCMS is an extension of Fort Carson and does not operate independently." Exhibit C, Major Land Acquisition Proposal at 8; see also PCMS EIS at ES-2 (The PCMS is the "maneuver site for Fort Carson. It is administered and used by military units stationed at, or otherwise under the responsibility of, Fort Carson, Colorado."). The Army cannot simply state that the incremental impacts attributable to one site are "not anticipated" to affect the resources at the other site. The Army is shirking from its responsibility to take a "hard look" at the reasonably foreseeable cumulative impacts of its proposed actions.

The Army's actions at the PCMS and Fort Carson have the potential to have cumulative impacts on wildlife. The Army has not addressed the total combined impact the transformation and expansion of the PCMS will have on listed species in the region. The Region hosts a number of federally and state listed species. PCMS EIS at 3-42-44; Fort Carson EIS at 3-45-53. JE Canyon itself is home to at least four listed species, including the bald eagle, mountain plover, long-billed curlew, and the kit fox, which is a subspecies of the larger swift fox. Both the PCMS EIS and the Fort Carson EIS are completely devoid of any discussion of how the future expansion of the PCMS, in addition to the current transformation activities, will impact these species.

The transformations of PCMS and Fort Carson, together with the planned expansion of the PCMS, have the potential to have significant cumulative impacts upon socioeconomics, water quality, cultural resources, and air quality. Yet the Army has not prepared a cumulative impacts analysis to address those resources. The PCMS EIS and Fort Carson EIS should be revised to remedy this defect. I299-28

5. The Army Must Analyze the Cumulative Impacts on Cultural Resources

Implementation of the Army's transformation programs at Fort Carson and the PCMS and the future expansion of the PCMS will have significant cumulative impacts on cultural resources. I299-29 NEPA requires the Army to analyze the cumulative impacts of all "past, present, and reasonably foreseeable future actions" on cultural resources. 40 C.F.R. §§ 1508.7, 1502.15(g). The Army has failed to examine the cumulative impacts associated with the expansion of the PCMS.

The PCMS and Fort Carson region is rich with cultural, archaeological, and paleontological sites. Both the PCMS EIS and the Fort Carson EIS recognize the cultural significance of this area. See PCMS EIS at 3-58-62; Fort Carson EIS at 3-62-66. At the PCMS, 5,113 archaeological sites have been identified and, of those, 488 are eligible for inclusion in the National Register of Historic Places. PCMS EIS at 3-58. However, "approximately 65,600 acres remain unsurveyed on the PCMS and would require inventory prior to additional training use." Id. at 3-62. The Army projects that 2,040 sites, 406 of which are potentially eligible for inclusion in the National Register, have yet to be identified. I299-30 Id. All of these sites "may be encountered or adversely affected as a result of increased military training activities at the PCMS." Id.

The lack of information at Fort Carson is the same. Approximately 34,500 acres remain unsurveyed. Fort Carson EIS at 3-65. The Army projects that 792 additional sites, 183 of which are potentially eligible for inclusion in the National Register, have yet to be identified. Id. The significant adverse impacts on these unidentified cultural resources is undeniable. The Army states:

- "The consequences of BRAC 2005 actions, including IGPBS and AMF [Transformation Programs], will have an impact on nearly all available land within the boundaries of Fort Carson. All forms of military training activities have the potential to adversely affect cultural resources." Fort Carson EIS at 3-66; see PCMS EIS at 3-62. I299-31

- "Fort Carson has experienced intense military training for many years, and this activity has altered the integrity of numerous landforms. Although the I299-32

comparative analysis anticipates 792 additional sites would be encountered in the unsurveyed areas, with 183 projected to be eligible for inclusion in the National Register, this number is likely overestimated because of past disturbance." Fort Carson EIS at 3-65.

I299-32

- "Two National Register-eligible Historic Districts are located within the downrange area of Fort Carson . . . The Turkey Creek Rock Art District has been designated for dismounted training only. Nevertheless, the potential for adverse impacts due to increased training activities in or around this District are significant." Id. at 3-67.

I299-33

The Army acknowledges that its training activities have had, or will have, an adverse impact on cultural and historical resources on land *within* the boundaries of Fort Carson and the PCMS. That damage is occurring on land the Army is already supposed to be monitoring and protecting. Given the density of sites at Fort Carson and the PCMS, it is foreseeable that future expansion of the PCMS will significantly impact hundreds, if not thousands, of unidentified cultural resources. NEPA requires the Army to analyze these cumulative impacts in the PCMS EIS and the Fort Carson EIS. 40 C.F.R. §§ 1508.7; 1502.15(g). Both EISs are silent regarding what cumulative impacts expansion of the PCMS will have on cultural resources. The Army's analysis fails to take the requisite "hard look" at the cumulative impacts that all past, present, and reasonably foreseeable actions will have on the affected area and violates NEPA.

I299-34

Federal law comprehensively regulates cultural and historical resources on lands under federal control. See Antiquities Act 1906, 16 U.S.C. § 431 et seq.; National Historic Preservation Act of 1966, 16 U.S.C. § 470 et seq.; The Native American Graves Protection and Repatriation Act of 1990, 25 U.S.C. § 3001 et seq.; Federal Land Policy and Management Act of 1976, 43 U.S.C. § 1701 et seq.; National Forest Management Act of 1976, 16 U.S.C. § 1600 et seq.; The Historic Sites Act of 1935, 16 U.S.C. § 461 et seq.; The Historic and Archaeological Data Preservation Act, 16 U.S.C. § 469 et seq.; Archaeological Resources Protection Act of 1979, 16 U.S.C. § 470aa et seq.; The American Indian Religious Freedom Act of 1978, 42 U.S.C. § 1996. Neither the PCMS EIS nor the Fort Carson EIS analyze how these numerous federal laws apply to the planned expansion of the PCMS. The Army's failure to analyze the significant cumulative impacts on cultural resources and its failure to disclose how the Army will expand the PCMS in the context of the federal regulatory scheme for cultural resources violates NEPA.

I299-35

E. The Army Has Not Considered a Reasonable Range of Alternatives in the PCMS EIS

I299-36

NEPA requires an agency to evaluate reasonable alternatives for any proposal that involves unresolved conflicts regarding alternative uses of available resources. 42 U.S.C. § 4332(2)(C)(iii), (E); 40 C.F.R. § 1502.14(a). A reasonable alternative to the proposed action is one that would accomplish the goals or objectives identified in the agency's purpose and needs statement. Citizens' Comm. to Save Our Canyons v. U.S. Forest Serv., 297 F.3d 1021, 1030 (10th Cir. 2002). An agency's decision regarding which alternatives it will consider is "'bound by a rule of reason and practicality.'" Davis v. Mineta, 302 F.3d 1104, 1120 (10th Cir. 2002) (quoting Airport Neighbors Alliance, Inc. v. United States, 90 F.3d 426, 432 (10th Cir. 1996) (internal quotations omitted)).

The analysis of the proposed action and alternatives is the "heart of the environmental impact statement." 40 C.F.R. § 1502.14. Agencies must "rigorously explore and objectively evaluate all reasonable alternatives" to the proposed action, including a "no action" alternative. 40 C.F.R. §§ 1502.14; 1501.2(c) (Agencies are required to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources."). If an agency decides not to evaluate a particular alternative it must "briefly discuss the reason" for eliminating the alternative from further review. 40 C.F.R. § 1502.14.

An agency's purpose and need statement cannot be defined so narrowly as to preclude consideration of reasonable alternatives to the proposed action. An "agency may not 'define [a] project so narrowly that it foreclose[s] a reasonable consideration of alternatives.'" Fuel Safe Washington v. FERC, 389 F.3d 1313, 1323-24 (10th Cir. 2004) (quoting Davis v. Mineta, 302 F.3d at 1119).

The PCMS EIS states that the purpose of the Proposed Action is to implement the Transformation Programs at the PCMS. PCMS EIS at 1-2. The Army considered alternatives including "training troops at other locales, acquiring additional land to expand the PCMS, and varying training schedules to account for operational deployments. None of these alternatives was determined to be reasonable because it either was *not approved* or unreasonably restricted the Army's ability to respond to changing conditions." PCMS EIS at ES-4 (emphasis added), 2-26.

The Army failed to analyze a reasonable alternative the Army has previously identified – expansion of the PCMS. The Army acknowledged expansion, but promptly rejected it because it has not been "approved." PCMS EIS at 2-26; Exhibit D, PCMS Report at 18, 21-23. However, in this case, a reasonable alternative is any alternative that facilitates

the Army's ability to implement the transformation program. The Army has stated that expansion of the PCMS will do just that. The Army's PCMS Report states that expanding to lands "surrounding the PCMS offers increased training options that could potentially meet the training requirements of the units stationed at Fort Carson." Exhibit D, PCMS Report at 19. The Army is required to rigorously explore this alternative in the PCMS EIS, and its failure to do so violates NEPA. See Muckleshoot Indian Tribe v. United States Forest Serv., 177 F.3d 800, 814 (9th Cir. 1999) (ruling that a federal agency's refusal to consider acquiring land as an alternative in an EIS violated NEPA because the agency incorrectly concluded that it need only analyze alternatives within its control); 40 C.F.R. § 1502.14(c) ("reasonable alternatives" include those "not within the jurisdiction of the lead agency").

I299-36

F. The PCMS EIS Does Not Address Future Conflicts Between Local Land Use Policies and Expansion of the PCMS

I299-37

The PCMS EIS is inadequate because it does not address the inevitable conflict between the future expansion of the PCMS and local land use policies.

An EIS must discuss "possible conflicts between the proposed action and the objectives of the Federal, regional, State, and local . . . land use plans, policies and controls for the area concerned." 40 C.F.R. § 1502.16(c). If there are immediate conflicts with land use plans, or conflicts that may arise in the future when the plans are completed, the EIS must recognize and describe the extent of the conflicts. Forty Most Asked Questions Concerning CEQ's NEPA Regulations, Question 23a, 46 Fed. Reg. 18,033 (Mar. 23, 1981).

The PCMS EIS recognizes that the *Las Animas County Development Guide* (Las Animas County Planning Commission, 1994) and the *Draft Cimarron and Comanche National Grasslands Land Management Plan* (USFS, 2005) govern land-use on lands surrounding the PCMS. PCMS EIS at 3-5. The EIS states that "[t]hese plans recognize the PCMS as a military training installation." Id. However, the PCMS EIS is completely devoid of any discussion relating to possible future conflicts between the plans and the future expansion of the PCMS. Id.

The potential for conflict exists. The EIS states that the PCMS is "surrounded on three sides by land that is zoned for agricultural uses and used for dryland cattle grazing." Id. Much of this land is considered prime farm land that is protected by the Farmland Protection Policy Act of 1981. Id. This Act mandates that federal agencies consider the impact of *any* activity that may "convert prime or unique farmlands to non-agricultural uses." Id.; see 7 U.S.C. § 4201 et seq. If the PCMS expands, a significant portion of this land will be converted from agricultural uses to military training lands.

