CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

4.1.1 Organization

This section presents the environmental impacts associated with the proposed action, any adverse environmental effects that cannot be avoided (should the ranges be constructed and operated), the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources (should this project be implemented) (Council on Environmental Quality (CEQ) Regulation 1502.16, *Environmental Consequences*). Direct and indirect effects and their significance, cumulative effects, and means to mitigate adverse environmental impacts are also discussed for each resource. Issues 2 through 8 were identified during public scoping as primary issues of concern (see Section 1.9, *Issues Identified During the Scoping Process* and Table 4.1.1.a). Issue 9 was identified during the public comment process for the Draft Environmental Impact Statement (EIS):

- Issue 2: Soil Resources
- Issue 3: Surface Water
- Issue 4: Fire Management
- Issue 5: Noise
- Issue 6: Human Health and Safety
- Issue 7: Wildlife and Fisheries
- Issue 8: Cultural Resources
- Issue 9: Airspace

Issue 1: Site criteria or selection of the site is discussed in Chapter 2, Section 2.3, *Detailed Description of Location Alternatives*. Issue 10: Army commitment to mitigations is discussed in the appendix. The division between "primary" and "secondary" resources is based on public input and not ecological importance.

Table 4.1.1.a Primary Issues of Concern.

Section	Resource Category	Page Number
4.2.1	Soil Resources (**Issue 2:** Permafrost impacts resulting from vegetation removal)	4-4
4.2.2	Surface Water (**Issue 3:** Flooding and hydrology, particularly with respect to winter ice overflow (aufeis) at Jarvis Creek)	4-17
4.2.3	Fire Management (**Issue 4:** Risk of wildfires)	4-31
4.2.4	Noise (**Issue 5:** Noise impacts)	4-45

Section	Resource Category	Page Number
4.2.5	Human Health and Safety (**Issue 6:** Safety, as relating to the use of munitions and large convoys traveling on highways)	4-60
4.2.6	Wildlife and Fisheries (**Issue 7:** Seasonal moose movement and springtime migratory birds and waterfowl migration)	4-69
4.2.7	Cultural Resources (**Issue 8:** Impacts to cultural/historical/grave sites)	4-96
4.2.8	Airspace (**Issue 9:** Airspace use and compatibility of range operations with other airspace users)	4-107

The remaining topics, listed in Table 4.1.1.b, will also be presented in this EIS. Initial scoping indicated that none of the proposed alternatives would have any effects on geologic resources as discussed in Section 1.3.1, *Resource Areas Not Included in the Scope of Environmental Analysis*. Thus, a discussion of effects on geology will be excluded from this document.

Table 4.1.1.b Secondary Issues of Concern.

Section	Resource Category	Page Number
4.3.1	Air Quality	4-117
4.3.2	Groundwater	4-130
4.3.3	Wetlands	4-136
4.3.4	Vegetation	4-147
4.3.5	Threatened or Endangered Species and Species of Concern	4-158
4.3.6	Socioeconomics	4-165
4.3.7	Subsistence	4-171
4.3.8	Public Access and Recreation	4-177
4.3.9	Environmental Justice	4-191
4.3.10	Cumulative Effects Analysis	4-201

4.1.2 Methodology

Site-specific references to all available data are included within the individual resource sections. In cases where quantitative data were incomplete and/or unavailable, the information is qualitatively compared. The impact categories “none,” “minor,” and “moderate” are considered insignificant impacts and the impact category of “severe” is considered significant. Existing and proposed mitigation measures are explained, in detail, in each respective resource section.

The comparison of impacts under each alternative is measured against the baseline described in Chapter 3, *Affected Environment*. Therefore, the No Action Alternative (Alternative 1) still indicates some impacts from ongoing military activities and projects, and will also include the effects of the ongoing transformation of U.S. Army Alaska (USARAK). The proposed ranges are considered within the larger context of Army transformation at USARAK. Predicted impacts within each defined alternative location are in addition to those broader, less discrete environmental consequences associated with transformation at Donnelly Training Area (DTA) East (USARAK 2004a).

The environmental consequences analysis in this chapter is divided into three activity areas for each location alternative: construction footprint, maneuver area, and surface danger zone. Soldier training functions described in previous sections within Chapter 2, *Description of Proposed Action and Alternatives* (e.g., construction, training, and live fire) would remain constant at each alternative location. Section 2.4.2, *Activity Areas* describes the general activities occurring within each activity area which are applicable to all location alternatives. In certain instances, the effects of the proposed action would not have an impact within all three activity areas (construction footprint, maneuver area, and surface danger zone). Thus, those activity areas that were not impacted were not included within the analysis of that particular resource.

4.1.3 Restatement of Proposed Action

USARAK proposes to construct and operate a Battle Area Complex (BAX) and a Combined Arms Collective Training Facility (CACTF). Each has standardized design requirements, as set forth in Training Circular (TC) 25-8, developed to ensure that Soldiers and their units meet training doctrine requirements as outlined in Field Manual (FM) 7-0. The BAX would support collective live-fire training exercises on a fully automated range. The CACTF supports collective training events in a fully instrumented, urban training environment. While these ranges can be used separately to train specific skills, their ability to be used together to provide the flexible training required to prepare USARAK's forces for diverse combat missions is vital to wartime preparedness. The proposed action was developed in accordance with training, range design, and site criteria objectives listed in Section 1.2, *Purpose and Need for Action*.

4.1.4 Alternatives Considered In This Analysis

The following alternatives will be analyzed in this EIS and presented to the decision-makers:

- **Alternative 1 (No Action)**: Do not construct or operate a BAX and CACTF on training lands managed by the Army in Alaska.
- **Alternative 2 (Eddy Drop Zone)**: Construct and operate a BAX and CACTF on training lands within the Eddy Drop Zone area at DTA East.
- **Alternative 3 (Donnelly Drop Zone)**: Construct and operate a BAX and CACTF on training lands within the Donnelly Drop Zone area at DTA East.
- **Alternative 4 (North Texas Range)**: Construct and operate a BAX and CACTF on training lands within the North Texas Range area at DTA East.
- **Alternative 5 (North Texas Range/Eddy Drop Zone Combination)**: Construct and operate a BAX at North Texas Range and a CACTF at Eddy Drop Zone within DTA East.

4.2 PRIMARY ISSUES OF CONCERN

4.2.1 Soil Resources

Issue 2: Permafrost impacts resulting from vegetation removal. The impact of construction and operation of the BAX and CACTF to permafrost was identified as a primary issue of concern during scoping.

This section analyzes and compares the soil impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.2.1.

Alaskan soils are diverse due to the variation in climate, topography, parent material, and the prevalence of permafrost. Soil types can support appropriate land uses based on their defining characteristics but are unsuited for some other land uses. Impacts, therefore, differ in type and severity according to location.

4.2.1.1 Comparison of Alternatives

4.2.1.1.1 Description of Methodology

The following definitions will be used to qualitatively categorize potential impacts. Adverse impacts are defined as serious consequences to soil and permafrost that could cause (1) erosion resulting in permanent loss of soils, and/or soil loss or compaction that precludes establishment of native vegetation, (2) ice masses to melt and irregular subsidence to occur, or (3) sediment delivery to a water body that would degrade water quality below state standards for that particular water body.

- None – No measurable impacts are expected to occur.
- Minor – Short-term but measurable adverse impacts are expected. Adverse impacts would occur on less than 3 percent of soils within DTA East.
- Moderate – Noticeable adverse impacts that would have a measurable effect on soil and permafrost. Adverse impacts would occur between 3 and 5 percent of soils within DTA East.
- Severe – Adverse impacts would be obvious. Adverse impacts would occur on greater than 5 percent of soils within DTA East.
- Beneficial – Impacts would benefit soil resources.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant in this analysis. The next category (severe) is considered significant. Mitigation measures have been identified to offset negative impacts. Existing and proposed mitigation for impacts to soil resources is presented in Section 4.2.1.2, *Mitigation*.

Table 4.2.1.a presents a summary of quantitative impacts to several soil resources parameters for each alternative. Further discussions of environmental consequences for each alternative are within Table 4.2.1.b and subsequent sections.

Table 4.2.1.a Quantitative Summary of Impacts to Soil Resources.

Alternative/Footprint[1]	Area Disturbed (acres)
Eddy Drop Zone – BAX	
Construction Footprint	254
Maneuver Area	2,872
Eddy Drop Zone – CACTF	
Construction Footprint	96
Maneuver Area	1,184
Donnelly Drop Zone – BAX	
Construction Footprint	508
Maneuver Area	3,413
Donnelly Drop Zone – CACTF	
Construction Footprint	44
Maneuver Area	694
North Texas Range – BAX	
Construction Footprint	552
Maneuver Area	2,548
North Texas Range – CACTF	
Construction Footprint	105
Maneuver Area	771
Combined North Texas Range and Eddy Drop Zone[2]	
Construction Footprint – NTR BAX	727
Construction Footprint – EDZ CACTF	96
Maneuver Area – NTR BAX	4,081
Maneuver Area – EDZ CACTF	1,184

[1]Acres of soils impacted within the surface danger zone are not listed because there are no impacts to soils expected to occur within the surface danger zone.
[2]A different range layout and orientation has been proposed for the BAX at North Texas Range under this alternative. The BAX construction footprint and maneuver area under this alternative utilizes a greater amount of terrain to allow for increased maneuver and incorporation of existing landforms.

Table 4.2.1.b Summary of Environmental Consequences to Soil Resources.

Alternatives/ Footprints	Resource Issues	
	Soils	**Permafrost**
Alternative 1: No Action		
Impact within DTA East (104,601 acres)	Minimal impacts when soils are frozen but measurable impacts to unfrozen soils in low-lying areas and areas with poorly-drained soils	Disturbance from construction and training activities
Alternative 2: Eddy Drop Zone		
Construction Footprint *Impact*	350 acres of soil to be disturbed (0.3% total soils on DTA East) *Minor*	Less permafrost; Avoidance may be easier *Minor*
Maneuver Area *Impact*	4,056 acres of soil utilized for maneuvers (3.8% total soils on DTA East)[1] *Moderate*	Placing roads/trails in permafrost would be avoided; localized moderate impacts in lowland areas[1] *Minor*

Alternatives/ Footprints	Resource Issues	
	Soils	**Permafrost**
Surface Danger Zone *Impact*	Non-explosive munitions would be used *Minor*	Non-explosive munitions would be used *Minor*
Alternative 3: Donnelly Drop Zone		
Construction Footprint *Impact*	552 acres of soil to be disturbed (0.5% total soils on DTA East) *Minor*	More permafrost, so avoidance may be more difficult *Moderate*
Maneuver Area *Impact*	4,107 acres of soil utilized for maneuvers (3.9% total soils on DTA East)[1] *Moderate*	Placing roads/trails in permafrost would be avoided; more permafrost, so avoidance may be more difficult[1] *Moderate*
Surface Danger Zone *Impact*	Non-explosive munitions would be used *Minor*	Non-explosive munitions would be used *Minor*
Alternative 4: North Texas Range		
Construction Footprint *Impact*	657 acres of soil to be disturbed (0.6% total soils on DTA East) *Minor*	More permafrost, so avoidance may be more difficult *Moderate*
Maneuver Area *Impact*	3,319 acres of soil utilized for maneuvers (3.2% total soils on DTA East)[1] *Moderate*	Placing roads/trails in permafrost would be avoided; more permafrost, so avoidance may be more difficult[1] *Moderate*
Surface Danger Zone *Impact*	Explosive munitions would be used within existing impact areas in DTA West *Minor*	Explosive munitions would be used within existing impact areas in DTA West; localized moderate impacts in lowland areas *Minor*
Alternative 5: North Texas Range/Eddy Drop Zone Combination		
Construction Footprint (NTR BAX) *Impact*	727 acres of soil to be disturbed (0.7% total soils on DTA East) *Minor*	More permafrost, so avoidance may be more difficult *Moderate*
Construction Footprint (EDZ CACTF) *Impact*	96 acres of soil to be disturbed (less than 0.1% total soils on DTA East) *Minor*	Less permafrost; Avoidance may be easier *Minor*
Maneuver Area (NTR BAX) *Impact*	4,081 acres of soil utilized for maneuvers (4.3% total soils on DTA East)[1] *Moderate*	Placing roads/trails in permafrost would be avoided; more permafrost, so avoidance may be more difficult[1] *Moderate*
Maneuver Area (EDZ CACTF) *Impact*	Minimal off-road disturbance as travel would primarily be on established roads and trails within the range complex *Minor*	Placing roads/trails in permafrost would be avoided; less permafrost; Avoidance may be easier[1] *Minor*
Surface Danger Zone (NTR BAX) *Impact*	Explosive munitions would be used within existing impact areas in DTA West *Minor*	Explosive munitions would be used within existing impact areas in DTA West; localized moderate impacts in lowland areas *Minor*
Surface Danger Zone (EDZ CACTF) *Impact*	Non-explosive munitions would be used *Minor*	Non-explosive munitions would be used *Minor*

[1]This impact estimate assumes the even distribution of vehicular maneuver across the range maneuver area. Realistically, impacts would likely be localized near targets, roads, and trails. The exact locations of maneuver impact cannot be predicted. As a result, a worst case scenario predicting soil disturbance throughout the entire maneuver area was used in this analysis. In combination with existing and proposed mitigation measures, including permafrost avoidance and soil rehabilitation, impacts to soils and permafrost within the maneuver area would be expected to be lower than listed in this table.

Various soils-related studies were completed and used to assess the impact of Army transformation on soils and permafrost on USARAK lands. For additional information on these studies, see *Final Environmental Impact Statement for Transformation of U.S. Army Alaska, Vols. 1 and 2* (USARAK 2004a).

4.2.1.1.2 Impacts Common to All Alternatives

Possible soil impacts include compaction, erosion, rutting, reduced soil strength, restricted water movement, contamination, disturbance to vegetation, and subsequent melting of permafrost. Compaction inhibits plant growth and increases water runoff. Soil may be lost through erosion and contribute to increased sedimentation of waterways. Exposed soils are subject to warming, which may lead to melting of permafrost. Some contaminants may prove persistent in soils, taken up by plants, and entered into the food chain.

Permafrost is particularly vulnerable to surface disturbance, and impacts are likely to be long-term and irreversible. When surface vegetation is disturbed and the insulating mat protecting permafrost is damaged, permafrost begins to melt and can cause substantial thermokarst (thawing and settling of ice-rich permafrost), subsidence, and pond formation. Land areas, typically trails or off-road vehicle tracks, become impassable, and thermokarst processes, once initiated, can continue to melt areas well beyond the initial disturbance. This process is irreversible, restoration is not possible, and impacted areas often become impassible to vehicle traffic.