The Army dismisses this potential conflict with one line: "Because no prime farmland exists within the PCMS, prime farmland is not carried forward in this EIS for further analysis." PCMS EIS at 3-5. This analysis is unacceptable. Under both NEPA and the Farmland Protection Policy Act, the Army must consider the potential impacts of its actions on local land use plans, and in this case, the impact that future expansion will have on the prime farm land that surrounds the PCMS. The EIS should be rewritten to include an analysis of any potential impacts expansion of the PCMS will have on surrounding non-agricultural lands.

I299-37

G. The Army Failed to Adequately Address the Impacts That a "Phased" Project Will Have on Surrounding Communities

I299-38

The PCMS does not adequately analyze the significant impacts associated with phasing the proposed future expansion of the PCMS. "Phasing" refers to the "environmental impacts that occur because a project will not be constructed all at once."[1] Davis v. Mineta, 302 F.3d at 1124. An agency must evaluate the direct, indirect and cumulative impacts when there is a substantial delay between each phase. Id. This includes an analysis of the "economic or social and natural or physical environmental effects" caused by the proposed action. 40 C.F.R. § 1508.14.

The environmental, economic, and socioeconomic impacts associated with the phased transformation of the PCMS are not adequately analyzed in the PCMS EIS. The Army stated that the "restationing of units at Fort Carson is expected to occur in stages. Temporary actions occurred in 2005, and implementation of the full restationing and transformation actions is expected to be complete by 2011, with most actions being completed by 2009." PCMS EIS at 2-15. As noted above, the Army's transformation program will create a training land shortfall, which the Army is actively attempting to resolve. Exhibit D, PCMS Report at 20. The Army has stated that it does not anticipate that it will be able to acquire all of the land that it needs from willing sellers. Id. at 23. The Army's Major Land Acquisition Proposal also states:

- "[I]t is the Army's view that the use of eminent domain, if required, is an appropriate exercise of authority and that condemnation is an important acquisition tool that should be available to the Army to ensure that the project is carried out in the most effective manner possible." Exhibit C, Major Land Acquisition Proposal at 6.

[1] "Phasing" is different from "segmentation." Segmentation refers to an agency's decision to divide its environmental analysis into smaller pieces, which decreases the significance of the overall impacts. Phasing refers to the implementation of one project in successive stages.

The possibility of eminent domain actions in the area directly impacts the property value of land surrounding the PCMS, like JE Canyon, which is a prime target for expansion.

The PCMS EIS does not contain any discussion of the economic effect of implementing the proposed action over the course of six years. Examining the impact of a "phased" approach is particularly important in this instance because while the Army waits for authorization to expand the PCMS, surrounding landowners, including JE Canyon, are watching their property value decrease as potential buyers contemplate future eminent domain actions.

H. The Army Must Supplement the PCMS EIS to Incorporate Information Relating to the Future Expansion of the PCMS

The Army is responsible for insuring that its NEPA documentation is up-to-date. The Army is required to periodically review its documentation for "adequacy and completeness in light of changes in project conditions." 32 C.F.R. § 651.5(g); 40 C.F.R. § 1502.9(c)(1). The Army must supplement its NEPA documentation when: "(1) The Army makes substantial changes in the proposed action that are relevant to environmental concerns; or (2) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impact." 32 C.F.R. §§ 651.5(g); 651.45(l); see also 40 C.F.R. § 1502.9.

The proposal pending within the Army to expand the PCMS constitutes a "significant new circumstance" that will have significant direct, indirect, and cumulative impacts on the PCMS and surrounding lands. The PCMS EIS does not contain any documentation or analysis relating to the possibility of future expansion of the PCMS. Since the Army has requested a waiver from the Department of Defense and is actively pursuing land acquisition, any information the Army has regarding future expansion is relevant to environmental concerns and bears on the proposed action. See Exhibit D, PCMS Report at 20; Exhibit C, Major Land Acquisition Proposal at 1-11. Army documents demonstrate that the Army has analyzed the future expansion of the PCMS:

- "The potential impacts on the human and natural environment from the purchase of private lands and transfer of public lands in the proposed area surrounding PCMS entail: (1) Potential need for cleanup of possible contaminated sites prior to training use; (2) Increased military training impacts in areas that have seen none to date . . . (3) Erosion and dust related problems due to military training; (4) Possible water quality concerns due to military training; (5) Administrative vehicle use impacts; (6) Infrastructure impacts due to additional training support needs; (7) Potential significant number of cultural sites in the canyon lands east of the Purgatorie River that may require mitigation or protection. *Fort Carson has*

I299-38

> *developed a timeline and cost estimates for environmental studies and NEPA documentation.*" Exhibit C, Major Land Acquisition Proposal at 7 (emphasis added); see also Land Use Study.

The Army needs to supplement the PCMS DEIS to include information it has regarding the Army's plans to expand the PCMS. The Army's refusal to do so violates NEPA. I299-38

I. The Army has Failed to Include Information Necessary to Make an Informed Decision in the Fort Carson EIS and PCMS EIS

I299-39

When the Army is evaluating "reasonably foreseeable significant adverse effects on the human environment," and information that is "essential to a reasoned choice among alternatives" is lacking, the Army is required to make it clear in the environmental impact statement. 40 C.F.R. § 1502.22(a). If the incomplete information is necessary to make an informed decision and the overall costs of obtaining the information are not exorbitant, the agency is required to include the information in the EIS. 40 C.F.R. § 1502.22(a). If the costs of obtaining the information are exorbitant or the means of obtaining it are not known, the agency is required to include within the EIS:

> (1) A statement that such information is incomplete or unavailable; (2) a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment; (3) a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment; and (4) the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community.

40 C.F.R. § 1502.22(b). The term "reasonably foreseeable" is defined in this section as "impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason." Id.

The Army has failed to satisfy this requirement. The Army's expansion of the PCMS is reasonably foreseeable and will have catastrophic consequences on the human environment, including to the Ranch, other ranchers in the Region, and to cultural resources, socioeconomics, local tax revenues, wildlife, and other resources. The Army is required to analyze future expansion "even if [its] probability of occurrence is low." Id. By refusing to analyze the possibility of future expansion the Army has made it clear that there is incomplete and unavailable information regarding the PCMS expansion. The PCMS EIS

states that "[w]hen, or if, the [Office of Secretary of Defense] will provide approval for land acquisition is unknown and, therefore, this cannot be considered a reasonable alternative at this time." PCMS EIS at 2-26; Exhibit D, PCMS Report at 21-23.

The time to analyze the impacts of future expansion is now. Even if expansion is not a reasonable alternative, it is reasonably foreseeable. The Army has not demonstrated that the costs of completing this analysis is exorbitant. In fact, the Army has already "developed a timeline and cost estimates for environmental studies and NEPA documentation" relating to the expansion of the PCMS. Exhibit C, Major Land Acquisition Proposal at 7. The Army is required to include this documentation, and any other information the Army has regarding the PCMS expansion, in the PCMS EIS.

The Army has attempted to excuse its failure to supply the required information on the premise that if a decision to expand the PCMS is made "it would be evaluated through a separate NEPA process." PCMS EIS at 1-1; Exhibit B, PCMS Report at 7, 21-23. That commitment to undertake a separate NEPA process does not release the Army of the obligation to analyze the expansion now as a reasonably foreseeable future action. Disclosure of the environmental impacts associated with the future expansion of the PCMS is essential to a reasoned choice among alternatives. The Army is already working on the PCMS and Fort Carson EISs. The NEPA process is already underway. To avoid delay and minimize costs the Army must obtain and disclose the information the Army needs to make a reasoned choice among alternatives.

Even if the Army concludes that the cost of obtaining the information regarding the expansion of the PCMS is exorbitant, the Army has failed to include the required statement in both the Fort Carson EIS and the PCMS EIS. See 40 C.F.R. § 1502.22(b). Based on the information the Army has already compiled for the two pending EISs, and the cost estimates for NEPA documentation relating to future expansion, the Army is in a position to evaluate the impacts the proposed expansion will have on the human environment. The Army is equipped to satisfy this requirement, but it has not done so.

I299-39

J. The Army Must Analyze its Proposal to Expand the PCMS Under the Endangered Species Act

I299-40

The Army has failed to disclose how it intends to comply with the Endangered Species Act ("ESA") in the PCMS EIS. The ESA is designed to protect designated species. Section 7(a)(2) provides:

> Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any

> endangered species or threatened species or result in the destruction or adverse modification of (the critical) habitat of such species . . . .

16 U.S.C. § 1536(a)(2). Under the ESA, the Army is required to review its programs and all other actions to determine whether any of its activities possibly affect endangered or threatened species or their habitats. Id. An "action" is defined as "all activities or programs of any kind authorized, funded or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas . . . Action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." 50 C.F.R. § 402.02. "Where the consultation or conference has been consolidated with the interagency cooperation procedures required by other statutes such as NEPA or FWCA [Fish and Wildlife Coordination Act], the results should be included in the documents required by those statutes." Id. at § 402.06(b).

Expansion of the PCMS is an "action" that triggers the requirement to comply with both NEPA and the ESA. The ESA requires the Army to analyze how expansion of the PCMS will effect endangered or threatened species in its NEPA documents. The PCMS EIS is silent regarding the effect expansion will have on endangered or threatened species and their habitat. The Army is required to undertake this analysis in the PCMS EIS and failure to do so violates both NEPA and the ESA.

I299-40

K. The Army Has Not Fulfilled its Obligation Under the National Defense Act

I299-41

To date, the Army has remained silent regarding its plans to expand the PCMS. Whatever the Army's official position, it has concrete plans to expand the PCMS. These plans will significantly affect the surrounding environment and must be disclosed. Congress and the President agree. The National Defense Act required that the Secretary of the Army submit a report to the congressional defense committees analyzing any potential expansion of the military training range at the PCMS by November 30, 2006. Exhibit G, National Defense Act § 2827(a)(1).

After the deadline, the Army submitted an incomplete report. The PCMS Report acknowledges that one option to solve the current training land shortfall is to acquire land surrounding the PCMS. Exhibit D, PCMS Report at 19. However, the report states that it will not undertake an in-depth analysis of this land acquisition until "the Army is given approval to pursue a potential land acquisition." Id. at 18.

The Army cannot avoid disclosing the reasonably foreseeable effects of its plans simply by remaining silent. The National Defense Act requires that the Army include a detailed analysis of the "current and *projected* military requirements" of the Army at the

PCMS. Exhibit G, National Defense Act at § 2827(a)(2)(A) (emphasis added). The report must address the Army's future military requirements and include "a description of any proposed expansion of the existing Pinon Canyon Maneuver Site by acquiring privately held land surrounding the site and an analysis of alternative approaches that would not require expansion." Id. at § 2827(a)(2)(C). The report must also consider any economic and environmental impact that may occur as a result of the Army's proposed plan to address future military requirements within the PCMS. Id. at § 2827(a)(3).

The Army has not fulfilled its obligation under the National Defense Act. The Army has taken the position that because it has not been authorized to expand onto adjoining lands like JE Canyon, it does not have to disclose its plans. That position is a charade, and makes a mockery of the direct Congressional mandate in the National Defense Act. Both the National Defense Act and NEPA require the Army to involve the public in a meaningful review of any proposed action. The Army is attempting to avoid this requirement by repeatedly deferring the necessary to a future unknown date. This is unacceptable. The Army has an obligation to the public to be forthcoming and honest about its existing plans to expand the PCMS so that the public has an opportunity to comment.

I299-41

IV. Conclusion

For the reasons stated above, the Pinon Canyon Maneuver Site Transformation Draft Environmental Impact Statement and the Fort Carson Transformation Draft Environmental Impact Statement are so inadequate that they preclude meaningful review. Each draft EIS violates NEPA. The Army should revise them in accord with NEPA and provide a meaningful opportunity for public comment at the draft stage.

We hope that these comments are helpful to the Army. Thank you for this opportunity to comment.

Sincerely,

[redacted]

Comment Responses for Letter I299, [redacted]

This comment letter was submitted for the *PCMS Transformation DEIS*; however, several comments pertain to the *Fort Carson Transformation DEIS* and are addressed here. Issues related to the transformation action at the PCMS are addressed in the *PCMS Transformation FEIS*.

Response to I299-14

The Army agrees that Fort Carson and the PCMS are operationally linked, and this linkage is acknowledged throughout the *PCMS Transformation DEIS* and other documents referenced by the commenter. The functions and responsibilities of the two sites are different, and the Army made a reasoned decision to prepare separate EISs for the transformation actions at Fort Carson and the PCMS because the impacts of transformation initiatives are different and the sites are geographically separated and involve a divergent set of environmental and social issues, the actions merit separate consideration and analysis. Preparing two EISs allowed the Army to focus on disclosing the impacts of the separate sites and aided agency and public reviewers in assessing environmental impacts that could occur at the different sites. To further aid the understanding of the actions and allow reviewers to read and comment on both EISs if they chose to do so, the Army prepared the documents concurrently, in a similar format, and provided extensive cross-references between the EISs to facilitate review and an understanding of the differences in actions and impacts.

The commenter does not provide any evidence that the Army has violated the "connected action rule" by understating the overall environmental impacts of the transformation actions at the two sites. The DEISs for Fort Carson and the PCMS accurately portray the environmental impacts at each site, and no impacts are understated as a result of preparing two statements. Please also refer to the Master Response on “Segmentation of the Fort Carson and the PCMS Transformation Actions.”

Response to I299-15

As discussed in the *PCMS Transformation EIS* (Section 3.13) and the Fort Carson Transformation EIS (Section 3.13), the CEQ regulations implementing NEPA (40 CFR Section 1508.7) define a cumulative impact for purposes of NEPA as follows:

> Cumulative impact is the impact to the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The cite referenced by the commenter (40 CFR Sec. 1508.25) is a general introductory “Scope” section of CEQ’s regulations implementing NEPA that discuss the scope of actions that must “be considered in an environmental impact statement.” Cumulative impacts are one type of impact that 40 CFR 1508.25 requires be analyzed in an EIS. This general introductory “Scope” section of the CEQ regulations further states that an EIS must include consideration of “Cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement” (40 CFR 1508.25(a)(2)). The commenter relies on this general descriptive “Scope” statement of NEPA regulations as a rationale to support the contention that the separate actions at the PCMS and Fort Carson, when considered together, will result in significant cumulative impacts. Nothing in the regulations cited or in the quoted sections of the EISs or in relevant documents cited, as discussed individually below, supports this conclusion.

Response to I299-16

The commenter lists quotes from the *PCMS Transformation EIS*, the *Fort Carson Transformation EIS*, and the NOI as support for the comment that the “Army itself concludes that the PCMS and the Fort Carson EIS will have cumulatively significant impacts when viewed together. “ This is an incorrect conclusion and the Army disagrees with the conclusion and the rationale for the conclusion. The documents cited by the commenter are misinterpreted, taken out of context, or misquoted and/or not fully quoted. In brief, they do not support the asserted conclusion of cumulative significance. Each of the

quoted sections is reproduced accurately as it appears in the cited sources and responded to individually below.

Response to I299-17

Quote 1. "The Army determined the new construction and training activities that are associated with supporting realigned and relocated troops have the potential to result in adverse environmental impacts to air quality, biological resources, cultural resources, and geology and soils at the PCMS. *Consequently, the Army has prepared an EIS for this action*."(responder's emphasis added)

Response. This quote is from a general introductory section comprising three brief paragraphs that introduce the reader to the general scope of the EIS and the overall framework for the analysis conducted in subsequent sections of the DEIS (see Section 1.3.2 of the DEIS, Scope of Environmental Analysis) which explains that the Army decided to prepare an EIS because the potential existed for the Proposed Action to result in impacts. The commenter's cited paragraph provides no support for the assertion that the Army concluded that the impacts of the two actions, when considered together, result in cumulative impacts. The commenter neglected to include the final sentence of the brief introductory paragraph which states that the Army determined that an EIS for the PCMS transformation activities was required because the potential existed for significant impacts to occur.

Response to I299-18

Comment Quote 2. "The Fort Carson BRAC action has the potential to significantly impact natural resources at the PCMS since the approximately 10,000 new personnel to be stationed there will now be training at the PCMS on a regular basis." (Notice of Intent To Prepare Environmental Impact Statements for Realignment Actions Resulting From the 2005 Base Realignment and Closure Commission's Recommendations, 70 FR 225, part 70795) on November 23, 2005.)

Response. This is a quote from the NOI issued by the Army in the *Federal Register* (70 FR 70795) for the initiation of numerous EISs to be prepared as a result of the 2005 BRAC Commission's recommendations. In addition to the notice that an EIS would be prepared for Fort Carson and an EIS would be prepared for the PCMS, the NOI also serves as notice for the Army's intent to prepare EISs at Fort Meade, Aberdeen Proving Ground, Fort Lee, Fort Belvoir, Fort Benning, and Fort Sam Houston.

The NOI is the notice that informs the public that a decision has been made to prepare an EIS, it is not the document that analyzes impacts and makes findings of impacts. In addition, the quoted NOI text clearly states the Army has determined that the Fort Carson action has the "potential" to result in significant impacts; the NOI, however, is not the analysis that is required under an EIS to assess the significance of impacts.

Response to I299-19

Comment Quote 3. The full quote from the NOI (70 FR 225, part 70795, November 23, 2005) is "New construction and training activities at the PCMS could have an impact on archaeological resources, natural resources, air and water quality, and soil erosion."

Response. The NOI (70 FR 225, part 70795, November 23, 2005) states that "The EIS to be prepared for the PCMS will examine…," which clearly relays that the analysis of potential impacts of transformation activities at the PCMS has yet to be conducted.

Response to I299-20

The commenter states that the separate actions at the PCMS and Fort Carson should be combined in a single EIS and again cites 40 CFR Section 1508.25(a)(2) as the supporting regulation. As discussed above, nothing in the comment supports the conclusion that the cumulative assessment does not meet the CEQ's NEPA requirements. In addition, the commenter in the closing paragraph states an adequate NEPA analysis of cumulative impacts requires preparation of a combined document, which misinterprets the objectives of a NEPA cumulative analysis. The reader is referred to the Master Response on "Segmentation of the Fort Carson and PCMS Transformation Actions."

Response to I299-21

As with comment I299-13, the commenter is confusing connected actions with cumulative actions. In addition, the commenter selectively quotes 40 CFR Section 1508.25(a)(3) and asserts that this section of the CFR requires that the two actions be considered in the same document. The full and accurate citation is as follows:

> "Similar actions, which when viewed with other reasonably foreseeable or proposed

agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography. An agency may wish to analyze these actions in the same impact statement. It should do so when the best way to assess adequately the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single impact statement."

As discussed in response I299-13, the NOI that noticed the Fort Carson and the PCMS actions (70 FR 225, part 70795, November 23, 2005) also provided notice of intent to prepare EISs for six other Army installations, all of which are being prepared as individual EISs.

The comment quotes several sentences from the two DEISs and states that the quoted text supports the Army's decision to prepare separate EISs. The intent of the references was to acknowledge public concern about the two actions and to provide adequate references to guide the reader in understanding the separate actions.

The comment's conclusion that federal law requires the Fort Carson action and the PCMS action to be considered in a single EIS is not accurate and the argument presented in the comment does not support that conclusion. Also see response I299-13.

Response to I299-22

The comment also presents incomplete section quotes from Army and CEQ regulations that implement NEPA to support the assertion that the Army is violating NEPA. The Army disagrees with this unsupported assertion. The Army prepared this EIS in accordance with all the cited regulations, and nothing in those referenced regulations supports the assertion of non-compliance.

The comment selectively quotes passages from Army documents that preliminarily explore the feasibility of expansion as a possible proposed action and inaccurately quotes part of the CEQ regulations implementing NEPA. The CEQ's implementing regulations for NEPA state that a proposal

> "exists at that stage in the development of an action when an agency subject to the Act has a goal and is actively preparing to make a decision on one or more alternative means of accomplishing that goal and the effects can be meaningfully evaluated."

(emphasis added). 40 CFR Sec. 1508.23)

As discussed in the Master Response regarding expansion, the Army has committed to prepare an EIS for proposed expansion of the PCMS, but that proposed action has yet to be developed and, therefore, "meaningful analysis," as required by 49 CFR 1508.23, cannot occur in the absence of a defined proposal for the Army to evaluate.

The comment also proceeds to misquote the same regulation. The comment incorrectly quotes "Whether a proposal exists depends on the facts, not on whether the agency declares a proposal exists." This FEIS quotes Section 1508.23 accurately, as follows: "A proposal may exist in fact as well as by agency declaration that one exists." (emphasis added) The comment's quote selectively removed language that affirms the agency's role in determining whether a proposal capable of meaningful analysis exists.

Response to I299-23

Contrary to the comment the Army is not "actively preparing to make a decision on the issue," the Army is proposing to prepare an EIS that would include an as yet to be defined proposed action and alternatives. The Army will make a decision on the issue following compliance with NEPA and other federal laws to analyze impacts of such a proposed action.

As discussed in detail in the Master Response on "Expansion at the PCMS," the Army has prepared several preliminary assessments of the feasibility of expanding the PCMS boundaries to inform the Army of the need for and feasibility of expanding the PCMS and general ways in which to optimize future use of the PCMS for meeting the mission training requirements. The reports are preliminary planning evaluations and represent neither a prescribed proposed action for PCMS expansion nor an analysis of environmental impacts at a level commensurate for evaluation in an ongoing cumulative impact analysis. In addition, none of the preliminary planning documents commits any resources to implementation, and all conclude with recommending additional study.