Climate change can have long-term impacts on permafrost areas. While the causes and effects of climate change are still debated, Alaskan permafrost temperatures have clearly risen significantly over the last decade, and much permafrost is at (or near) the melting temperature (Osterkamp et al. 1998; Osterkamp and Romanovsky 1998). This trend may significantly influence permafrost terrain and its ability to recover from even minor human-caused disturbances or natural disturbances, such as fire, as it might have in past decades. Rising ground temperatures, continued increases in active layer thickness, and widespread degradation may lead to the irreversible melting of ground ice that might have previously recovered after re-vegetation and post-fire succession restored an insulating organic mat (Burns 1998). These long-term global trends may produce significant ecological, hydrologic, and soil changes that could influence both trafficability and mobility on training lands. The long-term effects of future warming, continued permafrost degradation, and the soil and hydrology impacts on training areas are essentially unknown.

Construction of new facilities is expected to have direct, short-term impacts to soils. Impacts from construction would result from vegetation removal and soil disturbance in the immediate (actual) construction footprint. Erosion impacts are temporary, as buildings, pavement, lawn, or reseeded native vegetation would cover once barren land, and adequate storm water runoff structures would convey water from the site. If soil were compacted during construction, this soil would support a lower amount of natural vegetation. Periodic range maintenance activities, including road grading, target repair, and berm re-contouring, would occur under the proposed action to also reduce erosion.

Fugitive dust from construction is also an indirect, short-term impact to air quality. This impact is further assessed in Section 4.3.1, *Air Quality*.

While there is no known soil contamination, any discovered during preconstruction or construction would be mitigated through appropriate soil remediation methods selected

by USARAK, the Environmental Protection Agency (EPA), and the Alaska Department of Environmental Conservation (ADEC).

Pollutants; petroleum, oil, and lubricants (POL); and any hazardous materials associated with military operations may directly impact soil resources. Standard spill prevention measures would be integrated into any range construction and operation (including the preparation or updating of Spill Prevention Control and Countermeasures [SPCC] and/or spill contingency plans). All USARAK units would be equipped with (and have available) appropriate spill response materials for types and quantities of hazardous materials they may transport to support military operations, as required by statutory and Army requirements. Any spills would be promptly cleaned up and all spills/releases would be reported to the fire department and to the Spill Prevention and Response section of the ADEC. Appropriate response and cleanup measures would then be established.

This project is greater than one acre and it requires the submission of a Notice of Intent (NOI) to the Environmental Protection Agency (EPA) seven days prior to project initiation. The implementation of a Storm Water Pollution Prevention Plan is also required. The facility design will be consistent with EPA and State of Alaska Construction General Permit Storm Water Pollution Prevention requirements and Fort Wainwright's Storm Water Pollution Prevention Plan to eliminate runoff contamination.

The range design includes permanent latrines with a buried collection tank. USARAK, or a designated contractor, will dispose of any waste off-site at the local landfill. No wastewater will be disposed of in wetlands or open water, and disposal will be in compliance with applicable laws and regulations.

The use of training munitions would create low levels of propellant residue at firing points. Munitions residue would not be expected within the surface danger zone of ranges, except for portions of the North Texas Range BAX surface danger zone that fall within existing dudded impact areas, as only inert rounds would be used. Trace amounts (parts per million levels) of propellant components such as 2,4-dinitrotoluene (DNT) and nitroglycerine (NG) would be deposited at weapons firing points within the proposed training facilities. The compound NG readily degrades and is not persistent. The compound 2,4-DNT degrades much more slowly but is generally immobile in soils. Sampling at DTA firing points have detected low levels (parts per million) of 2,4-DNT on the surface, but not at depth in the soils, and not in the groundwater or surface waters. This lack of soil mobility is due to low solubility, low precipitation in the region, and frozen soil conditions most of the year.

Various metals are used in munitions components. Lead is found in primers, and zinc, lead, antimony, copper, manganese, and iron are found in shell casings and various projectile components. All of these metals are also naturally found, at some background levels, in soils. Numerous soil samples were collected from various training areas of DTA and analyzed for metal concentrations (Walsh 2004). Low levels of zinc, copper, lead, and antimony were detected within impact areas and target berms where munitions were used. The metal concentrations were above natural background levels, but no samples had values approaching levels of concern. The mainly sandy and gravelly DTA soils have neutral pH values of 6 to 7.8 and are not conducive to dissolution and mobilization of metals deposited from munitions components. These types of soils are typical of both firing points and target berms. Metals, such as lead, can dissolve and mobilize in acidic soils where pH is below 5.5. While soils in permafrost areas with black spruce and sphagnum moss cover are often acidic with pH levels of 4.0 to 5.0, the shallow active layer and impermeable underlying permafrost limit mobility of any dissolved metals in these areas.

All vehicles within the Army inventory, including the Stryker, would utilize the range complex as part of the proposed action. A Stryker Maneuverability Study was conducted to model the vehicle's ability to operate off-road and to predict impacts to terrain (USARAK 2004a). Impacts from military vehicle use, including the Stryker, even in winter, regardless of frost depth, may damage vegetation (due to low or inadequate snow cover), thus altering ground surface thermal regimes, and causing thermokarst in sensitive permafrost areas (USARAK 2004a). Initiation of thermokarst can cause soil erosion and increased sediment loading in streams and water bodies. The Integrated Training Area Management (ITAM) program would continue to ensure that the carrying capacity of the training lands is maintained over time. Ongoing inventory and monitoring of USARAK land condition ensures that any damage related to vehicles would be assessed and adjustments to land use are made accordingly.

Groundwater is recharged in late spring and early summer when ground thawing permits penetration of meltwater. Jarvis Creek and the Delta River are losing streams (stream flow entirely infiltrates into the ground) in their lower reaches, with the groundwater table lower than the streambeds. A considerable portion of their flow infiltrates from the streambeds to the groundwater table. The presence of discontinuous permafrost does not prevent groundwater recharge over significant areas. Locally shallow permafrost can create local perched groundwater aquifers and can create areas of poor drainage, bogs, and small ponds, especially in glacial moraine areas.

While soils would be disturbed during construction, best management practices (BMPs) would be followed to minimize any negative effects. During training activities, following construction, any effects (including potential soil contamination) would be mitigated through existing USARAK management programs and the ongoing ITAM program. Effects on permafrost would be minimized by identifying any discontinuous permafrost as it is encountered during construction or training activities and managing these identified areas to minimize any negative impacts. All of these measures are supportive of (and consistent with) the military objective of natural, realistic training areas that reflect the undisturbed environment (soils and vegetation) that would be encountered in conflicts. As a result of these mutual objectives, the long-term effects of soils impacts would be minor to none.

A smaller, focused range facility would allow for potential adverse impacts to soils, permafrost and other natural resources to be easily observed, as opposed to impacts over a wide-ranging area. The range complex would be easily monitored and repairs scheduled on a more expedient schedule.

4.2.1.1.3 Impacts Attributed to Alternative 1 (No Action)

Potential impacts under the No Action Alternative take into account Army transformation activities at USARAK. The Record of Decision (ROD) on the transformation of USARAK was signed on May 27, 2004. Full transformation of USARAK was selected as the preferred alternative. The overall impact of transformation on soil resources at DTA was determined to be moderate (USARAK 2004a).

The portion of DTA east of the Delta River would continue to be used year-round by tracked Small Unit Support Vehicles (SUSV) and wheeled support vehicles, including the Stryker, with no soil impacts above current levels.

The number of munitions expended and the current level of impact to soil would remain the same. Overall, impacts to soils and permafrost would be moderate under this alternative.

4.2.1.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

Soils

The overall impact of construction and use of the BAX and CACTF on soils at Eddy Drop Zone is considered moderate.

Construction projects under the proposed action include structures, targetry, and roads at the BAX and structures and roads at the CACTF. A total of approximately 350 acres would be partially cleared of vegetation for roads, targetry, utility lines and building foundations. However, this clearing would be minimized, and as much existing vegetation would remain as possible to provide cover, concealment and realism for subsequent training exercises. Existing cleared areas would be incorporated into the design to also minimize the amount of clearing. Approximately 50 acres are currently cleared within the construction footprint and the maneuver area.

Construction of new facilities is expected to have direct, short-term impacts to soils. Impacts from construction would result from vegetation removal and soil disturbance in the immediate (actual) construction footprint. Erosion impacts are temporary, as buildings, pavement, lawn, or reseeded native vegetation would cover once barren land, and adequate storm water runoff structures would convey water from the site. If soil were compacted during construction, this soil would support a lower amount of natural vegetation. Periodic range maintenance activities, including road grading, target repair, and berm re-contouring, would occur under the proposed action to prevent erosion.

USARAK would “cut” and “fill” during construction of the BAX and CACTF. On-site “fill” requirements may exceed that created by “cuts” during range construction. Some of this needed fill material is currently available from established sources. If established gravel pits at DTA become either insufficient or too far from the construction footprint, a new pit would be developed near the proposed CACTF location, just outside of the northwest corner of the alternative area in a sparsely forested abandoned channel of Jarvis Creek. These pits would be closed and revegetated when they are depleted, though such closure may not occur after completion of this proposed action (if additional fill material is needed for other projects).

The maneuver area for the BAX and CACTF at Eddy Drop Zone is approximately 4,050 acres. Transition corridors between the BAX and CACTF are included within the maneuver area. This area also includes Buffalo Drop Zone (an existing cleared area). Approximately 245 acres are currently cleared of vegetation or modified within the maneuver area. Soils utilized for maneuvers in this area represent 3.8 percent of the total soils on DTA East. According to the NRCS soil survey, hydric soils make up approximately 16 percent of the BAX maneuver area and 9 percent of the CACTF maneuver area. Activities within the maneuver area would create a moderate impact to soil resources.

Military vehicles used at the BAX would travel primarily off road, and vehicle travel at the CACTF would primarily be on established roads and trails within the range complex. DTA East, in general, is characterized by well-drained soils capable of supporting the Stryker and other military vehicles year-round (USARAK 2004a). Areas more susceptible to damage include the thick forests and wet areas along the floodplains of Jarvis Creek and Delta River. The potential for

severe soil impact exists in localized lowland areas where soils tend to be fine grained and wet. However, these areas would not be used during sensitive times of the year (periods when the soil is not frozen). During winter, when soils are frozen, minimal vehicle impacts are expected due to increased soil strength and protective snow cover (USARAK 2004a).

The potential for soil compaction as a result of off-road vehicle maneuvers exists in soils with fine sandy or silty loam surface layers. These soils quickly reach their maximum compactibility, but do not remain compacted over time (Durham 2006). At Eddy Drop Zone, these compactable surface soils exhibit coarse, gravelly, well-drained subsurface layers. The soils at Eddy Drop Zone would not be subject to deep compaction (more than 24 inches below the surface). Naturally occurring freeze-thaw cycles breakup compacted areas (Daum 1996). Combined with the fact that most areas of the BAX complex will receive minor off-road vehicle traffic (single vehicle passes), maneuver activities would not be expected to significantly impact soil compaction, storm water infiltration or aquifer recharge. Greater compaction as a result of repeated passes would be expected to occur on and near established roads, trails and target areas. The Integrated Training Area Management (ITAM) program will address any impacts, such as potential deterioration of local soil conditions, associated with this activity. In combination with existing and proposed mitigation measures, including permafrost avoidance and soil rehabilitation, impacts to soil compaction, storm water runoff and aquifer recharge within the maneuver area would be expected to be minor.

The majority of soils on Eddy Drop Zone are considered trafficable and able to support year-round training with military vehicles. Due to the distribution of trafficable soils within the site, the BAX maneuver area can support 10,001 Stryker vehicle passes per year during the summer months without severe damage from rutting and erosion. This exceeds the 1,012 vehicle passes per year during summer months (minimum throughput) required for the BAX. No fill would be required to accommodate the minimum throughput and maneuverability requirements. Some areas would still be disturbed but these areas would be repairable through the ITAM program (See the mitigation matrix in the Appendix for a description of management techniques).

The mainly sandy and gravelly soils in the areas sampled in DTA have neutral pH values of 6 to 7.8 and should not be conducive to dissolution and mobilization of metals deposited from munitions components. These types of soils are typical of both firing points and target berms. Metals, such as lead, can dissolve and mobilize in acidic soils where pH is below 5.5. While soils in permafrost areas with black spruce and sphagnum moss cover are often acidic and have pH levels of 4.0 to 5.0, the shallow active layer and impermeable underlying permafrost limit mobility of any dissolved metals.

Permafrost

The Eddy Drop Zone alternative has less permafrost compared to the Donnelly Drop Zone and North Texas Range alternatives. Based on the NRCS soil survey, permafrost soils exist in approximately 16 percent of the BAX maneuver area and 9 percent of the CACTF maneuver area. The overall impact of construction and use of the BAX and CACTF on permafrost at the Eddy Drop Zone alternative is considered minor.

Using the information gathered during the geotechnical investigation program and aerial photo interpretation, areas with a higher potential for permafrost were delineated and the site layout was adjusted to locate the proposed structures away from areas having high permafrost potential.

Additional drilling is planned to confirm initial interpretations (R&M Consultants 2002, 2004 and USACE 2004).

Permafrost was encountered in fine-grained material near the surface and the removal of this material, down to the underlying gravel, was recommended under all proposed structures to prevent settlement due to the thawing of the frozen ground. Recommendations for permafrost problems include relocating (or siting) structures on unfrozen ground or building designs to ensure foundation stability when the permafrost thaws. In general, the proposed BAX site was found to be relatively free of permafrost.

4.2.1.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

Soils

Impacts to soils as a result of the proposed action are likely similar to those discussed under Alternative 2. The overall impact of construction and use of the BAX and CACTF on soils at Donnelly Drop Zone alternative is considered moderate.

Construction projects under the proposed action include structures, targetry, and roads at the BAX and structures and roads at the CACTF. A total of approximately 550 acres would be partially cleared of vegetation for roads, targetry, utility lines and building foundations. However, this clearing would be minimized, and as much existing vegetation would remain as possible to provide cover, concealment and realism for subsequent training exercises. Existing cleared areas would be incorporated into the design to also minimize the amount of clearing. Approximately 15 acres are currently cleared within the construction footprint.

Natural terrain features would allow for “fill” requirements to meet that created by “cuts” during range construction. No new gravel pits would be established within the Donnelly Drop Zone alternative, as there is adequate material within DTA near the proposed site. Some of this material is currently available from existing sources. However, if additional “fill” requirements arise and established gravel pits are either insufficient or too far from the construction footprint, new pits may be developed. These pits would be closed and re-vegetated when they are depleted, though such closure may not occur after completion of this proposed action (if additional fill material is needed for other projects). In addition, these potential gravel pit locations have been included within the maneuver area.

The maneuver area for the BAX and CACTF at Donnelly Drop Zone is approximately 4,100 acres. Transition corridors between the BAX and CACTF are included within the maneuver area. This area also includes Bear Drop Zone (an existing cleared area). Approximately 245 acres are currently cleared of vegetation or modified within the maneuver area. Soils utilized for maneuvers in this area represent 3.9 percent of the total soils on DTA East. Activities within the maneuver area would create a moderate impact to soil resources. According to the NRCS soil survey, hydric soils make up approximately 31 percent of the BAX maneuver area and 29 percent of the CACTF maneuver area. Military vehicles used at the BAX would travel primarily off road, and vehicle travel at the CACTF would primarily be on established roads and trails within the range complex. Impacts would be similar to those discussed under Alternative 2.