The facility construction and increased training action evaluated in the *PCMS Transformation EIS* is fundamentally separate from the possible future action of expansion, and can be implemented independently of possible expansion. With the approval of the major land acquisition moratorium waiver request, the Army is now beginning its real estate planning effort for a possible expansion at PCMS and, as recommended, is initiating an EIS to evaluate and disclose the impacts of expansion. The Army's

potential need for an expansion of PCMS is not dependent upon nor necessitated by the transformation activities that are the subject of this EIS. For additional relevant responses to the comment on expansion and segmentation, see the Master Responses "Expansion of the PCMS," in particularly the subheading "Army Planning to Support the Major Land Acquisition Waiver Request."

Response to I299-24

This comment is introductory in nature and lists numerous CFR cites relevant to preparing a NEPA cumulative impact assessment, including the need to discuss the past, present, and reasonably foreseeable future actions that could, when combined with impacts of the Proposed Action, result in cumulative impacts. Contrary to the comment that the Army is limiting its analysis to actions that are similar to the Proposed Action at the PCMS or Fort Carson, the Army considered a wide range of past, present, and reasonably foreseeable future actions, as documented in Sections 3.13.1 through 3.13.3 of the DEISs.

The cumulative impact assessments in the *PCMS Transformation EIS* and the Fort Carson Transformation EIS were prepared in accordance with the CEQ's implementing regulations and CEQ and EPA guidance on cumulative impact analyses. The Army first identified the scope of the analysis by focusing on those actions that are relevant and consequential to decisions about the proposed action and alternatives--"count what counts" (U.S. EPA, Considering Cumulative Effects under the National Environmental Policy Act, CEQ, January 1997). The Army next identified the past, present, and reasonably foreseeable actions that, when considered with the Proposed Action, had the potential to combine to result in significant cumulative impacts (see Sections 3.13.1, 3.13.2, and 3.13.3 of the DEISs). In addition, Table 3-24 of the Fort Carson Transformation EIS and Table 3-17 of the *PCMS Transformation EIS* contain detailed disclosure of the cumulative impacts of past, present, and reasonably foreseeable future actions at those installations. For a cumulative impact to occur, impacts of separate actions must be related in space and time.

Each of the EISs identifies past, present, and reasonably foreseeable future actions in a manner consistent with the CEQ's NEPA regulations and EPA guidance (EPA, 1999). Through scoping, the Army determined that actions planned by others in the vicinity of Fort Carson had the potential to cumulatively affect several environmental resources. Through scoping for PCMS, no other actions were identified in the vicinity of the PCMS that had the potential to, when combined with the Proposed Action, to result in cumulative environmental impacts. CEQ (2005) recognizes that "the extent and form of the information needed to analyze appropriately the cumulative effects of a proposed action and alternatives under NEPA varies widely and must be determined by the federal agency proposing the action on a case-by-case basis."

The DEIS for Fort Carson does disclose that significant impacts could occur as a result of implementing other actions in combination with other past, present, or reasonably foreseeable actions. For example, the Fort Carson Transformation EIS discloses in Section 3.13 that cumulative effects could occur for transportation and traffic as a result of the historical and ongoing delayed maintenance. For the *PCMS Transformation EIS*, the Army consulted with the appropriate local municipal agencies in Los Animas. Otero, and Huerfano Counties, as well as the USFS (Comanche National Grasslands) to determine what reasonable foreseeable future projects should be considered as other actions that might result in cumulative impacts.

No future projects (except transformation) outside of construction of a handful of private residences planned by private or governmental entities of any kind in the vicinity of the PCMS. Because no projects were planned by the Army or others that had the potential to contribute to cumulative effects, analysis of the environmental effects of the Army's actions at the PCMS are contained within the No Action and Proposed Action of the DEIS. As noted above, although the impacts of the PCMS and Fort Carson may be related in time, they are not related in space because of the distance of 150 miles between the two installations. In addition, many of the impacts of the installations differ because of the differences in how transformation activities will be implemented at each site. As a result, no cumulative impacts at the PCMS, including any from Fort Carson, would occur.

Although the actions at Fort Carson and the PCMS will occur during a similar time frame, the geographically distance of the sites (more than 150 miles) results in a lack of an exposure pathway for impacts that could be cumulatively significant.

Response to I299-25

This comment discusses similar impacts as part of the identification of past, present, and reasonably foreseeable future actions. The Army concurs with the comment that it must consider all "other past, present, and reasonably foreseeable future actions" (40 CFR 1508.7).

The PCMS and the Fort Carson DEISs are correct in stating that for cumulative impacts to occur, there must be "past, present, or reasonably foreseeable future actions that have the potential for incremental and potential impacts that are similar to those of the Proposed Action." The use of the word "similar" in the quoted text refers in this instance to "similar impact, " not to "similar actions." That is what is meant by the use of the term "similar impact" in the DEIS.

The Army agrees with the commenter that it cannot limit its analysis of impacts to only those other actions that are similar to the Proposed Action. The similarity of actions was one of the factors the Army applied in developing the past, present, and reasonably foreseeable future actions to consider in the cumulative analysis. As noted above, the DEIS does consider those other actions, regardless of whether the actions are similar in nature or outside the jurisdiction of the military. The PCMS and the Fort Carson DEISs are correct in stating that for cumulative impacts to occur, there must be "past, present, or reasonably foreseeable future actions that have the potential for incremental and potential impacts that are similar to those of the Proposed Action." The use of the word "similar" in the quoted text refers in this instance to "similar impact, " not to "similar actions," and this is an appropriate criterion for determining cumulative impacts.

For an impact to be considered cumulative, it (that is, the impact) must be similar to the other action's incremental impact —that is, air quality impacts from hypothetical project A and air quality impacts from hypothetical project B could combine to result in cumulative impacts, but air quality impacts from project A and geology impacts from project B cannot, by definition, incrementally combine to result in a cumulative impact because they are of a different nature of impact. The collective impacts of the Proposed Action are considered throughout Section 3.0 of the DEIS to the extent that a impact in one resource area can result in direct or indirect impacts to another resource (e.g., the interrelationship of fisheries and water quality impacts demonstrate an interrelationship of such impacts, but they are not considered "cumulative" impacts under NEPA definition of cumulative impacts).

To avoid confusion on the Army's approach to the cumulative impact assessment, Section 3.13 of the PCMS DEIS and Section 3.13 of the Fort Carson DEIS are revised in the FEIS to clarify the methodology for conducting the cumulative assessment to discuss in more detail the process for identifying the past, present, and reasonably foreseeable future actions and the ways in which these actions were assessed for cumulative impacts.

Response to I299-26

Please refer to the Master Response regarding "Expansion of the PCMS," particularly subheading "Cumulative Analysis of the Separate Transformation and Expansion Actions."

Response to I299-27

Part D.3 of the comment letter contends that the cumulative impact analysis is deficient on the basis of its organization of impacts by resources. The introductory section of the cumulative analysis of the FEIS has been revised to clarify that no cumulative impacts would occur from the resource categories noted in the comment.

Response to I299-28

Part D.4 of the comment continues to confuse the request for a combined EIS with the conduct of a cumulative analysis. Please see the response to comments I299-10, I299-11, and the remainder of I299-13. Also see the Master Responses for "Expansion of the PCMS," and "Segmentation of the PCMS Transformation and Expansion Actions."

The potential for the transformation actions at Fort Carson and the PCMS to result in cumulative impacts was considered but determined not to be relevant because, as stated in Section 3.13. the resources affected are different and, therefore, effects to the respective resources are additive but not cumulative. See also the Master Response on "Segmentation of the Fort Carson and PCMS Transformation Actions."

Response to I299-29

As noted by the commenter at the end of D.5, federal law comprehensively regulates cultural and historical resources under federal control. The listing of laws and regulations relevant to cultural resource management at the PCMS, including all referenced by the commenter in addition to others not cited, is provided in Appendix F.2. The DEIS acknowledges that these laws and regulations shape cultural resource management at the PCMS. Additionally, the PCMS operates under an Integrated Cultural Resource Management Plan (DECAM 2002b) that "provides guidance and procedures to enable…Fort Carson to meet its legal responsibilities…for identification, evaluation, and protection of cultural resources…and integrate legal requirements for cultural resources preservation into the everyday operation of the…military mission and supporting activities."

The first paragraph of the comment states that the Army must evaluate cumulative effects to cultural resources, and the Army agrees. The paragraph also states that the implementation of the Proposed Action will have significant cumulative effects on cultural resources, and this statement is unsupported. Specific responses to specific comments are provided below.

Response to I299-30

The DEIS acknowledges that the PCMS and Fort Carson are rich in cultural, archaeological, and paleontological sites and also acknowledges that additional important resources are likely present that have not been previously identified. The purpose of the projection of potentially eligible sites was to establish a magnitude for the numbers and types of resources present in areas that are unsurveyed to establish a projected baseline of National Register-eligible sites that may be present at the PCMS and Fort Carson. Any sites within the PCMS and Fort Carson are within the Area of Potential Effects for the purposes of Section 106, and therefore, must be considered in proposed training exercises (undertakings). The complete quotation from the DEIS is "A comparative analysis was developed to complement the analysis in this EIS (see Appendix F, Attachment F.3). This analysis establishes projections of the number of archaeological sites/historic properties with the potential to be eligible for inclusion in the National Register that may be encountered and/or adversely affected in unsurveyed areas because of increased military training activities at Fort Carson." The DEIS also notes that Fort Carson was heavily for military training prior to the establishment of the laws and regulations protecting cultural resources detailed in Appendix F.2.

The commenter concludes that "significant adverse impacts on these unidentified cultural resources is undeniable." To the contrary, the Army has established procedures to effectively assess potential adverse effects on cultural resources before training exercises are allowed in unsurveyed areas.

Response to I299-31

This bullet beginning "The consequences of BRAC 2005…" is misquoted and out of context. The actual quote from the DEIS is "…Military training activities have the potential to result in adverse impacts to cultural resources. The extent of the impact is contingent upon two factors: the type of training and the landform where the training takes place." The DEIS goes on to state that "All training activities that could affect properties eligible for inclusion in the National Register must be considered

to be undertakings in accordance with NHPA Section 106."

Response to I299-32

This bullet is also out of context. Past activities altering land forms at Fort Carson occurred before the protection of cultural resources was mandated by federal laws and regulations or recognized as an important land management goal. Fort Carson was established in 1941, and the first comprehensive law protecting cultural resources, the NHPA, was established in 1966.