The soils on Donnelly Drop Zone are considered not trafficable and unable support year-round training with military vehicles without major site modification. Due to the distribution of trafficable soils within the site, the BAX maneuver area can only support 988 vehicle passes per year during summer months without severe damage. This does not meet the vehicle passes per year during summer months (minimum throughput) required for the BAX. Filling of wet soils (wetlands) would be required to accommodate the minimum throughput and maneuverability requirements. Approximately 198 acres of fill would be necessary, mostly to provide sufficient trafficable terrain in order to meet maneuverability requirements. While fill would minimize rutting and erosion in wet soils, it would greatly alter the site's vegetation and negatively impact natural soil structure and drainage patterns.

Permafrost

Permafrost soils exist in approximately 31 percent of the BAX maneuver area and 29 percent of the CACTF maneuver area. As a result, impacts due to construction and maneuver would be moderate. The fill necessary to meet the minimum throughput and maneuverability requirements for training would add to these impacts.

No detailed geotechnical explorations are available for this location. The site layout would be adjusted to relocate the proposed structures away from areas having high permafrost potential. Additional drilling is planned to confirm initial interpretations. The suggested engineering actions to be taken to eliminate or lessen the potential affect at Donnelly Drop Zone would be similar to those discussed under Alternative 2.

4.2.1.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

Soils

Impacts to soils as a result of the proposed action are likely similar to those discussed under Alternative 2. The overall impact of construction and use of the BAX and CACTF on soils at the North Texas Range alternative is considered moderate.

Construction projects under the proposed action include structures, targetry, and roads at the BAX and structures and roads at the CACTF. A total of approximately 660 acres would be partially cleared of vegetation for roads, targetry, utility lines and building foundations. However, this clearing would be minimized, and as much existing vegetation would remain as possible to provide cover, concealment and realism for subsequent training exercises. Existing cleared areas would be incorporated into the design to also minimize the amount of clearing. About 65 acres is currently cleared within the construction footprint.

No new gravel pits would be established within the North Texas Range alternative, as there is adequate material within DTA. Some of this material is currently available from existing sources. However, if additional "fill" requirements arise and established gravel pits are either insufficient or too far from the construction footprint, new pits would be developed. These pits would be closed and re-vegetated when they are depleted, though such closure may not occur after completion of this proposed action (if additional fill material is needed for other projects). In addition, these potential gravel pit locations have been included within the maneuver area.

The maneuver area for the BAX and CACTF at North Texas Range is approximately 3,300 acres. Transition corridors between the BAX and CACTF are included within the maneuver area. This

area also includes Sally Drop Zone (an existing cleared area). Approximately 135 acres are currently cleared of vegetation or modified within the maneuver area. Soils utilized for maneuvers in this area represent 3.2 percent of the total soils on DTA East. Activities within the maneuver area would create a moderate impact to soil resources. According to the NRCS soil survey, hydric soils make up approximately 60 percent of the BAX maneuver area and 66 percent of the CACTF maneuver area. Military vehicles used at the BAX would travel primarily off road, and vehicle travel at the CACTF would primarily be on established roads and trails within the range complex. Impacts would be similar to those discussed under Alternative 2.

The soils on North Texas Range are considered not trafficable and unable to support year-round training with military vehicles without major site modification. Due to the distribution of trafficable soils within the site, the BAX maneuver area can only support 517 vehicle passes per year during summer months without severe damage. This does not meet the 1,012 vehicle passes per year during summer months (minimum throughput) required for the BAX. Filling of wet soils (wetlands) would be required to accommodate the minimum throughput and maneuverability requirements. Approximately 109 acres of fill would be necessary, mostly to provide sufficient trafficable terrain in order to meet maneuverability requirements. While fill would minimize rutting and erosion in wet soils, it would greatly alter the site's vegetation and negatively impact natural soil structure and drainage patterns.

Permafrost

Permafrost soils exist in approximately 59 percent of the BAX maneuver area and 66 percent of the CACTF maneuver area. Fill would be necessary to meet the minimum throughput and maneuver requirements for training at North Texas Range and the impacts would be moderate.

Permafrost was encountered in 15 of the 20 test borings drilled during site investigations at North Texas Range in 2005 (R&M Consultants 2005), with massive ice encountered in two of the 15 test borings. Permafrost was not encountered along the eastern edge or central portion of the North Texas site. The site layout would be adjusted to relocate the proposed structures away from areas having high permafrost potential. Impacts to permafrost would be moderate within the North Texas Range alternative. The suggested engineering actions to eliminate or lessen the potential effect at the North Texas Range alternative would be similar to those discussed under Alternative 2.

4.2.1.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

Soils

Impacts to soils as a result of the proposed action are likely similar to those discussed under Alternative 2. The overall impact of construction of the BAX on soils at the North Texas Range alternative and the CACTF on soils at the Eddy Drop Zone alternative is considered minor. The impact of use of these two areas during military training maneuvers would be severe.

Construction projects under the proposed action include structures, targetry, utility lines and roads at the BAX and structures and roads at the CACTF. A total of approximately 820 acres would be partially cleared of vegetation for roads and building foundations. However, this clearing would be minimized, and as much existing vegetation would remain as possible to provide cover, concealment and realism for subsequent training exercises. Existing cleared areas would be

incorporated into the design to also minimize the amount of clearing (approximately 40 acres are already cleared or modified within the construction footprint).

Construction of new facilities is expected to have direct, short-term impacts to soils. Impacts from construction would result from vegetation removal and soil disturbance in the immediate (actual) construction footprint. Erosion impacts are temporary, as buildings, pavement, lawn, or reseeded native vegetation would cover once barren land, and adequate storm water runoff structures would convey water from the site. If soil were compacted during construction, this soil would support a lower amount of natural vegetation or agricultural uses. Periodic range maintenance activities, including road grading, target repair, and berm re-contouring, would occur under the proposed action to also reduce erosion.

The maneuver area for the BAX at North Texas Range and the CACTF at Eddy Drop Zone is approximately 5,300 acres. Approximately 240 acres are currently cleared of vegetation or modified within the maneuver area. Soils utilized for maneuvers in both areas represent 5.1 percent of the total soils on DTA East. Activities within the maneuver area would create a severe impact to soil resources. Military vehicles used at the BAX would travel primarily off road, and vehicle travel at the CACTF would primarily be on established roads and trails within the range complex. Impacts would be similar to those discussed under Alternative 2.

The mainly sandy and gravelly soils in the areas sampled in DTA have neutral pH values of 6 to 7.8 and should not be conducive to dissolution and mobilization of metals deposited from munitions components. These types of soils are typical of both firing points and target berms. Metals, such as lead, can dissolve and mobilize in acidic soils where pH is below 5.5. While soils in permafrost areas with black spruce and sphagnum moss cover are often acidic and have pH levels of 4.0 to 5.0, the shallow active layer and impermeable underlying permafrost limit mobility of any dissolved metals.

The soils on North Texas Range are considered not trafficable and unable to support year-round training with military vehicles without major site modification. Due to the distribution of trafficable soils within the site, the BAX maneuver area can only support 648 vehicle passes per year during summer months without severe damage. This does not meet the 1,012 vehicle passes per year during summer months (minimum throughput) required for the BAX. Filling of wet soils (wetlands) would be required to accommodate the minimum throughput and maneuverability requirements. Approximately 100 acres of fill would be necessary, mostly to provide sufficient trafficable terrain in order to meet maneuverability requirements. While fill would minimize rutting and erosion in wet soils, it would greatly alter the vegetation and negatively impact natural soil structure and drainage patterns.

Permafrost

Permafrost soils exist in approximately 9 percent of the proposed CACTF maneuver footprint at Eddy Drop Zone. Impacts to permafrost for the CACTF site would be minor and similar to those described under Alternative 2.

Permafrost soils make up approximately 51 percent of the BAX maneuver area at the North Texas Range BAX. Permafrost investigations within the North Texas Range area note that permafrost is prevalent (R&M Consultants 2005). Fill would be necessary to meet the minimum throughput

and maneuverability requirements for training at North Texas Range and the impacts would be moderate.

The BAX site layout would be adjusted to relocate the proposed structures away from areas having high permafrost potential. Impacts to permafrost would be moderate within the North Texas Range alternative. The suggested engineering actions to eliminate or lessen the potential effects at the North Texas Range alternative would be similar to those discussed under Alternative 2.

4.2.1.2 Mitigation

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts to soil resources. The appendix states how the offered mitigation would serve to eliminate or lessen the foreseen impact and offers an assessment of the potential success of the mitigation. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

Temporary direct impacts would result on DTA soils from construction projects at DTA, as well as those related to this range upgrade. BMPs, common in the construction industry in Alaska, would be used to localize impacts and to ensure soils would not erode from the site or enter waterways. The applicable BMPs (Durham 2004) were determined by the Natural Resources Conservation Service (NRCS) in cooperation with the Salcha-Delta Soil and Water Conservation District (SWCD).

In order to mitigate impacts, permafrost areas must be identified. The most important mitigation for permafrost soil impacts includes the maintenance (nondisturbance) of the vegetation mat, precluding the predictable subsequent initiation of thermokarst. This is best accomplished through the avoidance of permafrost-rich areas altogether or by limiting disturbance to periods when sufficient snow depth prevents vegetation damage. Discontinuous permafrost is present at DTA East.

4.2.1.2.1 Existing Mitigation

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts.

- Compliance with training exercise regulations, as stipulated by USARAK Range Regulation 350-2.
- Application of the ITAM program to inventory and monitor, repair, maintain, and enhance training lands.
- Implementation of programs to track munitions usage.
- Use of the Range Facility Maintenance Support System (RFMSS) and input range use data.
- Implementation of a soil and water monitoring program for DTA.

4.2.1.2.2 Proposed Mitigation

The following mitigation measures are essential in addressing impacts associated with the proposed action.

- Adjust site layouts to relocate proposed structures away from areas having higher permafrost potential, when necessary.
- Additional drilling at sites to confirm the initial interpretations, prior to final design and construction.
- Prevent off-road vehicle traffic in high permafrost areas during summer months when the ground is thawed.
- Incorporate existing cleared areas into design of range facilities.
- Utilize BMPs, common in the construction industry in Alaska, to localize impacts and to ensure soils would not erode from the site or enter waterways. These include the following:
  - Avoid permafrost whenever possible.
  - Particularly avoid areas with ice wedges or ice-rich permafrost.
  - Some frozen soils allow for easier, more uniform thawing and settling. These frozen soils are preferred.
  - When working in permafrost, minimize the footprint of the disturbed area, take into account how thermokarsts (melting ice wedges) would affect local drainage, and slow or prevent thawing of permafrost by providing insulation (vegetative cover) as soon as possible following disturbance.

4.2.2 Surface Water

Issue 3: Flooding and hydrology, particularly with respect to winter ice overflow (aufeis) at Jarvis Creek. The impact of construction and operation of the BAX and CACTF on local hydrology was identified as a primary issue of concern during scoping.

This section analyzes and compares the surface water impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.2.2. Surface waters on USARAK lands are diverse, differing in origins and locations. Most surface waters on DTA lands are glacial in origin and nature. Water quality on all USARAK properties is good, as all waters on post are within state water quality standards.

4.2.2.1 Comparison of Alternatives

4.2.2.1.1 Description of Methodology

Predictive models and historic and scientific data are used to qualitatively and quantitatively predict changes to surface water. The following categories are used to qualitatively evaluate impacts to surface waters on DTA East:

- None – No measurable impacts are expected to occur.
- Minor – No measurable adverse impacts are expected to occur. Impacts may have a slight effect on water resources including, but not limited to, water quality, streamflow, and/or floodplains.
- Moderate – Adverse impacts are expected to occur. Impacts would be noticeable and would have a measurable effect on water resources including, but not limited to, water

quality, streamflow, and/or floodplains. Construction would occur within a floodplain, but streamflow would not be impeded or channelized.

- Severe – Adverse impacts are expected to occur. Impacts would be obvious and would result in a violation of state water quality criteria, constitute a violation of federal or state discharge permits, serve to impede or channelize streamflow within a floodplain, and/or consist of an unpermitted placement of structures inside of normal high watermark.
- Beneficial – Impacts are expected to improve water resources.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant in this analysis. The next category (severe) is considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to surface water is presented in 4.2.2.2, *Mitigation*.

Table 4.2.2.a presents a summary of quantitative impacts to several surface water resources parameters for each alternative. Further discussions of environmental consequences for each alternative are within Table 4.2.2.b and subsequent sections.

Table 4.2.2.a Quantitative Summary of Impacts to Surface Water Resources.

Alternatives/Footprint	Parameters (acres)		
	Area	Jarvis Creek Floodplain[1]	Delta River Floodplain[1]
Eddy Drop Zone – BAX			
Construction Footprint	254	97	0
Maneuver Area	2,872	948	0
Surface Danger Zone	23,741	2,460	0
Eddy Drop Zone – CACTF			
Construction Footprint	96	0	0
Maneuver Area	1,184	0	0
Surface Danger Zone	1,123	36	0
Donnelly Drop Zone – BAX			
Construction Footprint	508	33	0
Maneuver Area	3,413	171	0
Surface Danger Zone	19,313	1,286	0
Donnelly Drop Zone – CACTF			
Construction Footprint	44	0	0
Maneuver Area	694	16	0
Surface Danger Zone	871	27	0
North Texas Range – BAX			
Construction Footprint	552	0	0
Maneuver Area	2,548	0	0
Surface Danger Zone	22,041	0	6,267
North Texas Range – CACTF			
Construction Footprint	105	0	0
Maneuver Area	771	0	0
Surface Danger Zone	1,318	0	0

Alternatives/Footprint	Parameters (acres)		
	Area	Jarvis Creek Floodplain[1]	Delta River Floodplain[1]
Combined North Texas Range and Eddy Drop Zone			
Construction Footprint – NTR BAX	727	0	0
Construction Footprint – EDZ CACTF	96	0	0
Maneuver Area – NTR BAX	4,081	0	0
Maneuver Area – EDZ CACTF	1,184	0	0
Surface Danger Zone – NTR BAX	23,741	0	8,722
Surface Danger Zone – EDZ CACTF	1,123	36	0

[1]Floodplain refers to the 100-year flood discharge.

Table 4.2.2.b summarizes impacts to surface water resources by alternative. Impacts to most surface water resource issues are localized and minor when compared at the watershed level. However, selection of either Alternative 2 (Eddy Drop Zone) or Alternative 3 (Donnelly Drop Zone) could result in moderate impacts to flooding within the BAX construction footprint and maneuver area. The Eddy and Donnelly Drop Zones' construction footprints and maneuver areas would be within the delineated 100-year floodplain (Appendix, Figure 3.d), but facilities would be constructed so as not to impede water flow. In addition, training activities would have the potential to affect water quality from sediment additions. No impacts are anticipated from activities within the surface danger zones.

Table 4.2.2.b Summary of Environmental Consequences to Surface Water Resources.

Alternatives/ Footprints	Resource Issues				
	Waterways	Flooding	Floodplains	Lakes and Ponds	Surface Water Quality
Alternative 1: No Action					
Impact within DTA East (104,601 acres)	Sedimentation caused by vehicle and personnel use of trails, stream crossings, and ice bridge approaches	No information was available	No information was available	Sedimentation caused by vehicle and personnel use of trails, stream crossings, and ice bridge approaches	Slight sedimentation from trail use and chemical decomposition of munitions constituents from impact area
Alternative 2: Eddy Drop Zone					
Construction Footprint *Impact*	Sedimentation, altered runoff and overland flow patterns from construction *Moderate*	Potential to increase flow rates within BAX footprint *Moderate*	Constructed within floodplain, but would not impede water flow *Moderate*	Sited to avoid these areas; number of lakes within footprint *None to Minor*	Sedimentation from construction; use of BMPs *Minor*
Maneuver Area *Impact*	Sedimentation from stream crossings and overland travel *Moderate*	Maneuver operations not to increase water flow *Minor*	Maneuver operations conducted not to impede water flow *Minor*	Maneuver not allowed in these areas *None to minor*	Sedimentation from stream crossings and overland travel *Minor*
Surface Danger Zone *Impact*	Only inert munitions used; only trace deposition of munitions residues (propellant) *Minor*	No structures or facilities proposed *None*	No structures or facilities proposed *None*	Firing of munitions into open water prohibited *None to Minor*	Only inert munitions used; only trace deposition of munitions residues (propellant) *Minor*

Alternatives/ Footprints	Resource Issues				
	Waterways	**Flooding**	**Floodplains**	**Lakes and Ponds**	**Surface Water Quality**
Alternative 3: Donnelly Drop Zone					
Construction Footprint	Sedimentation, altered runoff and overland flow patterns from construction	Potential to increase flow rates within BAX footprint	Constructed within floodplain, but would not impede water flow	Sited to avoid these areas; number of lakes within footprint	Sedimentation from construction; use of BMPs
Impact	*Minor*	*Minor*	*Moderate*	*None to Minor*	*Minor*
Maneuver Area	Sedimentation from stream crossings and overland travel	Maneuver operations not to increase water flow	Maneuver operations conducted not to impede water flow	Maneuver not allowed in these areas	Sedimentation from stream crossings, bridge construction and overland travel at Jarvis and Ober creeks
Impact	*Moderate*	*Minor*	*Minor*	*None to Minor*	*Moderate*
Surface Danger Zone	Only inert munitions used; only trace deposition of munitions residues (propellant)	No structures or facilities proposed	No structures or facilities proposed	Firing of munitions into open water prohibited	Only inert munitions used; only trace deposition of munitions residues (propellant)
Impact	*Minor*	*None*	*None*	*None to Minor*	*Minor*
Alternative 4: North Texas Range					
Construction Footprint	Sedimentation, altered runoff and overland flow patterns from construction	Potential to increase flow rates within BAX footprint	Not constructed within floodplain	Sited to avoid these areas; number of lakes within footprint	Sedimentation from construction; use of BMPs
Impact	*Minor*	*None*	*None*	*None to Minor*	*Minor*
Maneuver Area	Sedimentation from stream crossings and overland travel	Maneuver operations not to increase water flow	Not within floodplain	Maneuver not allowed in these areas	Sedimentation from stream crossings and overland travel
Impact	*Minor*	*None*	*None*	*None to minor*	*Minor*
Surface Danger Zone	Only inert munitions used; only trace deposition of munitions residues (propellant)	No structures or facilities proposed	No structures or facilities proposed	Firing of munitions into open water prohibited	Only inert munitions used; only trace deposition of munitions residues (propellant)
Impact	*Minor*	*None*	*None*	*None to Minor*	*Minor*
Alternative 5: North Texas Range/Eddy Drop Zone Combination					
Construction Footprint (NTR BAX)	Sedimentation, altered runoff and overland flow patterns from construction	Potential to increase flow rates within BAX footprint	Not constructed within floodplain	Sited to avoid these areas; number of lakes within footprint	Sedimentation from construction; use of BMPs
Impact	*Minor*	*None*	*None*	*None to Minor*	*Minor*
Construction Footprint (EDZ CACTF)	Sedimentation, altered runoff and overland flow patterns from construction	Potential to increase flow rates within CACTF footprint	Not constructed within floodplain	No lakes within footprint	Sedimentation from construction; use of BMPs
Impact	*Minor*	*Minor*	*None*	*None*	*Minor*
Maneuver Area (NTR BAX)	Sedimentation from stream crossings and overland travel	Maneuver operations not to increase water flow	Not constructed within floodplain	Maneuver not allowed in these areas	Sedimentation from stream crossings and overland travel
Impact	*Minor*	*None*	*None*	*None to minor*	*Minor*

Alternatives/ Footprints	Resource Issues				
	Waterways	**Flooding**	**Floodplains**	**Lakes and Ponds**	**Surface Water Quality**
Maneuver Area (EDZ CACTF) *Impact*	Sedimentation from overland travel *Minor*	Maneuver operations not to increase water flow *Minor*	Not constructed within floodplain *None*	No lakes within footprint *None*	Sedimentation from stream crossings and overland travel *Minor*
Surface Danger Zone (NTR BAX) *Impact*	Only inert munitions used; only trace deposition of munitions residues (propellant) *Minor*	No structures or facilities proposed *None*	No structures or facilities proposed *None*	Firing of munitions into open water prohibited *None to Minor*	Only inert munitions used; only trace deposition of munitions residues (propellant) *Minor*
Surface Danger Zone (EDZ CACTF) *Impact*	Only inert munitions used; only trace deposition of munitions residues (propellant) *Minor*	No structures or facilities proposed *None*	No structures or facilities proposed *None*	Firing of munitions into open water prohibited *None to Minor*	Only inert munitions used; only trace deposition of munitions residues (propellant) *Minor*

4.2.2.1.2 Impacts Common to All Alternatives

Impacts to water resources may indirectly occur as a result of direct impacts to other affected resources such as soils and vegetation, altering flow dynamics and water quality. Direct impacts within the surrounding watershed may occur from chemical constituents that might be inadvertently introduced into waters.

Soil compaction from increased use of existing trails as well as creation of new trails would lead to greater overland flow and reduced groundwater percolation. The construction of new trails would reduce vegetation cover and could cause soil erosion and increased windborne sedimentation. Bank-side erosion at stream crossings would significantly increase (over historic levels) due to the increased frequency and magnitude of disturbance from vehicles. (This would not be an issue at North Texas Range as there would be no stream crossings.) In addition, increased sedimentation and localized widening of waterways at crossings would occur. Most impacts would occur in the Jarvis Creek watershed where summer maneuver training is accessible and soils are better suited for maneuver training. Sedimentation impacts would be minor due to the localized nature of the impacts and the high base levels of sediment in the Jarvis Creek and other area waterways.

Munitions use is expected to increase, affecting surface waters, particularly water bodies within surface danger zones. Utilized munitions include small arms ammunition, training rounds, and inert projectiles from 25mm up to 105mm in size. No high explosive munitions would be used at any of the proposed BAX and CACTF locations. No new dudded impact areas would be created. The exclusive use of training and inert munitions in all proposed locations would result in only trace deposition of munitions residues, such as propellants. Sampling work at DTA has shown trace amounts (parts per million levels) of propellant components such as 2,4-DNT and NG are deposited at firing points (Walsh et al. 2004). The components are immobile or not persistent in the environmental conditions of DTA. The intensive use of training and inert rounds can cause increased soil disturbance around target berms. The significance of increased sedimentation and water quality effects is minor given the rate of chemical decomposition (of any residues) and the slight sediment increases when compared to base sedimentation loads.

Water bodies may be directly impacted by live fire. However, only inert munitions would be used. No adverse effect is expected to surface water bodies as a result of this action. Various metals are used in munitions components. Lead is found in primers, and zinc, lead, antimony, copper, manganese, and iron are found in shell casings and various projectile components. All of these metals are also found at some natural background levels in soils. Numerous soil samples from various training areas of DTA were collected and analyzed for metal concentrations (Walsh 2004). Low levels of zinc, copper, lead, and antimony were detected within impact areas and target berms where munitions were used. The metal concentrations were above natural background, but no samples had values approaching levels of concern. The mainly sandy and gravelly soils in the areas sampled in DTA have neutral pH values of 6 to 7.8 and should not be conducive to dissolution and mobilization of metals deposited from munitions components. These types of soils are typical of both firing points and target berms. Metals, such as lead, can dissolve and mobilize in acidic soils where pH is below 5.5. Soils in permafrost areas with black spruce and sphagnum moss cover are often acidic and have pH levels of 4.0 to 5.0, although the shallow active layer and impermeable underlying permafrost limit mobility of any dissolved metals.

Vehicles would cross small water bodies while maneuvering downrange. USARAK would continue to classify wetlands and riparian areas as "higher function" or "other" for management purposes, and would continue to use the environmental limitations overlays for planning military training activities and managing surface water and wetlands. See Section 4.3.3, *Wetlands*, for additional information.

Smoke generation training would be conducted, including the use of fog oil smoke generators (both stationary and vehicular-mounted units), smoke grenades, and smoke pots. Production and use of SGF-2 (fog oil) smoke may have a slight adverse effect on DTA water quality. SGF-2 is a highly refined mineral oil that is nontoxic to humans and birds. The smoke cloud produced by the fog oil smoke generator atomizes oil into a very fine mist and, upon contact with a water body, this mist may form a thin film (or "sheen") on the water surface. Large doses of oil pose a threat to aquatic organisms as some aquatic biota are sensitive to oil-based products, and large quantities of oil can be persistent and may bio-accumulate. However, the deposition rate of oil from an SGF-2 generated smoke cloud is extremely low and would not produce the serious impacts that an oil spill would incur, given the relatively small volume of oil released to the environment. The measured deposition rate from SGF-2 generated smoke clouds average less than 10 mg/m^2. This is equivalent to about one ounce of oil per acre per fogging event (USARAK 2000c).

Smoke generation is permitted only in approved and designated locations. In addition, various mitigation measures have been outlined to protect the existing physical environment from any negative effects associated with SGF-2 generated smoke (USARAK 2000c).

4.2.2.1.3 Impacts Attributed to Alternative 1 (No Action)

The evaluation of potential impacts under the No Action Alternative recognizes and includes the current Army transformation activities at USARAK. The ROD on the transformation of USARAK was signed on May 27, 2004. Full transformation of USARAK was selected as the preferred alternative. The overall impact of transformation on surface water resources at DTA was determined to be moderate (USARAK 2004a).

DTA is currently used as an "all-seasons" maneuver area, with continuous impacts on soil compaction and overland surface flow, as well as a slight potential to reduce percolation and groundwater recharge. Bank-side erosion is expected to occur under this alternative, from both

non-winter stream crossings as well as at ice bridge approaches. Sedimentation would increase over background levels, and localized changes to stream width, particularly at the crossing points, could occur. Sedimentation impacts would be minor due to the high base (natural) levels of sediment in area waterways (USARAK 2004a).

The Army would also continue to use Oklahoma, Delta Creek, Washington, and Mississippi dudded impact areas for training using high explosive munitions (which are located within DTA West). This would continue to deposit constituents from ordnance on these impact areas, with constituents potentially entering Delta Creek and Delta River. No constituents have been detected in DTA groundwater. Only trace levels (part per billion levels) of explosive residues (RDX [Hexahydro-Trinitro-Triazine] and TNT [2,4,6-Trinitrotoluene]) have been detected in local surface runoff. However, studies have shown that these constituent concentrations degrade rapidly over time and distance (Houston 2002; Ferrick et al. 2001). No downstream effects are expected. Only one propellant chemical found in some munitions (2,4-DNT, explosive residue from propellant) does not rapidly degrade, but it is also relatively immobile and has not been detected in DTA groundwater or surface waters (Walsh et al. 2004).

4.2.2.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

Waterways and Floodplains

Appendix, Figures 3.c and 3.d illustrate surface waters and floodplains potentially affected by the proposed action within the Eddy Drop Zone alternative, immediately east of Jarvis Creek. Construction projects under the proposed action include structures, targetry, utility lines and roads at the BAX and structures, roads and utility lines at the CACTF. Floodplains were delineated for Jarvis Creek by combining the flooding conditions occurring under two different scenarios: with and without the effects of aufeis (river ice). Modeling was conducted using the U.S. Army Corps of Engineers River Analysis System computer program (HEC-RAS) and topographic data obtained through Light Detection and Ranging (LIDAR) surveys. LIDAR is a survey system that utilizes electromagnetic radiation at optical frequencies to take measurements of objects (in this case, topographic landforms). Areas of aufeis formation were determined from aerial photographs taken during the spring 2004 flooding event. As can be seen in the Appendix, Figure 3.e, the floodwaters during ice-free events are generally contained within the banks of Jarvis Creek. Aufeis deposits and river ice cover significantly increase water levels in Jarvis Creek such that floodwaters flow away from Jarvis Creek in an established floodplain in the vicinity of Eddy Drop Zone (Appendix, Figure 3.d). Portions of both the construction footprint and maneuver area of the BAX are within the Jarvis Creek floodplain due to these ice-affected flooding events.

Portions of the construction footprint, maneuver area and surface danger zone of the BAX are within the Jarvis Creek 100-year floodplain. The construction and maneuver areas of the CACTF are not within the Jarvis Creek 100-year floodplain. A portion of CACTF surface danger zone falls within the Jarvis Creek floodplain, but placement of structures within this area is not proposed.

Other impacts to the floodplain associated with construction and maneuver include clearing of vegetation, which could increase velocities and reduce floodwater retention, and percolation within the local construction footprint and maneuver area.

It is understood that ice damming, or aufeis creation, on Jarvis Creek can impede natural water flow and overflow the existing streambank just south of the Eddy Drop Zone alternative,

particularly during spring break-up. Aufeis remains in portions of the creek, and seasonally frozen ground prevents meltwater and overflow from infiltrating into normally permeable gravelly soils. This natural historical occurrence has developed a water drainage course that eventually runs through the community of Delta Junction, as well as through the site for the proposed ranges. Flooding of outlying areas can occur annually, and flooding within the city has occurred relatively frequently (Darby and Associates 1980; USDA 1987). No changes to this historical flooding pattern are expected under the proposed action. The proposed range site and Delta Junction can anticipate continued flooding events. In the spring of 2004, overflow from Jarvis Creek combined with heavy spring rains, resulted in water leaving its normal drainage channel, crossing the Eddy Drop Zone area (through a wooded area beyond 33-Mile Loop Road), and continuing off post. It then crossed under the Alaska Highway (via culverts) and School Road (in Delta Junction), and continued north, flooding homes and farmland in the Tanana Loop area. Records indicate that a similar flooding event occurred in 1968 (*Delta Wind*, May 13, 2004).