Response to I299-33

The final bullet is also out of context. The sentences were pieced together to suggest that the Turkey Creek Rock Art District would be significantly impacted by the Proposed Action. The DEIS actually states that impacts would be significant (because the resource is significant) but that no impacts are anticipated; it is acknowledged throughout the EIS that the Turkey Creek Area is restricted from training activities. The actual quotes from the DEIS is "It is anticipated that the Proposed Action will have no adverse impact to the Turkey Creek Recreation Area. The Turkey Creek Rock Art District has been designated for dismounted training only. Nevertheless, the potential for adverse impacts due to increased training

activities in or around this District are significant. Should future training initiatives involve a change in training policy or be determined to have the potential for adverse impacts to the resources within the District, Fort Carson will comply with Section 106 consultation procedures prior to use."

Response to I299-34

Section 3.13 of the DEIS and FEIS addresses cumulative effects to cultural resources at and around Fort Carson. Comments related to the PCMS are addressed in the *PCMS Transformation FEIS*, as noted in response to comment I299-3.

Response to I299-35

Please refer to responses I299-27 through I299-33.

Response to I299-39

The commenter is misstating the CEQ regulations. The information on "reasonably foreseeable significant adverse effects" cited in 40 CFR 1502.22 relates to incomplete environmental data that may inform decision making. The "probability of occurrence" does not mean the probability of an action, such as expansion, occurring but rather the probability that an action being evaluated in an EIS may result in catastrophic consequences (e.g., exposure to a chemical may cause a significant human health effect even though the relationship between the exposure and health effects are not well understood).

The fact that the Army has not developed a proposed action or alternatives for expansion is not the type of incomplete information that is referenced in 40 CFR 1502.22. The Army has committed to preparing an EIS and environmental baseline studies to support a thorough analysis of potential environmental effects of expansion but this analysis is not necessary to inform the decision making in the PCMS Transformation DEIS. Please refer to the master response regarding expansion of the PCMS and segmentation of the PCMS transformation and expansion actions.

FORT CARSON LOCAL COMMUNITY



COLORADO COUNCIL OF PROFESSIONAL ARCHÆOLOGISTS

January 5, 2007

Dear [redacted]

The CCPA appreciates having had the opportunity to look over the draft Environmental Impact Statement for Ft. Carson and PCMS. This letter was composed with input from members of the current Executive Committee and several other members of our organization. Given the current "buzz" about possible future proposals for expansion at PCMS, we are concentrating the bulk of our comments on the PCMS draft EIS, rather than the Ft. Carson one. We understand that the expansion, if the proposal is approved, will fall under a separate EIS document, so the majority of our comments concern this document. However, it seems clear that plans laid out in this draft EIS lay the groundwork for the possible expansion. The separate EIS for expansion constitutes a somewhat arbitrary segmentation of what is clearly one, coherent long term plan. So a brief section of these comments also addresses that. The final comment is a general observation that we feel may explain the current sense of frustration and disempowerment on the part of the public as a whole, as well as the professional community who deal with environmental compliance issues outside the military.

LC10-1

We thank you for your time and attention.

Comments on the PCMS draft EIS:

- **Cumulative, permanent resource damage:** In places the authors argue that the Army will "rest" the land between rotations and treat natural resources sustainably because "it is in the Army's interest to sustain the land at the PCMS for future training activities" (p.2-13). There is some debate about the value of such "rest" to natural resources; archaeological work has shown that compression from tracked vehicles on soil and artifacts occurs to at least the base of excavations at 70 cm. below current ground surface. *However, it is very clear that no amount of rest between training rotations will help cultural resources "recover."* We are left with the conclusion that the Army has no incentive (beyond compliance with the law, which is weak incentive) to protect archaeological resources. Support for protecting sites varies markedly with the personal commitment of Commanding Officers, who change every two to three years. Archaeological resources are often viewed more as obstacles to training.

LC10-2

Again, the section 1.2.5 headed "Installation Sustainability" contains a statement of intent to "protect training lands from permanent damage" (p.1-7). *All damage to archaeological sites is permanent damage.*

LC10-3

LC10-4

"Dismounted training" (p.ES-9) needs definition. The claim that it is "similar to recreational uses, such as hiking or camping" (p.2-12) is impossible to evaluate given the lack of information on the nature of dismounted training activities. Hiking and recreation do, in fact, cause impacts to cultural resources – sometimes serious ones. Variables that are important to dismounted training are the same as those that were important to historic and prehistoric users of the landscape, such as line-of-site, protection from attack, protection from elements, and ease of pedestrian travel. Even small damages will accumulate over time, with increased training rotations, and become substantial. *Even dismounted military use will further concentrate use in areas most likely to impact cultural resources.*

We strongly disagree that dismounted training should be allowed to go on before survey (p.ES-9), before "the proposed use area has been evaluated to determine that cultural resources can be protected against adverse impacts."

LC10-5

- (p.ES-5) document states that resources in the Maneuver Training Area, which excludes canyons, "could be disturbed during training exercises." It is the case that canyon areas, the most densely rich in archaeological sites, can be and have been impacted by training activities in the past, despite the fact that they lie technically outside the Training Area.

LC10-6

In section (p.ES-5), the document states that "Cumulative environmental impacts, therefore, are not expected for the Proposed Action." Once again, damage to archaeological sites is cumulative by definition.

In section 3.13 (p.3-90), once again, the description of cumulative effects says nothing about archaeological sites. Yet the proposed Action Plan clearly would generate cumulative damage to archaeological sites.

We cannot emphasize enough that damage to cultural resources will be cumulative and permanent. Nowhere in the document is this fact adequately acknowledged. Why are cultural resources not discussed under cumulative effects?

LC10-7

- The statement on p.3-101 that known resources "are protected and unlikely to be harmed during training" has unfortunately proved not to be the case in the past. Despite good faith efforts by the Army to protect such sites, the military has called in archaeologists to assess damages on several prehistoric and historic period National Register-eligible archaeological sites that have been impacted by training despite the protective measures that were in place. So far, the protective measures on such sites have proven vulnerable.

LC10-8

- Discussions of Noise and vibration and "controlled burns" are not discussed anywhere in conjunction with cultural resources, yet these events clearly impact archaeological sites. Many of the historic structures on the PCMS are free

LC10-8

standing, dry-laid masonry walls that will not withstand much in the way of vibrations.

LC10-9

- **Staffing problems:** Several CCPA members have worked productively with the knowledgeable and dedicated archaeology staff at DECAM. However, it is clear that current staffing levels for archaeology at DECAM are stretched far too thin to cover the resources under the pressures of the current rotation schedule, never mind increased use. There is no way that current staff, committed personnel as they are, can cover the necessary survey, assessment, mitigation, and write-up that are and will be required by the increased rotation schedule. There would need to be either significant staff increase, or increase in subcontracting larger projects.

  Nowhere in the document is there any discussion of contracting or subcontracting the significantly increased number of archaeologically trained personnel that will be needed to cover the increased workload to assess and monitor adverse effects on cultural resources.

LC10-10

- **Oversight:** It is our understanding that DECAM recently severed ties with the National Park Service, Midwest Archaeological Center, which had been working with DECAM archaeologists on many projects. The Army's Rocky Mountain Arsenal and Pueblo Chemical Depot both work with private contractors and the U. S. Fish and Wildlife Service on environmental compliance projects. It seems that more and more of the work on Ft. Carson and at the PCMS is occurring entirely in-house. While we appreciate the abilities of the DECAM archaeologists, and in-house work is appropriate for some projects, archaeology is a discipline where new perspectives result in better Section 106 compliance and contribute to cutting edge research.

  We feel strongly that links with outside agencies provide better support and diversified oversight for some projects, and such agreements, ties, and contracts with outside agencies and companies should continue. The wide variety of cultural resources present in the PCMS requires a breadth of experience that benefits from associations with other agencies and professional archaeologists.

LC10-11

- **Non-Native American Traditional Cultural Properties:** Traditional Cultural Properties (discussed in the document as cultural resources) are usually associated with Native Americans. However, any group, whether it be ethnically defined or not, may claim Traditional Cultural uses that need to be considered. Two examples from the National Park Service website are:

  1) a rural community whose organization, buildings and structures, or patterns of land use reflect the cultural traditions valued by its long-term residents;

  2) a location where a community has traditionally carried out economic, artistic, or other cultural practices important in maintaining its historic identity.

- The 135,000 acres for expansion referenced in the document is only one (and the smallest) of the numbers that have been publicized of late. There has been discussion of acreage as high as 1,250,000. *We find the current reticence of the Army concerning the actual desired acreage antithetical to productive public discussion and planning.*

LC10-12

- *Given the density of sites on adjacent Forest Service Lands, especially NRHP eligible sites and eligible districts, it is not advisable that any military training ever happen in the main canyons of the Purgatoire River or the major tributary Chacuacua Creek.* This area is important throughout prehistory, and historically it is the main artery of a pattern of early Hispanic settlement in the state of Colorado that is not duplicated elsewhere (patterns in the San Luis Valley are quite different, for example). *This area is arguably just as resource rich and archaeologically important as Mesa Verde.*

LC10-13

- (p.3-59) states that paleontological resources "do not have the same federal mandates for identification and protection as cultural resources at PCMS." The Forest Service lands adjacent to PCMS are extremely rich in very important paleontological resources, beyond just the dinosaur track site, and the Forest Service is currently inventorying those resources.

In conclusion:

The largest problem with this document is the legislative sleight-of-hand, perhaps legal, but unethical, that exempted the Base Closure and Realignment Act of 1990 from NEPA review to begin with. Worse is the way this exemption has been stretched to effect current realignment decisions and environmental planning. This action represents an end run around the spirit of environmental and preservation law. As it stands now, the document tries to have it both ways. It ties the necessity of this action plan to base realignment, with no viable alternatives, but precludes any discussion of realignment under NEPA. This move allows the Army, in this document, to present only the black-and-white options of Action or No Action, offering no room for compromises such as training in smaller groups, leaving Forest Service lands in Forest Service hands (thus preserving public access), or negotiating in good faith with surrounding landowners.

LC10-14

There is no real attempt here to come up with genuine compromise positions, only the options "Action" versus "No Action." *We do not accept the premise of this document that "action" or "no action" are the only options available.* The document says alternatives were explored and rejected, but they are not outlined in any detail. We believe that such compromises may be possible, but not if the Army will not discuss the expansion in any detail until it is already approved and funded. The current options presented in this document seem to be part of a long term Army strategy to channel discussion away from legitimate public concern by presenting no real compromise position, thus leaving no room for good faith negotiation.

I close with a direct quotation from the Congressional Record, dating from May 3, 1990, when the Honorable Hank Brown, Senator from Colorado, introduced the legislation that resulted in the addition of the PCMS's Purgatoire Valley lands to the Comanche National Grassland expressly "for the purpose of protecting the paleontological, archaeological, and natural resources of those lands."

LC10-15

> "The canyon plays an important role in southeastern Colorado's history. It is important for folks to have the opportunity to visit and view the remaining artifacts. It would be in the best interest of cultural preservation and public recreation for the property to be managed by an agency whose sole responsibility is the management of public lands."