The seasonal flooding from the aufeis blockage on Jarvis Creek is not an annual event, but depends upon a combination of events, such as those that created the severe flooding in spring 2004. In addition, this occurs only during an approximate two-week time window, until such time as the aufeis melts, removing the blockage, and flow in Jarvis Creek returns to normal. Nonetheless, this flooding is frequent enough to constitute a foreseeable impact to the Delta Junction community. In addition, the aufeis generally forms in the same area of Jarvis Creek and would continue to form in this area for the foreseeable future. The channel of Jarvis Creek where aufeis has naturally and historically formed would remain unaltered under this alternative. The intensity, frequency, or duration of “ice damming” within Jarvis Creek would also not change as a result of the proposed action.

The overflow waters of Jarvis Creek flow through the proposed BAX construction footprint and maneuver area during spring break-up (usually the end of April and beginning of May), and the current range siting places several roads, trails, and other features within this overflow area of Jarvis Creek. The actual extent of flooding and direction of water travel depends upon the point where aufeis conditions cause water to leave the banks of Jarvis Creek. As water levels increase, the overflow waters leave Jarvis Creek along several smaller channels. The water eventually coalesces into the few preferential flow channels that traverse the proposed BAX site at Eddy Drop Zone. Appendix, Figure 3.d illustrates the 100-year floodplain based on hydraulic modeling. The area depicted in the illustration includes overflow waters from spring aufeis events.

During the range design phase, placement and construction of facilities, access roads and range targetry stations would be undertaken to ensure unimpeded flows and the maintenance of current flow rates through the area. For example, water crossings and culverts in road systems would be modified as needed to preclude impoundment behind roadway systems and to prevent potential overtopping, roadbed erosion, or diversion of surface waters. Vegetation within high water drainage ways and channels would be maintained, except in very localized areas. This natural channel vegetation slows water velocities and flow rates from flood events, thus lessening the downstream effects toward the Alaska Highway and Delta Junction. With these modifications, the overall impact of construction and operation of the range projects at Eddy Drop Zone would be moderate and would not produce a discernable change to flood water travel through the Eddy Drop Zone alternative.

Proposed features within the construction footprint and maneuver area of the BAX at Eddy Drop Zone, including roads, targetry and other facilities, would require the clearing of vegetation

within the construction footprint and the modification of tall standing woody vegetation within the maneuver area, rendering some formerly forested areas to tall shrub, scrub-shrub, or early seral habitats. A majority of the roads and trails would be designed to run north to south and would be elevated. However, some range design features will also be constructed to run east to west, which will function to slow water velocity. In addition, raised construction of roads and trails combined with low water crossings and adequately sized culverts will maintain existing flow rates. The timing of peak flows and water velocities would remain unchanged.

Limited areas of compacted soil would be expected as a result of off-road maneuvers within the range complex. Since flooding as a result of aufeis in the spring is the only hydrologic event that causes extensive overland flow in the Eddy Drop Zone area, compacted soil is not expected to affect infiltration rates as the soil is typically frozen at that time of year, allowing only minimal infiltration. The design and or use of the range facilities would not produce any discernable change to floodwater travel times through the Eddy Drop Zone alternative.

The natural historical occurrence of Jarvis Creek spring flooding due to aufeis accumulation would still occur, regardless of range construction and maneuver, and it would be conveyed along its natural path. However, flows would be concentrated at select points and would effectively increase the velocity within the BAX facility itself. As this flow exits the BAX construction footprint and maneuver area, the downstream vegetation would likely return the velocities to existing levels. The impacts associated with this scenario would be moderate.

Culverts of adequate size would be installed to convey annual spring break-up floodwaters through the range complex. As a result, the timing of peak flows and water velocities would remain unchanged. However, if the culverts become blocked with debris, a lessening of the flooding events and a decrease of the peak flows and water velocities through the BAX could occur. As the water slows down, any suspended sediment would settle out and accumulate on the upstream side of elevated roads and trails. Increased sediment deposition could occur in riparian and wetland areas and potentially decrease the functionality of these systems over time. Also, the likelihood of aufeis formation within the range complex culverts is very low as there is typically no water flow occurring in the area outside of the main Jarvis Creek channel during the winter months. Aufeis generally forms in the same area of Jarvis Creek each year, which is located to the south of the BAX complex. The impacts associated with these scenarios would be moderate.

A floodplain management study of the Delta Junction area completed by the U.S. Department of Agriculture (1987) identified five potential flood control projects along Jarvis Creek to eliminate or lessen the impacts of reoccurring flood events. Four of the potential projects entailed construction of earthen dikes to keep floodwaters out of the floodplain, and the other potential project involved the construction of a 20-mile channel to convey water into the Tanana River. The range complex would not prevent dikes from being built in the future. However, construction of the BAX would prevent the construction of the 20-mile by-pass channel, although this option was considered the least viable by the U.S. Department of Agriculture (USDA 1987). In addition, the designing of a potential earthen dike could be facilitated by using the updated hydraulic data collected by the Army.

Before the Army could proceed on this site, pursuant to Executive Order 11988 – *Protection of Floodplains,* a determination must be made that there is no practicable alternative to constructing the project within a floodplain and that adverse impacts of doing so would be minimized (see Draft Finding of No Practicable Alternative in the appendix).

Lakes and Ponds

This area contains numerous lakes on its eastern and southern portions, with none managed for fishing or stocked by the Alaska Department of Fish and Game (ADF&G). Ranges would be sited to avoid construction near lakes and ponds. In addition, the use of BMPs during construction, such as the installation and maintenance of silt fences, would reduce localized impacts and ensure that soils disturbed during construction would not erode into the lakes. The overall impact of construction and use of the BAX and CACTF on lakes and ponds at Eddy Drop Zone alternative is considered none to minor.

Off-road vehicle travel within lake and pond margins would be prohibited through the use of the environmental limitations overlays for planning military training activities. These planning tools restrict training activities within certain sensitive environments, including lakes and ponds.

Existing management programs regarding range management, INRMP implementation, environmental management, and sustainable range management are funded and implemented as a result of Army transformation. Programs include soil and water quality monitoring, a Training Area Recovery Plan, and ecosystem management. This would result in improved aquatic environment management on USARAK lands (USARAK 2004a).

Water Quality

The overall impact of construction and use of the BAX and CACTF on water quality at Eddy Drop Zone alternative is minor. Sedimentation impacts would be minor due to the localized nature of the impacts and the high, naturally occurring base levels of sediment in the Jarvis Creek and other area waterways.

The mainly sandy and gravelly soils in the areas sampled at DTA (which are common within the Eddy Drop Zone area) have neutral pH values of 6 to 7.5 and should not be conducive to dissolution and mobilization of metals deposited from munitions components. These types of soils are typical of both firing points and target berms. Metals, such as lead, can dissolve and mobilize in acidic soils where pH is below 5.5. Soils in permafrost areas with black spruce and sphagnum moss cover are often acidic and have pH levels of 4.0 to 5.0; however, the shallow active layer and impermeable underlying permafrost limit mobility of any dissolved metals. A mixture of both types of these conditions is present in portions of the surface danger zone. Thus, metals would not be expected to dissolve and mobilize at this proposed location.

Existing management programs regarding range management, INRMP implementation, environmental management, and sustainable range management are funded and implemented as a result of Army transformation. Programs include soil and water quality monitoring, a Training Area Recovery Plan, and ecosystem management. This would result in indirectly improved water quality management on USARAK lands (USARAK 2004a).

4.2.2.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

Waterways and Floodplains

Appendix, Figure 3.c illustrates surface waters potentially affected by the proposed action within the Donnelly Drop Zone alternative. The area is bisected by Jarvis Creek and its tributary, Ober Creek. At this site, the BAX would likely include both Ober and Jarvis creeks within the range

design, introducing challenging requirements for creek crossings during high water periods. Portions of both the BAX and CACTF construction footprint and maneuver area are within the Jarvis Creek and Ober Creek floodplains (Appendix, Figure 3.d). Construction projects under the proposed action include structures, targetry, utility lines and roads at the BAX and structures, utility lines and roads at the CACTF. A portion of both the BAX and CACTF surface danger zones fall within the Jarvis Creek floodplain, but construction of structures as part of the surface danger zone is not proposed.

Appendix, Figure 3.d illustrates the extent of the floodplain at Donnelly Drop Zone based on hydraulic modeling, as described in Section 4.2.2.1.4, *Impacts Attributed to Alternative 2 (Eddy Drop Zone)*. Hydrologic field investigations conducted in 2005 did not indicate any features that would cause extensive aufeis formation similar to that near Eddy Drop Zone. It is likely that portions of Jarvis Creek freeze solid during the winter months, but Jarvis Creek is fairly channeled and deep within the Donnelly Drop Zone alternative, which prevents large aufeis formations from occurring. An extensive preferential channel network, similar to the Eddy Drop Zone area, was also not observed within the construction footprint and maneuver area at Donnelly Drop Zone.

A majority of the structures, targetry, and roads would be constructed on the higher portions adjacent to Jarvis and Ober creeks (although still within the 100-year floodplain). Where necessary, adequate culverts would be installed along proposed roads and trails that cross historic and current natural channels, and watercourse vegetation would be maintained to prevent any flow alterations. Range design would ensure maintenance of the existing hydrologic flow regime of the floodplain. Facilities would be placed and constructed in such a way as to preclude the disruption of natural flows or acceleration of flow rates through the area. With these modifications, the overall impact of construction and operation of the range projects at Donnelly Drop Zone would be moderate and would not produce a discernable change to flood water travel through the Donnelly Drop Zon e alternative.

The primary impact to both Jarvis and Ober creeks under this alternative would be from vehicle stream crossings, as both active riverbeds flow through the Donnelly Drop Zone alternative (Appendix, Figure 3.d). Ranges would be sited to avoid any construction within the active riverbed. All facilities and construction would occur on the adjacent higher, vegetated outwash fan to the east of Jarvis Creek.

Stream crossings would be more frequent during maneuver activities under this alternative. Bank-side erosion at stream crossings could possibly lead to increased sedimentation and localized widening of waterways. Sedimentation impacts would be minor at Jarvis Creek, given the localized nature of the impacts and the high, naturally occurring base levels of sediment. However, instream activity within Ober Creek would have greater adverse impacts, as this waterway is a non-glacial (or clear) stream. Ober Creek is characterized by steeper banks and meandering bends. Stream crossings of this water body would most likely be accomplished by installation of bridges. Bridges or causeway/bridge combinations would likely affect levels and flows of Jarvis and Ober creeks. Impacts associated with stream crossings of Jarvis and Ober creeks would be moderate.

Before the Army could proceed on this site, pursuant to Executive Order 11988 – *Protection of Floodplains*, a determination must be made that there is no practicable alternative to constructing the project within a floodplain and that adverse impacts of doing so would be minimized (see Draft Finding of No Practicable Alternative in the appendix).

Lakes and Ponds

The alternative has a few small lakes in the extreme southeastern corner and a large shallow lake (Butch Lake) in the northeastern corner, none of which are managed for fishing or stocked by ADF&G. Ranges would be sited to avoid construction near lakes and ponds. In addition, the use of BMPs during construction, such as the installation and maintenance of silt fences, would reduce localized impacts and ensure that soils disturbed during construction would not erode into the lakes. The overall impact of construction and use of the BAX and CACTF on lakes and ponds at Donnelly Drop Zone alternative is considered none to minor.

Off-road vehicle travel within lake and pond margins would be prohibited through the use of the environmental limitations overlays for planning military training activities. These planning tools restrict training activities within certain sensitive environments, including lakes and ponds.

Existing management programs regarding range management, INRMP implementation, environmental management, and sustainable range management are funded and implemented as a result of Army transformation. Programs include soil and water quality monitoring, a Training Area Recovery Plan, and ecosystem management. This would result in improved aquatic environment management on USARAK lands (USARAK 2004a).

Water Quality

Sedimentation impacts to Jarvis Creek during construction and maneuver at Donnelly Drop Zone would be minor due to the localized nature of the impacts and the high base levels of sediment in the Jarvis Creek. Instream activity within Ober Creek would have greater adverse impacts, as this waterway is a non-glacial (or clear) stream. Increased suspended sediments could lead to violation of state water quality turbidity standards. Impacts associated with stream crossings of Ober Creek would be moderate under this alternative.

Sandy and gravelly soils with neutral pH values of 6 to 7.5 are less common within the Donnelly Drop Zone alternative. Soils in permafrost areas with black spruce and sphagnum moss cover are often acidic and have pH levels of 4.0 to 5.0. This type of soil is more common at Donnelly Drop Zone. The shallow active layer and impermeable underlying permafrost limit mobility of any dissolved metals. A mixture of both types of these conditions is present in portions of the surface danger zone. Thus, metals would not be expected to dissolve and mobilize at this proposed location.

Existing management programs regarding range management, INRMP implementation, environmental management, and sustainable range management are funded and implemented as a result of Army transformation. Programs include soil and water quality monitoring, a Training Area Recovery Plan, and ecosystem management. This would result in indirectly improved water quality management on USARAK lands (USARAK 2004a).

4.2.2.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

Waterways and Floodplains

The proposed action would be sited on a natural bench, a minimum of 100 to 150 feet above the Delta River floodplain (Appendix, Figure 3.d), and thus would not affect the floodplain. In

addition, the range complex would be sited an adequate distance from the edge of the natural bench to prevent erosion into the Delta River. The slope is steeper near the edge of the bench, so it also would be less desirable for target or road placement, which lessens the chance for erosion.

Culverts would be installed along proposed roads and trails that cross historic and current natural channels, and channel vegetation would be maintained to prevent any alteration of flow through the area. Range design would ensure the continued existing hydrologic flow regime of the area. With these modifications, the overall impact of construction and operation of the range projects at North Texas Range would be minor and would not produce a discernable change to runoff water travel through the area.

Lakes and Ponds

The North Texas Range alternative has numerous lakes, some of which are intensively managed for fisheries. The proposed construction footprint and maneuver area for the BAX and CACTF at North Texas Range would include North and South Twin, Rockhound, No Mercy, Doc, and Mark lakes, all of which are stocked by the ADF&G and heavily fished by members of the public. Ranges would be sited to avoid construction near lakes and ponds. In addition, the use of BMPs during construction, such as the installation and maintenance of silt fences, would reduce localized impacts and ensure that soils disturbed during construction would not erode into the lakes. The overall impact of construction and use of the BAX and CACTF on lakes and ponds at North Texas Range alternative is considered none to minor. However, access to these lakes for recreational purposes would be impacted under this alternative and is discussed further in Section 4.3.8, *Public Access and Recreation*.

Off-road vehicle travel within lake and pond margins would be prohibited through the use of the environmental limitations overlays for planning military training activities. These planning tools restrict training activities within certain sensitive environments, including lakes and ponds.

Existing management programs regarding range management, INRMP implementation, environmental management, and sustainable range management are funded and implemented as a result of Army transformation. Programs include soil and water quality monitoring, a Training Area Recovery Plan, and ecosystem management. This would result in improved aquatic environment management on USARAK lands (USARAK 2004a).

Water Quality

The overall impact of construction and use of the BAX and CACTF on water quality at North Texas Range is considered minor.

Sandy and gravelly soils with neutral pH values of 6 to 7.5 are less common within the North Texas Range alternative. Soils in permafrost areas with black spruce and sphagnum moss cover are often acidic and have pH levels of 4.0 to 5.0. This type of soil is more common at North Texas Range alternative. The shallow active layer and impermeable underlying permafrost limit mobility of any dissolved metals. A mixture of both types of these conditions is present in portions of the surface danger zone. Thus, metals would not be expected to dissolve and mobilize at this proposed location.

Existing management programs regarding range management, INRMP implementation, environmental management, and sustainable range management are funded and implemented as a result of Army transformation. Programs include soil and water quality monitoring, a Training Area Recovery Plan, and ecosystem management. This would result in indirectly improved water quality management on USARAK lands (USARAK 2004a).

4.2.2.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

Waterways and Floodplains

Appendix, Figures 3.c and 3.d illustrate surface waters and floodplains potentially affected by the proposed action within the North Texas Range and Eddy Drop Zone Combined alternative. Construction projects under the proposed action include structures, targetry, utility lines and roads at the North Texas Range BAX and structures, utility lines and roads at the Eddy Drop Zone CACTF. No portions of the CACTF construction footprint and maneuver area are within the Jarvis Creek 100-year floodplain. The BAX would be sited on a natural bench, a minimum of 100 to 150 feet above the Delta River floodplain (Appendix, Figure 3.d), and thus would not affect the 100-year floodplain. A portion of the CACTF surface danger zone falls within the Jarvis Creek floodplain and a portion of the BAX surface danger zone falls within the Delta River floodplain, but placement of structures within areas that could potentially impede streamflow are not proposed. The channel of Jarvis Creek where aufeis has naturally and historically formed would remain unaltered under this alternative. The intensity, frequency, or duration of "ice damming" within Jarvis Creek would also not change as a result of the proposed action. The overall impacts would be none to minor.

Lakes and Ponds

There are no lakes or ponds within the proposed CACTF site at Eddy Drop Zone. No impacts are predicted. The proposed construction footprint and maneuver area for the BAX at North Texas Range would include North and South Twin, Rockhound, No Mercy, Doc, and Mark lakes, all of which are stocked by the ADF&G and heavily fished by members of the public. The BAX would be sited to avoid construction near lakes and ponds. In addition, the use of BMPs during construction, such as the installation and maintenance of silt fences, would reduce localized impacts and ensure that soils disturbed during construction would not erode into the lakes. The overall impact of construction and use of the BAX on lakes and ponds at North Texas Range alternative is considered none to minor. Access to these lakes for recreational purposes would be impacted under this alternative, and this is discussed further in Section 4.3.8, *Public Access and Recreation*.

Off-road vehicle travel within lake and pond margins would be prohibited through the use of the environmental limitations overlays for planning military training activities. These planning tools restrict training activities within certain sensitive environments, including lakes and ponds.

Existing management programs regarding range management, INRMP implementation, environmental management, and sustainable range management are funded and implemented as a result of Army transformation. Programs include soil and water quality monitoring, a Training Area Recovery Plan, and ecosystem management. This would result in improved aquatic environment management on USARAK lands (USARAK 2004a).

Water Quality

The overall impact of construction and use of the BAX and CACTF on water quality at North Texas Range and Eddy Drop Zone is considered minor and is similar to that discussed in previous sections.

4.2.2.2 Mitigation

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts to surface water resources. The appendix states how the offered mitigation would serve to eliminate or lessen the foreseen impact and offers an assessment of the potential success of the mitigation. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

4.2.2.2.1 Existing Mitigation

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts.

- Compliance with training exercise regulations as stipulated by USARAK Range Regulation 350-2.
- Application of the ITAM program to inventory and monitor, repair, maintain, and enhance training lands.
- Use of the Range and Training Land Assessment (RTLA) program and the Land Rehabilitation and Maintenance (LRAM) program to inventory land conditions, monitor vegetation trends, repair damaged areas, and minimize future damage.
- Implementation of programs to track munitions usage.
- Use of the RFMSS and tracking of range use data.
- Implementation of a soil and water monitoring program for DTA.
- Compliance with conditions of Conditional Fog Oil Permit from ADEC.

4.2.2.2.2 Proposed Mitigation

The following mitigation measures are essential in addressing impacts associated with the proposed action.

- Comply with Executive Order 11988 – *Protection of Floodplains* to minimize adverse impacts to floodplains.
- Closely monitor all sites to detect and correct future changes in drainage patterns.
- Design and build ranges to ensure they would not impede floodwaters.
- Avoid designing roads and trails in the general direction of preferential water flow and at ground level.
- Avoid constructing large areas of impervious surface.
- Remove minimal amounts of vegetation to prevent increased overland flow through the range areas.
- Design range facility drainage to accommodate general local snowmelt runoff each spring and rainfall events throughout the year.
- Site ranges to avoid construction footprints near lakes and ponds.
- Prevent maneuver near lakes and ponds.
- Prevent direct fire into lakes and ponds.

- Construct permanent low-water crossings (i.e., ingress and egress ramps) or other features at designated vehicular stream crossings to prevent bank erosion, widening of waterways and increased sediment in streams.

4.2.3 Fire Management

Issue 4: Risk of wildfires. The impact of construction and operation of the BAX and CACTF to wildfire risk was identified as a primary issue of concern during scoping.

This section analyzes and compares the fire risks and management actions associated with operation and use of the BAX and CACTF at each alternative location. Baseline data for this comparison was presented in Section 3.2.3.

Due to the important role of fire in Alaskan ecosystems, wildland fire is seen as a positive impact on the natural environment. Negative impacts are those that threaten human life and property. This section specifically assesses the risk of unplanned human-caused fires near settlements and the need for increased fire protection under the proposed action.

4.2.3.1 Comparison of Alternatives

4.2.3.1.1 Description of Methodology

The following definitions will be used to categorize potential impacts:

- None – No measurable impacts are expected to occur.
- Minor – The potential for wildland fire occurrence would increase in unpopulated areas. Area has been designated as having low potential fire behavior rating.
- Moderate – The potential for wildland fire occurrence would increase. These adverse impacts would be in Critical, Full, or Modified management areas (Section 3.2.3.2, *Fire Policy*). Area has been designated as having moderate potential fire behavior rating.
- Severe – Adverse impacts would be obvious and would have serious consequences to wildland fire management and potential fire occurrence. Area has been designated as having high potential fire behavior rating.
- Beneficial – Impacts of alternatives would benefit wildland fire management.

The first three qualitative impact categories (none, minor and moderate) are considered insignificant in this analysis. The last category (severe) is considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to fire management is presented in Section 4.2.3.2, *Mitigation*.

Tables 4.2.3.a and 4.2.3.b present a summary of quantitative impacts to several fire management parameters for each alternative. Further discussions of environmental consequences for each alternative are within Table 4.2.3.c and subsequent sections.

Table 4.2.3.a Quantitative Summary of Impacts to Fire Management.

Alternative/Footprint	Parameters (acres)				
	Area	Burned w/in 25 years	Not Burned w/in 25 Years	Full Fire Management Option	Limited Fire Management Option
Eddy Drop Zone – BAX					
Construction Footprint	254	0	254	254	0
Maneuver Area	2,872	11	2,861	2,872	0
Surface Danger Zone	23,741	16,980	6,761	23,741	0
Eddy Drop Zone – CACTF					
Construction Footprint	96	0	96	96	0
Maneuver Area	1,184	0	1,184	1,184	0
Surface Danger Zone	1,123	0	1,123	1,123	0
Donnelly Drop Zone – BAX					
Construction Footprint	508	211	297	508	0
Maneuver Area	3,413	1,647	1,766	3,413	0
Surface Danger Zone	19,313	15,631	3,681	19,313	0
Donnelly Drop Zone – CACTF					
Construction Footprint	44	0	44	44	0
Maneuver Area	694	0	694	694	0
Surface Danger Zone	871	0	871	871	0
North Texas Range – BAX					
Construction Footprint	552	552	0	552	0
Maneuver Area	2,548	2,548	0	2,548	0
Surface Danger Zone	22,041	5,395	16,646	4,109	17,932
North Texas Range – CACTF					
Construction Footprint	105	105	0	105	0
Maneuver Area	771	771	0	771	0
Surface Danger Zone	1,318	1,318	0	1,318	0
North Texas Range and Eddy Drop Zone Combination					
Construction Footprint – NTR BAX	727	727	0	727	0
Construction Footprint – EDZ CACTF	96	0	96	96	0
Maneuver Area – NTR BAX	4,081	4,081	0	4,023	58
Maneuver Area – EDZ CACTF	1,184	0	1,184	1,184	0
Surface Danger Zone – NTR BAX	23,741	7,329	16,412	5,211	18,530
Surface Danger Zone – EDZ CACTF	1,123	0	1,123	1,123	0

Table 4.2.3.b Quantitative Summary of Impacts to Fire Management under Canadian Forest Service Fuel Type Designations.

Alternative/Footprint	Parameters (acres)				
		Canadian Forest Service Fuel Type Designations			
	Area	C-2 Boreal Spruce	O-1B Grass/Herb	M-2 Boreal Mixed Wood	Barren Land
Eddy Drop Zone – BAX					
Construction Footprint	254	45	86	109	12
Maneuver Area	2,872	790	514	1,533	34
Surface Danger Zone	23,741	1,425	14,440	3,783	871
Eddy Drop Zone – CACTF					
Construction Footprint	96	29	5	60	3
Maneuver Area	1,184	617	78	456	32
Surface Danger Zone	1,123	599	9	408	87
Donnelly Drop Zone – BAX					
Construction Footprint	508	109	261	10	10
Maneuver Area	3,413	663	1,948	101	105
Surface Danger Zone	19,313	896	14,304	1,359	508
Donnelly Drop Zone – CACTF					
Construction Footprint	44	9	19	8	4
Maneuver Area	694	162	351	70	10
Surface Danger Zone	871	176	464	68	28
North Texas Range – BAX					
Construction Footprint	552	29	472	21	24
Maneuver Area	2,548	108	2,274	70	73
Surface Danger Zone	22,041	12,097	3,983	958	1,545
North Texas Range – CACTF					
Construction Footprint	105	0	89	3	13
Maneuver Area	771	12	711	13	19
Surface Danger Zone	1,318	19	1,231	18	33
North Texas Range and Eddy Drop Zone Combination					
Construction Footprint – NTR BAX	727	20	642	47	18
Construction Footprint – EDZ CACTF	96	29	5	60	3
Maneuver Area – NTR BAX	4,081	365	3,177	334	124
Maneuver Area – EDZ CACTF	1,184	617	78	456	32
Surface Danger Zone – NTR BAX	23,741	10,740	4,855	1,071	2,691
Surface Danger Zone – EDZ CACTF	1,123	599	9	408	87

Table 4.2.3.c Summary of Environmental Consequences to Fire Management.

Alternatives/ Footprints	Resource Issues		
	Fire Hazard/Risk	**Fire Policy**	**Fuels Management**
Alternative 1: No Action			
Impact within DTA East (104,601 acres)	Military training in forested and potentially flammable areas	No changes to Alaska Wildland Fire Management policy proposed	INRMP and fire management plans provide for fuels management on training lands
Alternative 2: Eddy Drop Zone			
Construction Footprint *Impact*	Slight chance of fire starts during construction *Moderate*	No changes to Alaska Wildland Fire Management policy proposed *None*	Reduces flammable fuels *Beneficial*
Maneuver Area *Impact*	High fire behavior hazard; location closer to Delta Junction *Severe*	No changes to Alaska Wildland Fire Management policy proposed *None*	Reduces flammable fuels *Beneficial*
Surface Danger Zone *Impact*	High fire behavior hazard *Severe*	No changes to Alaska Wildland Fire Management policy proposed *None*	Reduces flammable fuels *Beneficial*
Alternative 3: Donnelly Drop Zone			
Construction Footprint *Impact*	Slight chance of fire starts during construction *Minor*	No changes to Alaska Wildland Fire Management policy proposed *None*	Reduces flammable fuels *Beneficial*
Maneuver Area *Impact*	Moderate fire behavior hazard; location further from Delta Junction *Moderate*	No changes to Alaska Wildland Fire Management policy proposed *None*	Reduces flammable fuels *Beneficial*
Surface Danger Zone *Impact*	Moderate fire behavior hazard *Moderate*	No changes to Alaska Wildland Fire Management policy proposed *None*	Reduces flammable fuels *Beneficial*
Alternative 4: North Texas Range			
Construction Footprint *Impact*	Slight chance of fire start during construction *Minor*	No changes to Alaska Wildland Fire Management policy proposed *None*	Reduces flammable fuels *Beneficial*
Maneuver Area *Impact*	Low to moderate fire behavior hazard; location further from Delta Junction *Minor to Moderate*	No changes to Alaska Wildland Fire Management policy proposed *None*	Reduces flammable fuels *Beneficial*
Surface Danger Zone *Impact*	Low to moderate fire behavior hazard; location further from Delta Junction *Minor to Moderate*	No changes to Alaska Wildland Fire Management policy proposed *None*	Reduces flammable fuels *Beneficial*
Alternative 5: North Texas Range/Eddy Drop Zone Combination			
Construction Footprint (NTR BAX) *Impact*	Slight chance of fire start during construction *Minor*	No changes to Alaska Wildland Fire Management policy proposed *None*	Reduces flammable fuels *Beneficial*
Construction Footprint (EDZ CACTF) *Impact*	Slight chance of fire starts during construction *Moderate*	No changes to Alaska Wildland Fire Management policy proposed *None*	Reduces flammable fuels *Beneficial*

Alternatives/ Footprints	Resource Issues		
	Fire Hazard/Risk	**Fire Policy**	**Fuels Management**
Maneuver Area (NTR BAX) *Impact*	Low to moderate fire behavior hazard; location further from Delta Junction *Minor to Moderate*	No changes to Alaska Wildland Fire Management policy proposed *None*	Reduces flammable fuels *Beneficial*
Maneuver Area (EDZ CACTF) *Impact*	High fire behavior hazard; location closer to Delta Junction *Severe*	No changes to Alaska Wildland Fire Management policy proposed *None*	Reduces flammable fuels *Beneficial*
Surface Danger Zone (NTR BAX) *Impact*	Low to moderate fire behavior hazard; location further from Delta Junction *Minor to Moderate*	No changes to Alaska Wildland Fire Management policy proposed *None*	Reduces flammable fuels *Beneficial*
Surface Danger Zone (EDZ CACTF) *Impact*	High fire behavior hazard *Severe*	No changes to Alaska Wildland Fire Management policy proposed *None*	Reduces flammable fuels *Beneficial*

4.2.3.1.2 Impacts Common to All Alternatives

A wildland fire hazard assessment was completed for areas of concern for USARAK transformation (USARAK 2004a). Fuel maps were created which indicate the fuel types that exist on DTA East, which are described in Section 3.2.3.4, *Fuels Management*. Fuels maps indicate concentrations of fire prone vegetation and recommend areas for hazard fuel reduction projects (Appendix, Figure 3.g). Table 4.2.3.b lists the fuel types by acre for each location.