Thank you for accepting our comments.

Sincerely,

[redacted]

The Colorado Council of Professional Archaeologists:

[redacted]

Comment Responses for Letter LC10, Colorado Council of Professional Archaeologists

This comment letter was submitted for the *PCMS Transformation DEIS*, however, one comment, LC10-1, pertains to the *Fort Carson Transformation DEIS*, which is addressed here. Issues related to the transformation action at the PCMS are addressed in the *PCMS Transformation FEIS*.

Response to LC10-1

Comment noted. The Army acknowledges the Colorado Council of Professional Archaeologists review of the Fort Carson DEIS. Please refer to the Master Response regarding “Segmentation of the Fort Carson and PCMS Transformation Actions.”.

Issues related to the potential expansion of the PCMS are addressed in the *PCMS Transformation EIS.*

ORIGINAL

REPORTER'S TRANSCRIPT

PINON CANON MANEUVER SITE

FORT CARSON

PUBLIC MEETING

MESA RIDGE HIGH SCHOOL

AUDITORIUM

NOVEMBER 1, 2006

COPIES OF TRANSCRIPTS ARE AVAILABLE UPON REQUEST. CONTACT THE FORT CARSON NEPA PROGRAM MANAGER AT 719.526.4666



Comment Responses for Meeting Transcript LC3, Meeting Transcript, Fountain, Colorado Public Meeting November 1, 2006

This comment letter was submitted for the *PCMS Transformation DEIS*. Issues related to the transformation action at the PCMS are addressed in the *PCMS Transformation FEIS*. Responses to comments LC3-1, LC3-19, LC3-20, LC3-22, LC3-23, LC3-51, LC3-57, and LC3-58 pertain to the *Fort Carson Transformation DEIS*, and responses to these comments are provided below.

Response to LC3-1

The Army extended the original 45-day comment period required under NEPA to a 90-day comment period for the *Fort Carson Transformation DEIS* afford the public additional review time. Please also refer to the Master Response regarding “Requests to Extend the Fort Carson Transformation DEIS Public Comment Period.”

Response to LC3-19

The Army shares your concern for global climate change and has made commitments to sustainable installations at Fort Carson and the PCMS. Section 1.2.5 of the DEIS provides information about the Army's commitment to installation sustainability. Section 1.2.5 of the FEIS has been modified to provide additional clarifying information about Fort Carson's various voluntary programs to reduce emissions. The addition of this information does not change the findings in the DEIS. Fort Carson is currently meeting all applicable environmental standards for air emissions, and as demonstrated in Section 3.3 of the DEIS, Fort Carson will continue to meet applicable air quality requirements as part of the Proposed Action.

Response to LC3-20

Training at Fort Carson and the PCMS does not include the use of depleted uranium ordnance, and the increased training that would occur as part of the Proposed Actions at both Fort Carson and the PCMS will also not use depleted uranium ordnance. Use of depleted uranium for training is prohibited worldwide by Army policy, as documented in AR 385-62. Thus, there would be no impacts from the use of depleted uranium ordnance to the Ogallala aquifer and the Arkansas drainage basin.

Response to LC3-22

Training requirements are detailed in Sections 2.2.4 and 2.3.4 of the DEIS. As noted in Section 2.2.4.3, Process for Implementing the Training Mission, the conduct of training is dependent on a number of factors. Because Fort Carson does not have adequate training areas to execute full doctrinal training, the DEIS discusses in the Proposed Action that the Army will need maximum flexibility to balance the training needs with land management and environmental stewardship (both of which are noted as key missions of the Army). Therefore, specific numbers of days, hours, or level of use cannot be precisely defined. As discussed in the DEIS, the level of use, will however, be greater than has occurred historically.

Under the Proposed Action air traffic would decrease from current levels. Please refer to the DEIS Section 2.3.2: “One notable change in equipment between the No Action alternative and the Proposed Action includes the loss of helicopters, which were assigned to the 3rd ACR. Helicopters could be used by visiting forces, but the use is anticipated to be infrequent.” Because no permanently assigned aircraft will be stationed at Fort Carson, the Army's use of aircraft, including helicopters, will be minimal, and these training activities are not described in detail because they are infrequent and not regularly planned. U.S. Air Force use of a small bombing range in the southern portion of Fort Carson would continue (as under No Action).

Response to LC3-23

The requirement for a discussion of "purpose and need" in an EIS under the CEQ regulations is to "briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action" (40 CFR 1502.13). The DEIS contains the relevant information for each of the programs mentioned by the commenter to describe the purpose and need to meet these requirements. The Army is, however, happy to share documents relevant to the purposes outlined in the DEIS and has provided links to electronic documents as requested. See http://www.carson.army.mil/rusag/pinon_canyon.html.

The commenter’s concerns with current direction and administration of the DoD and the Army are noted.

Response to LC3-51

Comment noted.

Response to LC3-57

Comment noted.

Response to LC3-58

Comment noted.

FORT CARSON LOCAL/REGIONAL AGENCY

Harold "Jake" Klein - Commissioner Dist. 1
Kevin Karney - Commissioner Dist. 2
Robert Bauserman - Commissioner Dist. 3
Michael L. Nicklos - County Attorney
Donna Rohde - County Administrator

OTERO COUNTY

Office of the Commissioners

November 7, 2006

[redacted]
1638 Elwell Street, Bldg 6236
Ft. Carson, CO 80913-4000

Dear [redacted]

LRA1-1 Thank you for your response regarding my request for additional time for public review and comment of the Fort Carson and PCMS Draft EIS. As an elected official from Otero County, I am compelled to enlist the services of professionals with the necessary expertise to completely evaluate this document and the impacts on the citizens whom I represent. After visiting with the Otero Board of County Commissioners, I respectfully request an additional 90 days comment period beyond the currently stated deadline of November 27, 2006.

Thank you for your consideration of this request. If you have questions or need further information, please do not hesitate to contact me.

Sincerely,

[redacted]
Otero County Commissioner

(719)383-3000/383-2456 TDD *P.O. Box 511 La Junta CO 81050-0511* *(719)383-3090 Fax*

Comment Responses for Letter LRA1, Otero County, Office of the Commissioners

Response to LRA1-1

The Army extended the original 45-day comment period required under NEPA to a 90-day comment period for the *Fort Carson Transformation DEIS* and to afford the public additional review time. Please also refer to the Master Response regarding “Requests to Extend the Fort Carson Transformation DEIS Public Comment Period.”

Issues related to the *PCMS Transformation DEIS* are addressed in the *PCMS Transformation FEIS*.

FORT CARSON STATE AGENCY

STATE OF COLORADO

Bill Owens, Governor
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
AN EQUAL OPPORTUNITY EMPLOYER

[redacted]

For Wildlife-
For People

December 1, 2006

[redacted]
ATTN: Fort Carson NEPA Coordinator
1638 Elwell Street, Building 6236
Fort Carson, CO 80913-4000

Subj: Comments on Draft Environmental Impact Statement for Transformation Programs at Fort Carson.

Dear Sir:

SA2-1 The Colorado Division of Wildlife has received and reviewed your request for comment on the Fort Carson Transformation Draft Environmental Impact Statement (DEIS). The Division recognizes the importance of training on Fort Carson, and understands that the training mission precedes other interests on the base. As the agency charged with managing the state's wildlife resource, our hope is that the Army continues to blend wildlife management and sportsmen's interests with the mission of Fort Carson. Upon review of the document, the Division offers the following general and specific section comments and suggestions for your consideration.

SA2-2 The Colorado Division of Wildlife is very concerned with the proposed changes to Fort Carson. The increased number of training rotations due to the influx of soldiers stationed at Fort Carson will potentially have negative impacts to the wildlife resource and the habitat. Additionally, the action being proposed at Fort Carson and PCMS appears to be both connected and interdependent in scope and, as such, the Division believes the action should be treated and evaluated in a single EIS. The handling of this personnel expansion action in separate EIS's is confusing and makes it difficult to properly assess cumulative impacts and appropriate mitigation measures. The CDOW understands the basis and purpose, and need to train soldiers in the interest of making them combat ready and for their safety, however we believe these connected actions warrant treatment in a single and comprehensive EIS. For example, training requirements for the different types of units being stationed at Fort Carson and utilizing PCMS are discussed independently in both documents but not comprehensively with attention given to training requirements that can be satisfied at PCMS and which might reduce or minimize impacts at Fort Carson (Ex: company & brigade level training & doctrinal training requirements). Additionally, the analysis should include an evaluation to determine if the combined facilities will meet 100% of DOD's training requirements or would still require, as a reasonably foreseeable future action, expansion of PCMS onto adjoining lands.

SA2-3 An effective alternatives analysis other than the proposed and no-action alternatives should include a range of specified uses and needs at both facilities. The Division is concerned with the overall lack of detail and environmental analyses regarding most aspects of the EIS, in particular the Biological Resource section. We believe that the alternatives analysis seems to lack an appropriate number of clearly defined alternatives, including an environmentally preferable alternative, or any justification as to why those listed alternatives were dismissed. We don't believe the reasoning for dismissing several of the alternatives was adequate for exclusion in the overall analysis based upon our understanding of NEPA and the alternatives analysis process.

[redacted]

SA2-4

In addition, there is little information outlining existing conditions and how training is managed on Fort Carson. We don't believe that simply referencing the Integrated Natural Resource Management Plan (INRMP), which does not clearly define existing training conditions or how training is managed, is sufficient for proper analysis by reviewing agencies. Associated with this concern is the absence of any information outlining how the existing Rest/Rotation/Deferment Program works either in writing or spatially. To gain a better understanding of existing down range training demands on Fort Carson, we feel that a detailed explanation that includes a spatial representation would help explain or clarify both the no action and proposed action alternatives. This type of information would help the Division analyze what the existing environmental impacts are and set the stage for environmental analyses for the proposed action. The Division's main concern with the transformations DIES is the increased levels of training which includes: increased number of troops, increased live-fire training, and increased maneuvers training. The majority of the environmental analyses associated with the proposed action merely states that there will be an increase in use on Fort Carson; therefore, the environmental impacts will increase. The Division believes that the qualitative impact assessment is inadequate for an EIS level document. We recommend that a baseline of adverse impacts resulting from the existing training condition be documented, then an additional environmental analyses of the proposed action can occur.

SA2-5

In the Existing Land Use (Section 3.2.1.3) of the DEIS, there is a brief statement referring to "restricted and/or no use areas" for the public under the Range Section. However, there is no definition of "restricted use or no use". To better understand training uses, we recommend a map showing areas that hold the restricted and no use designations along with definitions of those areas.