DTA East, which contains all the alternatives, is designated for Full protection fire management (USARAK 2002b). The frequency of natural fires would not increase as a result of either the no action and proposed action. The risk of fires from recreational users would continue at DTA, as areas would remain open to recreational use when no training is underway. While the construction of the proposed range facilities would not pose a wildland fire risk, the operation of these ranges and other ongoing training activities at DTA East would potentially increase the risk of fires above natural frequencies.

The overall risk of fire starts would increase due to the operation of the BAX and CACTF. Historical sources of wildfire starts include military training, human causes, and natural causes. Military training consists of specific risks such as pyrotechnics and munitions, support vehicle exhausts, general range maintenance, bivouac and other support activities, and soldier behavior (cigarettes, campfires, etc.). Regardless of the selected site, the risk of the fire start is increased proportionate to the level of range activity. However, certain sites have a higher potential fire behavior rating. The rate of transition from a fire start to a large, uncontrolled fire involves the atmospheric conditions at the time (relative humidity, wind speed, wind direction, etc.), the available fuel load and condition, and the success of the USARAK fire suppression efforts. The severity (or significance) of the wildfire risk is finally determined by the proximity of the larger event to human development.

While no personnel would be stationed at DTA as a result of the proposed action, there may be increased recreational use at DTA from newly stationed personnel and their families at FWA. The 30 additional personnel hired to operate the proposed ranges and their families could also contribute to a small increase in DTA recreational use. Recreational use of DTA East is already increasing as a result of the workforce associated with Space and Missile Defense Command

(SMDC) operations. Additional Soldiers have also been stationed at Fort Greely to provide security for SMDC facilities. This increase is not likely to cause a significant increase in wildland fire occurrence if any. However, construction and use of the BAX and CACTF is likely to result in greater military use of the training land, and, as a consequence, portions of DTA East would be closed to public access. Less recreational access would result in less recreational activity, which decreases the chance for a fire start from recreational users. Overall, these impacts would be moderate (USARAK 2004a).

Fire history records are extensive for DTA East. Most large fires in this area can be attributed to typical high winds, and large areas of grass and black spruce. These vegetation types can carry fire rapidly, especially in high wind events. Fire will always play a significant role at DTA East due to the weather patterns and natural vegetation types of the area. Forest fires can also lead to reduced air quality conditions due to smoke. Increased smoke near populated areas can create annoyance and potentially impact individuals' health.

The Fire Risk Index (described in USARAK Regulation 350-2) would continue to be used during low, moderate, high, and extreme fire danger periods to minimize fire occurrence from range operations. Fire index ratings are typically only assigned during the fire season (early April to late August). This time period represents approximately one-third of a calendar year. During this four month period, existing records show that a "low" fire index rating was assigned approximately 26 percent of the time, a "moderate" rating was assigned approximately 24 percent of the time, a "high" rating was assigned approximately 33 percent of the time, and an "extreme" rating was assigned approximately 17 percent of the time (Table 3.2.3.b). For the remaining two-thirds of the year (about 243 days), fire index ratings are typically "low" due to colder temperatures and greater precipitation (snowcover).

Table 4.2.3.d lists the existing restrictions to training based on the Fire Risk Index. Modifications to the training restrictions may be requested, but only if the exercise is required for deployment preparation (in response to an actual conflict, not normal training) and is based on Command decision. All countermeasures would be initiated prior to training.

Table 4.2.3.d Existing Fire Hazard Range Restrictions at USARAK (as listed in USARAK Range Regulation 350-2, June 2002).

Fire Risk Index	Existing Range Restrictions at DTA
Low	• No restrictions
Moderate	• Use of blank and ball ammunition allowed. • Use of pyrotechnics (including smoke, trip flares, or tracers) prohibited unless used in container that completely contains all burning elements of the device.
High	• Use of blank and ball ammunition allowed. • Use of pyrotechnics is prohibited. • Ground units carry fire-fighting equipment.
Extreme	• Use of blank and ball ammunition allowed on established ranges. • Use of pyrotechnics is prohibited. • Ground units carry fire-fighting equipment.

Historically DTA East has been subject to a high frequency fire regime. In the past 20 years 73,093 acres have burned in the area, costing the federal government approximately $7.8 million in suppression costs. Thus far, no fires have moved off military lands north of Buffalo Drop Zone, where private property exists and people reside. Given the current conditions of the fuels and the location of private property, the construction of live-fire maneuver ranges would increase the likelihood of a large fire moving off military lands.

In coordination with the Alaska Fire Service (AFS), USARAK is conducting a landscape scale fire mitigation project to reduce current risks. Multiple management techniques are being used to reduce the likelihood of fires moving off military lands onto private property. Rapid stand conversion from black spruce to a pure deciduous stand would be conducted over a period of three years, prior to full operation of the BAX and CACTF, regardless of which alternative is selected. If a fire were to start within DTA East, this less volatile deciduous stand would stop (or slow) the progression of a low intensity fire moving northward. This fuel break would also provide a suppression advantage to fire fighters during any high intensity crown fire.

Several suggested mitigation measures can reduce the risk of wildfire impacts on the community of Delta Junction. An extensive hazard fuels reduction project, coupled with a prescribed fire, would be required to protect the community residents. Under extreme conditions, since such measures cannot guarantee that fires will not spread onto adjacent lands, USARAK would prohibit the use of pyrotechnics during training exercises when fire index ratings are high or extreme. In addition, a detailed pre-attack plan (including an initial attack plan and egress routes for residents of Delta Junction) is required before any live-fire training exercises occur. USARAK would also coordinate with AFS to pre-position an Initial Attack Response Team in the Delta Junction area.

4.2.3.1.3 Impacts Attributed to Alternative 1 (No Action)

Under this alternative, the BAX and CACTF would not be constructed, but transformation of USARAK would still occur. Potential impacts under the No Action Alternative take into account Army transformation activities at USARAK. The ROD on the transformation of USARAK was signed on May 27, 2004. The overall impact of transformation on fire management at DTA was determined to be moderate (USARAK 2004a).

The frequency and intensity of maneuver and weapons training would increase as a result of transformation. Incendiary devices, field burning, vehicle exhaust, trash burning, and campfires are potential igniters of wildland fires, as identified in the *Alaska Army Lands Withdrawal Renewal Legislative Environmental Impact Statement* (USARAK 1999a). These activities could occur during training exercises. Under this alternative, efforts would continue to immediately extinguish fires resulting from training activities. Mitigation measures to reduce the fire risk at DTA would continue.

Several assumptions were used to assess the impact on wildland fire management and the risk on USARAK and surrounding lands: (1) added transformation infrastructure would require protection from wildland fire, (2) increased training activity would increase probability of fires, (3) increased transformation stationing of troops could lead to greater recreational use, thus increasing probability of fire occurrence, (4) use of frequently used training areas would increase under the proposed action, and (5) training areas that were not regularly used would be used more frequently. Additional analysis of the effects of transformation to fire management can be found

in the *Final Environmental Impact Statement for Transformation of U.S. Army Alaska, Vols. 1 and 2* (USARAK 2004a).

As a result of Army transformation, the number of small arms rounds fired at DTA East and West would increase by approximately 40 percent, while the use of high explosive rounds within DTA West would increase by about 50 percent (USARAK 2004a). No high explosive rounds would be used within DTA East. The increased use of high explosive rounds within DTA West would occur at the firing points located along the Delta River. This would increase the DTA wildland fire risk, and is an adverse long-term impact, especially in areas where boreal spruce fuels are located. The Delta River separates existing impact areas from DTA East and the community of Delta Junction. This is expected to result in a moderate impact to fire management.

In coordination with the AFS, USARAK is currently conducting a landscape-scale fire mitigation project (see Section 3.2.3.4, *Fuels Management*). Multiple management techniques are being used to decrease the likelihood that fires would spread from military lands onto private property, or spread from private property onto military lands. The Jarvis North Fire Mitigation Project was developed to mitigate potential fire risks from increased military use within DTA East (USARAK 2003b).

The effects of fire hazard mitigation are analyzed in the *Fort Greely Area/DTA Integrated Natural Resources Management Plan (INRMP) for 2002-2006*. For fire management, including wildfire prevention (analyzed independently), minor adverse impacts are anticipated for floral and faunal resources (USARAK 2002b). The Jarvis North Fire Mitigation Project would directly impact floral resources through the removal of vegetation. However, the affected acreages are minimal in comparison to the vast tracts of similar vegetation types elsewhere on DTA. Impacts to fauna are direct. Small mammals may not be able to escape during clearing operations, and the destruction of nests could occur in the hand thinned areas during summer. Indirect impacts are primarily related to habitat loss. Again, affected acreages are minimal in comparison to adjacent areas of similar habitat. No special interest areas are within the project area.

Negligible impacts are anticipated on soils and water resources. Soil impacts would occur from the removal of organic material from approximately 130 acres where stand conversion is desired. The site would be vulnerable to erosion during the time required for re-vegetation (one to three years). Water resources could be affected during this time, when large areas of bare soil are susceptible to water erosion and subsequent sedimentation. Most of the area is relatively flat, and only 15 percent of the stand conversion portion has a slope of more than 3 percent. Areas surrounding these stand conversion plots would remain undisturbed and would act as sediment traps for any eroding soil. In addition, the Jarvis North Fire Mitigation Project includes hand thinning as opposed to the use of large equipment. This reliance on hand work prevents the introduction of unnecessary vehicle traffic along the length of the project, subsequent vegetation removal, and additional erosion. Hand thinning would also be used in archaeologically sensitive areas within DTA.

Negligible and localized impacts to air quality are expected from smoke generated from burning slash, fugitive dust, and vehicle traffic on bare soil. All required prescribed fire and air quality permits would be obtained, and their specific stipulations would be followed. No effects are anticipated on cultural resources, facilities, or socioeconomics. Cultural surveys and Clean Water Act (CWA) Section 404 permits are required and have been completed or obtained.

From a public safety perspective, the benefits of this fire mitigation plan far outweigh the potential minor adverse effects. The Jarvis North Fire Mitigation Project is designed to reduce the probability of wildfire spreading north, off military land, through continuous stringers of black spruce to adjacent private property. This project affords significant wildfire protection to adjacent private landowners.

4.2.3.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

The overall impact of construction and use of the BAX and CACTF on wildfire hazard/risk at Eddy Drop Zone is considered severe. This assessment incorporates mitigation measures that would be undertaken. Under this alternative, fire management would continue as described in Section 3.2.3. Additional measures would lessen the risk of wildfire under this alternative and are described below.

The Eddy Drop Zone alternative is designated as a Full management option area (Alaska Fire Service and State of Alaska 1998). The frequency of natural fires would not increase under this alternative, but human/training caused wildland fires may increase as a result of increased small arms use and pyrotechnical devices. Fire starts from recreational users would remain the same, or potentially decrease, as the area would be subject to additional closures during range construction and operation. There would be no changes to fire management policy under this alternative.

Fire risk assessments for the proposed projects were conducted by the USARAK Forester and two Fuels Management Specialists from AFS. The risk assessment for this alternative is “high,” principally due to the presence of continuous stringers of black spruce, dwarf black spruce, and mixed hardwood with black spruce (Musitano et al. 2002). Understory vegetation consists of bluejoint reedgrass, mosses, and lichens. The fire history and localized weather pattern indicate an extreme hazardous fire situation. Typically, events are wind-driven, high intensity, black spruce fires that threaten state lands and private homesteads along the northern boundary. Based on fuel types, early to mid-summer ignition possibilities could limit the number of available training days or require range restrictions to be imposed.

The proposed BAX at the Eddy Drop Zone alternative would have a firing pattern from north to south (Appendix, Figure 2.e). The fuels composition of the southern portion of the Eddy Drop Zone alternative is a mix of C-2 (pure black spruce) and M-2 (a mix of aspen, birch, and black spruce). The fuel conditions change very little on the flanks of the Eddy Drop Zone alternative and then change almost entirely to C-2 north of the alternative leading to the installation boundary and private homes. Fuels classified as C-2 are those most likely to burn, and M-2 fuel types are the least likely to burn. The weather patterns of the Delta Junction area are very windy, typical of a Chinook condition, with dry air masses coming off the Alaska Range and moving northward. If a fire were to start in the DTA East area, with the necessary climatic variables, the fire would likely move off military lands.

The spread of wildfire at the Eddy Drop Zone alternative is likely, given the large fuel load that exists between the proposed site and the Delta Junction community. This threat would be reduced through (1) the reduction in the fuel load prior to any use of the range complex, and (2) the provision of a USARAK quick-reaction fire suppression capability at DTA. In addition, the range siting at Eddy Drop Zone alternative lies between the source of the wildfire ignition and Delta Junction. This orientation insures a dedicated USARAK response at the Eddy Drop Zone site to protect Army infrastructure investments and, subsequently, the Delta Junction community. The

impact at Eddy Drop Zone alternative is considered severe and significant, given the severity of potential harm during a large, uncontrolled wildfire.

Several mitigation measures have been suggested to reduce the risk of wildfire impacts on the community of Delta Junction (see Section 4.2.3.2, *Mitigation*). An extensive hazard fuels reduction project, coupled with a prescribed fire, has been undertaken to protect community residents. Under extreme conditions, such measures cannot guarantee that fires would not spread into adjacent lands. A detailed wildfire pre-attack plan (including an initial attack plan and egress routes for residents of Delta Junction) should be required before any live weapons fire training exercises occur. USARAK would not use pyrotechnics during training exercises when fire weather indices are rated high or extreme. In addition, USARAK should also coordinate with AFS to pre-position an Initial Attack Response Team in the Delta Junction area.

The Fire Weather Index (FWI) (described in USARAK Range Regulation 350-2) would be used during low, moderate, high, and extreme fire danger periods to minimize wildland fire ignition potential from range operations. Modifications to training restrictions may be requested, but only if the exercise is required for deployment preparation (in response to an actual conflict, not normal training), and is based on Command decision. All countermeasures would be in place prior to training being conducted. Table 4.2.3.d lists various USARAK training range restrictions and requirements.

4.2.3.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

The overall impact of construction and use of the BAX and CACTF on wildfire hazard/risk at Donnelly Drop Zone is considered moderate. This assessment incorporates mitigation measures that would be undertaken. Under this alternative, fire management would continue as described in Section 3.2.3. Additional measures would be adopted to lessen the risk of wildfire under this alternative and are described below.

The Donnelly Drop Zone alternative is designated as a Full management option area (Alaska Fire Service and State of Alaska 1998). The frequency of fires attributed to natural causes would not increase under this alternative. The frequency of wildland fires may increase as a result of increased small arms use and pyrotechnical devices. Fire starts from recreational users would remain the same, or potentially decrease, as the area would be subject to additional closures during range construction and operation. There would be no changes to fire management policy under this alternative.