SA2-6

In Section 3.2.2.2.2, Proposed Action, Training, the document states that *the increased training activities on Fort Carson would likely reduce the availability of downrange training areas for recreational uses, such as hunting, except for those portions of training areas that are in a limited-use status (as determined by FC Regulation 350-10). Hunting would likely still be allowed in deferred areas, if such use would not interfere with the training mission. Special areas used for recreation and wildlife protection currently off limits to training would likely continue to be off limits to training in the future.* Fort Carson is currently wholly contained within its own Game Management Unit (GMU 591). Most limited licenses available through the drawing process for GMU 591 can only be used on Fort Carson. It is unknown what a "deferred area" refers to, but reducing or eliminating recreational opportunity in an already limited hunting unit is not offering a fair opportunity to a license holder. Additional constraints or reductions on hunting access due to an increase in training, will negatively impact the ability of the Division to achieve harvest and population objectives for both deer and elk. We believe this impact should be more thoroughly analyzed and presented in the DEIS along with specific measures to mitigate those impacts. That analysis should address the following: recreation restriction levels (i.e. number of hunters, geographic areas, timing of hunting restrictions), historic versus proposed population and harvest levels, environmental impacts associated with reduced big game harvest, changes in habitat use (both type and intensity), and human safety related to potential big game population increases (i.e. vehicle conflict). Additionally, we believe the DEIS should address wildlife disease issues especially since GMU 591 is positive for Chronic Wasting Disease (CWD), a fatal neurological disease for deer and elk, which appears prevalent at higher levels at Fort Carson then in the surrounding GMU's. The Division is concerned that, with reduced hunter access and diminished harvest due to more intense training regimes Fort Carson might serve as a dispersal sink for deer and elk allowing them to concentrate at higher densities and with an increased potential for spread of CWD outside the boundaries to surrounding GMU's. Again, the Division believes that hunter access, population management, harvest management, and disease management, be further analyzed in the DEIS. Further, the Division believes that dates for hunter access such as those during the traditional holiday time frames when troops are not training, or other dates approved in advance should be identified and stipulated.

In Section 3.7.2.2 Proposed Action, Training, the document states *the types of impacts expected to occur to vegetation communities and to wildlife and their habitats in each of Fort Carson training areas under the Proposed Action would be the same as described for the No Action alternative. Because baseline data are not available for quantifying the extent (number of acres used) and magnitude (frequency) of training-related impacts on vegetation and wildlife resources, it is not possible to quantitatively estimate impacts to habitats and wildlife populations from implementation of the Proposed Action or what the magnitude or severity of those impacts would*

be compared to the No Action alternative. The Division believes that an increase in training as outlined in the Proposed Action would have an increased impact on vegetation and wildlife from the status quo (No Action alternative). The Division does not believe that impacts to wildlife and vegetation will be the same between the Proposed Action and the No Action alternative, despite a lack of quantifiable data. Continuous training could negatively impact native wildlife by forcing them to leave habitat on Fort Carson. Large ungulates, such as mule deer and elk, do not tolerate human activity and avoid such areas. However, in times of no training and a lack of hunting, Fort Carson could serve as a concentration area for big game. Raptors and other bird species also require areas without large scale activity to breed, nest and feed. The DEIS does not recognize an increase in negative impacts, and therefore does not offer any mitigation opportunities. Possible mitigation could include avoidance measures (for pronghorn, deer, elk, and wild turkey) during critical times of the year to include but not be limited to: severe winter range, fawning/calving areas, and roost sites. The Division of Wildlife would suggest that if an increase in training is unavoidable, then non-training areas be increased in size and habitat quality increased to attempt to off set the unavoidable negative impacts to wildlife. This mitigation will most likely not affect larger wildlife species, such as deer and elk, which will in large part be forced to avoid training areas within the base.

SA2-7

SA2-8

The document states that existing training needs are 28 weeks per year. However, the proposed action does not clearly define the increased training levels. The DEIS states: *"Training may or may not occur 52 weeks a year"* (Section 3.7.2.2). We understand that amount, type, and duration of training will vary depending on personnel on base and can not be absolutely defined. However, the Division recommends that an attempt at forecasting projected troop levels and training be performed so that the reader has a better understanding of the demands on Fort Carson. We believe that the current lack of detailed information regarding number of personnel, timing of arrival, training requirements, training locations, and training deferment inadequate in the DEIS. The Division recommends a more specific proposed action with regard to training activities which would lead to a better estimation of environmental impacts, environmental consequences, and more clearly defined mitigation recommendations.

SA2-9

With regard to sensitive wildlife species in the biological resource section listed in Table 3.10, the Division recommends changing the title of the table to accurately reflect the species listed. Table 3.10 is titled Colorado State listed Species; however, some species on the list are not State listed species. Some species on the list represent other NGO watch list wildlife species, which is fine to include, but should be titled appropriately. The EIS offers some mitigation measures (buffer zones and nest protection) to help protect the above listed species, however, states that they are voluntary and that in certain instances training requires encroachment or ignoring of those measures. For example, we are concerned with impacts associated with black-tailed prairie dogs, mountain plovers, and burrowing owls. There will be increased impacts to black-tailed prairie dogs as a result of implementing the proposed action. However, there is no specific mitigation offered to reduce those impacts. Black-tailed prairie dog colonies provide habitat for a suite of other species including but not limited to: mountain plover, burrowing owl, rattlesnakes, ferruginous hawks, and bald/golden eagles. The Division is concerned with the lack of specificity or voluntary nature of these mitigation measures. We recommend, to the extent practical, that these mitigation measures be mandatory and enforced.

SA2-10

The cumulative impacts section generally addresses biological resources but leaves out cumulative impacts associated with hunting as a result of a net increase in training. As part of the transformation of Fort Carson, we recommend public hunting continue in some form acceptable to both the Colorado Division of Wildlife and the United States Army. Should public hunting access become so restrictive on Fort Carson that harvest and population goals are not achievable, then we believe that the cumulative impacts analysis must address alternatives to hunting to manage game species (both population levels and disease components). The Division would also recommend mitigation measures associated with the loss of recreational hunting and the loss of wildlife habitat.

SA2-11

In closing, the Division understands that additional soldiers are being assigned to Fort Carson and that they must be properly trained as outlined in the DEIS. Further, it is understood that the arrival of additional soldiers will take place even under the no action alternative outlined in the DEIS. The Colorado Division of Wildlife does, however, have concerns with the possible negative impacts on the wildlife resource, the habitat, and loss in hunting opportunity, thus limiting our ability to manage the state's wildlife at Fort Carson. With that in mind, the CDOW requests that training requirements be further detailed, impacts from the proposed action be more thoroughly quantified in a comprehensive

SA2-12

SA2-13

SA2-14

DEIS covering both Fort Carson and PCMS to include an analysis of how these two facilities complement each others needs, and that additional suitable alternatives to full deployment at both sites be incorporated into the document for consideration. Additionally, the DEIS should quantify whether the training needs identified can be fully provided by the two facilities for both the current scenario and any reasonably foreseeable future actions or if expansion onto adjoining acreage surrounding PCSM will still be required. The Division might respond differently to the increased impacts at Fort Carson and PCMS if it felt comfortable knowing additional acreage would not be required further restricting our wildlife management and recreational capabilities. The comprehensive and combined DEIS should evaluate this full range of alternatives in comparative form including an environmentally preferable alternative, and more fully discuss the reasons for elimination of any alternatives. Finally, the DEIS should fully quantify the proposed action and environmental effects, and fully explore recognized methods for mitigation including avoiding, minimizing, rectifying, reducing, and compensating prior to making a "no mitigation required" determination.

The Colorado Division of Wildlife wishes to thank you once again for the opportunity to comment on this Draft Environmental Impact Statement. Please feel free to contact me should you have questions or require additional information.

Sincerely,

[redacted]

Cc: [redacted]

Comment Responses for Letter SA2, Colorado Division of Wildlife

Response to SA2-1

The Army intends to continue to blend wildlife management and recreational interests such as hunting and fishing with the installation's mission. The Army recognizes that hunting is an important wildlife management tool and will continue to work with CDOW and USFWS to provide recreational hunting opportunities on Fort Carson that do not conflict with military training operations.

Response to SA2-2

Please refer to the Master Responses section regarding “Segmentation of the Fort Carson and PCMS Transformation Actions” and “Number of Alternatives Considered.”

Response to SA2-3

In the case of the *Fort Carson Transformation EIS*, Congress limited the scope of NEPA for BRAC actions to exempt stationing decisions from alternatives analysis under NEPA. The “reasonable range” of alternatives considered under a BRAC action differ, then, from the typical NEPA process (and the CEQ regulations) because the purpose and need is to implement a defined program and the range of alternatives to meet the purpose and need applies only to the spectrum of reasonable implementation scenarios of the prescribed action (i.e., the BRAC recommendations). For a detailed discussion of this issue, please see the Master Response in this FEIS for “Number of Alternatives Considered.” As required by NEPA, the environmentally preferred alternative will be identified in the ROD.

It is not clear what details CDOW believes have been omitted from or should have been included in the DEIS. The biological resources section depicts the existing vegetation, wildlife conditions including the types and extent of vegetation and habitats, species occurrences, occurrence data and habitat mapping for special status species, and wetland areas. In addition, references are provided for those interested in additional details. Management actions related to these resources are also discussed. The consequences section of the DEIS identifies the types and extent of impacts that are expected. The assessment of impacts includes consideration of both the duration and magnitude of direct and indirect impacts. Where significant adverse impacts are identified, mitigation measures that could reduce those impacts are also identified. Consequently, the DEIS provides a thorough comparative analysis of the merits of the alternatives. Because the quantitative relationship of training activities and impacts to resources is not known (and is difficult to predict because of the variety of factors that influence environmental conditions), the DEIS discloses that more of the same types of impacts predicted from past activities would occur in the future. Despite the lack of direct correlative data, the Army does carefully monitor and mitigate the effects of its training activities on the environment and will continue to do so under either the No Action or the Proposed Action.

Other alternatives considered by the Army but determined not to be feasible are described in Sections 2.4.1, 2.4.2, and 2.4.3 of the DEIS. These sections address that 1) the potential of training troops at other locations was considered but dismissed because it is not necessary under BRAC law, 2) expanding the Fort Carson boundaries via land acquisition was considered but eliminated because there are no undeveloped areas surrounding Fort Carson that would be suitable for acquisition, and because the Army is not authorized or funded to expand Fort Carson, and 3) varying training scenarios based on deployment conditions was considered but also eliminated because training scenarios as alternatives would be redundant of the defined Proposed Action, which has been determined to accommodate the required mission-ready flexibility. These alternatives were all dismissed on clear and reasonable grounds.

Response to SA2-4

Training requirements are detailed in Sections 2.2.4 and 2.3.4 of the PCMS DEIS. Sections 2.2.4.2 and 3.2.1.3 describe the types of training activities that occur on Fort Carson, and would continue under the Proposed Action. As noted in Section 2.3.4.3, …“this EIS assumes that training could occur at any location on the installation (in accordance with the appropriate training uses, for instance, maneuver areas). The specific scenarios, however, will be known only as the training needs are evaluated in the real-world context of identified needs (based on when troops are realigned to Fort Carson for home-

station training and other operational considerations) and on assessment of land and environmental conditions."

The actual conduct of training, as noted in Section 2.2.4.3 of the DEIS, is dependent on a number of factors. Because Fort Carson does not have adequate training areas to execute full doctrinal training, the EIS recognizes that compromises will need to be made and that maximum flexibility is needed for the Army to balance the training needs with land management and environmental stewardship (both of which are noted as key missions of the Army). Therefore, specific numbers of days, hours, or level of use cannot be precisely defined. However, the level of use, as disclosed in the EIS, will be greater than has occurred historically. Without the ability to specifically quantify these training parameters, it is not possible to precisely quantify the impacts in all resource areas that are associated with the increased training.

Deferment of training lands is one tool that the Army uses in its adaptive land management program. Throughout the DEIS (see, for instance, pages 2-13, 2-15, 2-26, 3-3, and 3-29), the EIS acknowledges that rest and deferment is necessary and will be implemented depending on the training needs and environmental and land conditions (for instance, rainfall). Adaptive management approaches are implemented based on site-specific conditions.

Section 3.7 of the DEIS discusses that data directly relating effects on the resources from past training activities at Fort Carson are not available. Because the quantitative relationship of training activities and impacts to resources is not known (and is difficult to predict because of the variety of factors that influence environmental conditions), the DEIS discloses that more of the same types of impacts predicted from past activities would occur in the future. Despite the lack of direct correlative data, the Army does carefully monitor and mitigate the effects of its training activities on the environment and will continue to do so under either the No Action or the Proposed Action.

For each resource area, the DEIS discusses the current environmental conditions, identifies the types of current impacts, and analyzes how these impacts would change under the proposed action. Where possible, the DEIS is quantitative in describing existing conditions and assessing of impacts (e.g., noise contours discussed in Section 3.4.2.4 and presented in Appendix D). The assessment of impacts includes consideration of both the duration and magnitude of direct and indirect impacts. Where significant adverse impacts are identified, mitigation measures that could reduce those impacts are also identified. Consequently, the DEIS provides a thorough comparative analysis of the merits of the alternatives. Quantifying the impacts to the level suggested by the commenter for each resource area would be a monumental undertaking and cost prohibitive. This information is not necessary for the Army to make an informed decision regarding the Proposed Action.

Response to SA2-5

Restricted Areas are defined in Section 3.2.1.3 of the DEIS. Fort Carson would be willing to discuss restricted use areas with CDOW, but does not publish this information for security reasons.

Response to SA2-6

Limited access to Fort Carson hunting areas is a long-standing problem; a problem resisting solutions crafted for perpetuity due to the dynamic nature of military training. One solution to resolving the fairness issue for license holders is for the CDOW not to issue licenses that are restricted to Fort Carson GMU 591. Currently, 22 big game licenses are available for Fort Carson. Of these, four are restricted to use on Fort Carson only. On August 15, 2006, the CDOW and DECAM met to discuss hunting issues, primarily hunter access. At the meeting, it was agreed that a solution would be for the CDOW to propose to the Colorado Wildlife Commission that Fort Carson elk and deer licenses be combined with GMUs 511 and 51. The result would be that elk and deer licenses for Fort Carson GMU 591 would be valid for all three GMUs. The remaining two licenses restricted to Fort Carson (rifle bear) would also be valid in multiple units due to season participation restrictions under the current rules.

Response to SA2-7

The DEIS states that the types of impacts are the same under the Proposed Action and the No Action, but that the magnitude of the impacts is greater under the Proposed Action. The reason for this is that the same activities would occur under the Proposed Action and the No Action, but would occur more frequently under the Proposed Action. Fort Carson has been used intensively for military training at various times over the 60 years, and during this period, mechanized and live-fire training has occurred at

the site. Additionally, the terrain at Fort Carson limits the "large scale activity" that could alter habitat at Fort Carson and force wildlife to leave the area. As described in Section 3.1, areas determined to be appropriate for free maneuver and live fire are limited at Fort Carson, and these areas represent limited value for wildlife habitat because of disturbance and military activity (as suggested by CDOW).

As stated in response to other CDOW comments, the Army does not foresee the need to eliminate hunting at Fort Carson.

Under the Proposed Action, the Army will continue to use its comprehensive Fort Carson/PCMS INRMP (DECAM, 2002a) to manage wildlife at Fort Carson. The INRMP, which is updated annually and revised every 5 years, is approved by the USFWS and CDOW and certified by the Wildlife Habitat Council, which is a non-profit group dedicated to restoring and enhancing wildlife habitat.

Response to SA2-8

As described in Section 2.3.4.3 of the DEIS, the Army has established a process for management of Fort Carson's environmental and cultural resources, including wildlife, that considers possible impacts to these resources during the development of training exercises. This process considers the location of training, the timing of training, and the size and intensity of a training exercise. Sections 2.2.4.4 and 2.2.4.5 of the DEIS describe the process whereby the G-3 coordinates with DECAM wildlife biologists to devise training plans that minimizes potential impacts to wildlife. Buffers and BMPs will be used to the extent practicable to avoid and minimize impacts to wildlife. The Army may limit training and/or avoid specific areas during critical times for wildlife (fawning/calving season and winter) to further minimize and avoid impacts to wildlife.

Given the Army's need for training flexibility at Fort Carson under the Proposed Action, the Army has committed to continued implementation of a proven program for resource management, its ITAM program. The Army is committed to continued land and resource stewardship under the Proposed Action to protect its training range resources for the purpose of military training, and has developed mitigation measures that can be used by range managers to reduce wildlife impacts during training. Specific mitigation measures are developed at the time of training to accommodate the Army's need for flexibility to accomplish the training mission.

Response to SA2-9

In detailing doctrinal training requirements, the Army has disclosed the maximum training that could occur. As the commenter notes, the actual conduct of training will vary depending on a variety of conditions. The Army considered a number of options for forecasting training but determined that scenarios based on deployment conditions were unrealistic and did not contribute to a better understanding of environmental impacts (see Section 2.4.3).

The number of personnel is described in Table 2-2, timing of arrival is displayed in Figure 2-4, training requirements are described in Section 2.3.4, and training locations are described in Section 3.2. Training deferment, like training conduct, is dependent on a number of variables. In addition, please see the Master Response, “Number of Alternatives Considered.”

Response to SA2-10

Table 3-10 has been retitled "Special Status Wildlife that Occur on Fort Carson." Another column, "Authority," has been added to the column to indicate what entity is tracking the species. Additionally, the text preceding Table 3-10 has been augmented to clarify the regulatory status (or lack of) for the species listed in the table.

Please also see the response to comment FA7-14 and SA2-8.

Response to SA2-11

See response to comment number SA2-6. Fort Carson will continue to work with CDOW to evaluate how to achieve CDOW's big game management goals for Fort Carson.

Response to SA2-12

Comment noted.

Response to SA2-13

See response to SA2-14.

Response to SA2-14

Training requirements and practices at both sites are presented in the *Fort Carson Transformation DEIS* and *PCMS Transformation DEIS* (Section 2.3.4 of each DEIS). Both DEISs acknowledge land constraints associated with training activities; these land constraints are greater at the PCMS. The proposed action of maximizing use of the existing PCMS land area is the Army's preferred (and only viable) alternative that is being considered or proposed at this point. While the Army acknowledges the interest in expansion of the PCMS, it is not the subject of this EIS, it is not a foreseeable future action, nor is it in any way integral to the proposed action. Please refer to the Master Response regarding "Segmentation of the Fort Carson and PCMS Transformation Actions." Issues related to the potential expansion of the PCMS are addressed in the *PCMS Transformation FEIS.*

For a more detailed discussion of the range of alternatives, please see the Master Response regarding the "Number of Alternatives Considered" provided in this FEIS. As required by NEPA, the Army's preferred alternative will be identified in the ROD.

The actual conduct of training, as noted in Section 2.2.4.3, is dependent on a number of factors. Since neither Fort Carson nor PCMS have adequate training areas to execute full doctrinal training, the EIS recognizes that compromises will need to be made and that maximum flexibility is needed for the Army to balance the training needs with land management and environmental stewardship (both of which are noted as key missions of the Army). Therefore, specific numbers of days, hours, or level of use cannot be precisely defined. However, the level of use, as disclosed in the EIS, will be greater than has occurred historically. Without the ability to specifically quantify these training parameters, it is not possible to precisely quantify the impacts in all resource areas that are associated with the increased training.

Because the quantitative relationship of training activities and impacts to resources is not known (and is difficult to predict because of the variety of factors that influence environmental conditions), the DEIS discloses that more of the same types of impacts predicted from past activities would occur in the future. Despite the lack of direct correlative data, the Army does carefully monitor and mitigate the effects of its training activities on the environment and will continue to do so under either the No Action or the Proposed Action.

Mitigation has been identified that would reduce the impacts of the proposed action through avoidance, minimization, and rectification. These mitigation measures are discussed

COLORADO HISTORICAL SOCIETY

The Colorado History Museum 1300 Broadway Denver, Colorado 80203-2137

November 1, 2006

[redacted]

Attn: Fort Carson Cultural Resources Program Manager
1638 Elwell Street, Building 6236
Fort Carson, CO 80913-4000

Re: Fort Carson Transformation Environmental Impact Statement (CHS #48986)

Dear [redacted]

Thank you for your correspondence dated October 18, 2006 and received by our office on October 19, 2006 regarding the above-mentioned project.

We recommend that you coordinate your National Environmental Policy Act (NEPA) studies with the studies required under Section 106 of the National Historic Preservation Act. According to 36 CFR 800.8 of Section 106, "Federal agencies are encouraged to coordinate compliance with Section 106 and the procedures in this part with any steps taken to meet the requirements of the National Environmental Policy Act." Also, Section 110 of the National Historic Preservation Act states that Federal agencies should "coordinate with the earliest phases of any environmental review carried out under the National Environmental Policy Act." At this point, our office has not been notified regarding Section 106 consultation.

SA3-1

The findings from the Section 106 studies can inform the NEPA studies, such as including mitigation measures identified under Section 106 into the NEPA decision document. Once we receive the Section 106 studies, we will be able to fully complete our reviews under both Section 106 and NEPA.

We have enclosed a flow chart that explains the coordination between Section 106 and NEPA. If we may be of further assistance, please contact Amy Pallante, our Section 106 Compliance Coordinator, at (303) 866-4678.

Sincerely,

[redacted]

Comment Responses for Letter SA3, Colorado Historical Society

Response to SA3-1

The Army agrees with the Colorado SHPO's Section 106 consultation approach outlined in this comment. Section 3.8.1.2 of the DEIS outlines the Section 106 consultation process that will be followed in accordance with the NHPA. Section 106 consultation will be conducted when the scope of specific undertakings associated with either the No Action or the Proposed Action are defined and initiated.