The risk assessment for this alternative is “moderate,” due to the availability of fuels, potential fire spread, and location of proposed ranges (Musitano et al. 2002). Fuels are continuous black spruce with pockets of hardwoods. The understory is generally composed of mosses and lichens. Based on the local fire history and weather patterns, the area is very susceptible to high winds and fire starts. Typical fires in this area have high rates of spread and intensities. Local fire scars, hardwoods, and road systems may serve as natural fuel breaks. Based on fuel types, early to mid-summer ignition possibilities could limit the number of available training days or require range restrictions to be imposed. The impacts associated with fire hazard/risk would be moderate.

The spread of a wildfire at Donnelly Drop Zone alternative is also likely, even though the distances are greater between the ignition site and the Delta Junction community. Despite these increased distances, a large uncontrolled fire may rapidly cover such distances. The same fuel

reduction program as discussed previously (Section 4.2.3.2, *Mitigation*) would reduce some of these risks. The range infrastructure is upwind at the Donnelly Drop Zone site, providing little additional firebreak protection to check the northward spread of a wildfire. Fuel loads immediately adjacent to the BAX/CACTF sites are smaller, affording more wildfire suppression response time before high intensity fuel sources are reached. The impact at Donnelly Drop Zone alternative is considered moderate due to the severity of potential harm during a large, uncontrolled wildfire.

Several mitigation measures have been suggested to reduce fire potential (see Section 4.2.3.2, *Mitigation*). Monitoring of fire weather indices and prohibition of pyrotechnics use during training exercises when indices are high to extreme could reduce wildland fire ignition potential. In addition, USARAK should coordinate with AFS to pre-position an Initial Attack Response Team in the Delta Junction area. An extensive hazard fuels reduction project, coupled with a prescribed fire, has been undertaken to protect the residents of Delta Junction. Under extreme conditions, these measures would not guarantee the prevention of spread onto adjacent lands. A detailed pre-attack plan (including an initial attack plan and egress routes for residents of Delta Junction) should be required before any live-fire training exercises occur.

The FWI (described in USARAK Range Regulation 350-2) would be used during low, moderate, high, and extreme fire danger periods to minimize wildland fire ignition potential from range operations. Modifications to training restrictions may be requested, but only if the exercise is required for deployment preparation (in response to an actual conflict, not normal training), and is based on Command decision. All countermeasures would be in place prior to training being conducted. Table 4.2.3.d lists various USARAK training range restrictions and requirements.

4.2.3.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

The overall impact of construction and use of the BAX and CACTF on wildfire hazard/risk at North Texas Range alternative is considered minor to moderate. This assessment incorporates mitigation measures that would be undertaken. Under this alternative, fire management would continue as described in Section 3.2.3. Additional measures would be adopted to lessen the probability of wildland fires under this alternative, and are described below.

The North Texas Range alternative is designated as a Full management option area (Alaska Fire Service and State of Alaska 1998). The frequency of natural fires would not increase under this alternative, but wildland fires may increase as a result of increased small arms use and pyrotechnical devices. Fire starts from recreational users would remain the same, or potentially decrease, as the area would be subject to additional closures during range construction and operation. There would be no changes to fire management policy under this alternative.

The risk assessment for this alternative is “low” to “moderate,” due to availability of fuels, fire spread index, and location of proposed ranges (Musitano et al. 2002). Fuels are an alpine tundra fuel type, consisting mainly of grasses/sedge willow, alder, short shrubs, and mosses, with a few pockets of black spruce. Fire spread can be moderate to high, depending on fuel and weather conditions. Old fire scars, to the east and northeast, and Delta Creek, to the west, may serve as fuel breaks. The impacts associated with fire hazard/risk would be minor to moderate.

The spread of fire at North Texas Range is less of a risk than at the Eddy or Donnelly Drop Zone alternatives, as the vegetation is less susceptible to such spread, primarily as a result of previous

wildfires. The affected human development is primarily the Fort Greely cantonment area, SMDC facilities, the Trans-Alaska Pipeline, and Cold Regions Test Center (CRTC) facilities. Subsequent risk to the Delta Junction community is unlikely and minor. The impact at the North Texas Range site is considered moderate, given the USARAK wildfire mitigations, and is still considered significant, given the severity of potential harm during a large uncontrolled wildfire.

Several mitigation measures have been suggested to reduce the potential for increased fires (see Section 4.2.3.2, *Mitigation*). Monitoring fire weather indices and prohibiting pyrotechnics use during training exercises when indices are high to extreme could reduce wildland fire ignition potential.

The AFS, in cooperation with USARAK and Delta Area Forestry, conducted a prescribed burn near North Texas Range alternative in the spring of 2003 and 2004. Approximately 3,000 acres were burned in 2003, another 2,000 acres were burned in 2004, and an additional burn is scheduled for 2006. The goal of the burn is to reduce flammable surface fuels, mainly the open grass thatch that dominates the area. Due to the existing road system and old fire scars, a possible prescribed fire rotation (one burn every three years) could be used to reduce the existing fuel loading and thereby reduce the overall threat of wildland fire. This in turn could increase training days available for live-fire training exercise.

The Hayes Lake Fuels Assessment Project is designed to address the probability of a fire moving from military land (designated as Modified management option) onto adjacent State of Alaska lands (designated as Full management option) in the Delta River Impact Area. (This project is described in Section 3.2.3.4.3, *Fuels Management by Alternative*).

The FWI (described in USARAK Range Regulation 350-2) would be used during low, moderate, high, and extreme fire danger periods to minimize fire occurrence from range operations. Modifications to training restrictions may be requested, but only if the exercise is required for deployment preparation (in response to an actual conflict, not normal training), and is based on Command decision. All countermeasures would be in place prior to training being conducted. Table 4.2.3.d lists various USARAK training range restrictions and requirements.

4.2.3.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

Impacts to fire management at the North Texas Range BAX are expected to be similar as to those discussed under Alternative 4. The impacts associated with wildfire hazard/risk would be minor to moderate, and no changes are proposed to existing Alaska wildland fire management policy. Impacts to fire management as a result of the CACTF being located at Eddy Drop Zone are expected to be similar to those discussed under Alternative 2. However, the fire hazard/risk would likely be lower due to use of non-live fire munitions at the CACTF.

4.2.3.2 Mitigation

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts to fire management. The appendix states how the offered mitigation would serve to eliminate or lessen the foreseen impact and offers an assessment of the potential success of the mitigation. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

Areas most likely to be affected by wildland fire are adjacent to those areas used for training, particularly live-fire training. Since wildland fire spreads unpredictably, the area of influence is difficult to determine. To address this issue, mitigation measures should prepare the landscape for impending wildland fires. Patches of thinned trees and controlled burns in high-risk areas may lessen wildland fire intensity and spread.

4.2.3.2.1 Existing Mitigation

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts.

- Use of the FWI (which is part of Canadian Forest Fire Danger Rating System), in cooperation with AFS.
- Strict adherence and compliance with existing fire risk index range regulations and restrictions (USARAK Range Regulation 350-2) to prevent wildland fires as indicated below:

Fire Risk Index	Existing Range Restrictions at DTA
Low	• No restrictions
Moderate	• Use of blank and ball ammunition allowed. • Use of pyrotechnics (including smoke, trip flares, or tracers) prohibited unless used in container that completely contains all burning elements of the device.
High	• Use of blank and ball ammunition allowed. • Use of pyrotechnics is prohibited. • Ground units carry fire-fighting equipment.
Extreme	• Use of blank and ball ammunition allowed on established ranges. • Use of pyrotechnics is prohibited. • Ground units carry fire-fighting equipment.

- Monitoring of fire weather indices and prohibition of pyrotechnics use during training exercises when indices are high to extreme (when weather and fuels conditions are conducive to quick fire ignition and spread).
- Continued update and implementation of fire management plans prepared by USARAK and the AFS for each installation. The plans assess current fire hazards and list recommendations to reduce them.
- Continued removal of hazardous fuels around Observation Point sites, range targets and structures.
- Conduct prescribed burning to remove light flashy fuels (vegetation) where grass is the primary fuel type. Burning may be done every one to three years depending on fuel load and conditions. Specifically continue prescribed fire at Texas Range, approximately 2,000 – 5,000 acres, every one to three years.
- Continued review of access to firing ranges to enable quick and effective response by initial attack forces in the event of a wildland fire.

- Compliance with detailed "pre-attack" (operational response) plan, including both (1) the initial DTA fire response plan and (2) emergency egress routes for residents of Delta Junction, developed prior to any live-fire training exercises. This is coordinated with AFS and includes an Initial Attack Response Team, pre-positioned in the Delta Junction area during periods of moderate and above fire risk index rating.
- Continued use of fire-fighting materials and equipment by all units on ranges or training areas during high and extreme fire risk index rating periods. These fire-fighting tools would include (but are not limited to) pulaskis, beaters, portable water extinguishers, and an adequate water supply for immediate response. Units would be trained to immediately suppress small range fires (up to 100 square feet) that might occur in the training areas.
- Continue to grant modifications to training restrictions only if the exercise is required for deployment preparation (in response to an actual conflict, not normal training). Approval is based on Command decision.

4.2.3.2.2 Proposed Mitigation

The following mitigation measures are essential in addressing impacts associated with the proposed action.

- Locate range operational areas within hardwood forests (i.e., not in black spruce) to minimize the probability of wildland fire ignition.
- Create defensible space around existing and new structures, including targets. This would be accomplished by clearing fuels around new structures and facilities.
- Create a fire break along the northern boundary of the BAX, under Alternative 2.
- Station a USARAK wildland fire crew at FWA depending upon type of range use and fire weather index rating. The crew would accompany troops that train at DTA during high and extreme fire danger and would provide immediate wildland fire suppression. During times of a low fire risk index rating, the fire crew would conduct needed hazard fuel reduction projects (mow and "burn out" grass patches around targets to prevent fire, remove dead trees, and thin live trees to reduce the fuels within the range footprints) near military structures and on ranges.
- At least two weeks prior to a major training exercise, a public notice would be posted throughout the Delta Junction community and published in the local newspaper. The notice would indicate which range would be used, duration of exercise/range closure, any use of close air support, and any anticipated use of military convoys on local roadways.
- Place fire weather stations at or near proposed BAX and CACTF sites. The station would be purchased and maintained by USARAK. AFS would advise on placement of facility (usually in an area with representative vegetation for the site) and initial setup. This on-site weather station would provide the most accurate fire weather indices for the proposed range.
- Develop a fuels management plan for Bolio Lake Training Area to reduce the threat of wildfires and increase military training opportunities.

4.2.4 Noise

Issue 5: Noise impacts. The impact of construction and operation of the BAX and CACTF to existing noise levels was identified as a primary issue of concern during scoping.

This section analyzes and compares the noise impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.2.4. Additional noise information can be found in the *Final Environmental Impact Statement for Transformation of U.S. Army Alaska, Vol. 2*, Appendix F.

Noise is unwanted sound that interferes with communications (or other human activities), is intense enough to damage hearing, or is otherwise annoying. The military noise environment consists primarily of three types of noise: transportation noise from aircraft and vehicles (including those used for construction), impulsive noise from armor and artillery firing and demolition operations, and noise from small arms ranges. Human response to noise varies, depending on noise type and characteristics, distance between the noise source and the receptor, receptor sensitivity, and time of day. Noise also affects wildlife. Depending on severity, adverse effects could include physiological, behavioral, and population-level responses.

4.2.4.1 Description of Methodology

Environmental noise analyses are primarily accomplished through computer simulations since direct measurement of noise levels is often impractical, expensive, and inconclusive. Also, modeling allows large geographical areas to be analyzed, whereas direct measurement only records noise levels at a specific location. The land uses that fall within the computer generated noise zones (NZ) are investigated to see if they conform to federal guidelines for compatibility (FICUN 1980 and AR 200-1). The noise contours (depicted in the following sections) represent a combination of small arms, large weapons, and demolition.

Four levels of impacts resulting from military activity (or other intensive land use programs) are listed below. Section 4.2.4.2.1, *Impacts Common to All Alternatives*, contains additional descriptions of NZs.

- None – Noise levels are within ambient conditions or NZ I, II, or III, and they do not extend beyond the installation boundary.
- Minor – NZ II extends beyond the installation boundary, but the land uses within the contours are compatible with noise levels according to federal guidelines.
- Moderate – NZ II conditions extend into areas either on or off-post where land uses are normally incompatible with noise levels according to federal guidelines. Peak blast noise levels extend beyond the installation boundary 10 percent of the time during adverse weather conditions. There would be a low risk of noise complaints.
- Severe – NZ III conditions extend into areas either on or off-post where land uses are incompatible with noise levels according to federal guidelines. Peak blast noise levels extend beyond the installation boundary 50 percent of the time during adverse weather conditions. There would be a moderate risk of noise complaints.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant in this analysis. The next category (severe) is considered significant. Mitigation

measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts from noise is presented in Section 4.2.4.3, *Mitigation*.

4.2.4.1.1 Heavy Weapons and Demolition Noise

Many studies have analyzed noise impacts upon surrounding communities. Studied noise contours include small arms, transportation, aircraft, and impulsive noise. Some studies utilize annoyance levels to quantify dose-response levels, utilizing questionnaires and interviews to reach conclusions. Other studies have analyzed actual complaints and subsequently evaluated the noise levels that generated the complaints.

The typical response of humans to noise is annoyance, a response that is remarkably complex and, considered on an individual basis, displays wide variability for any given noise level. Annoyance is the measured outcome of a community's response to survey questions on various environmental and other factors including noise exposure. Although individual annoyance is sometimes measured in the laboratory, field evaluations of community annoyance are most useful for predicting the consequences of actions involving highways, airports, road traffic, railroads, or other noise sources. Factors directly affecting annoyance from noise include interference with communication and sleep disturbance. Other less direct effects include disruption of one's peace of mind, the enjoyment of one's property, and the enjoyment of solitude. The consequences of noise-induced annoyance are privately felt dissatisfaction, often publicly expressed as complaints to the installation or authorities. Not all those annoyed will complain, but it can be assumed that those who complain are annoyed.

For this analysis, the BNOISE2 model was used to calculate the C- weighted day-night sound level (CDNL) noise contours for existing operations. The program was subsequently run to generate noise contours for training that would occur at the BAX (USARAK 2004a). BNOISE2 was not used for the CACTF, as no large caliber (larger than 20mm) weapons would be fired on the range.

Weather conditions can cause peak noise levels to significantly vary from day to day, or even from hour to hour. Under certain weather conditions, particularly during temperature inversions, noise from training can be heard over longer distances. The NZ II and NZ III are based on annual averages and are used to judge land use compatibility using federal guidelines. Though the annual average contours might show little impact on surrounding areas, people may still be annoyed if the peak noise level (from a single event) reaches a high enough level.

The BNOISE2 model, used to generate the annual average CDNL contours, can also be used to generate peak contours for single events. The peak contours show expected levels that one would receive on a sound level meter from a single noise event. Whereas annual average contours are run with typical weather conditions, the model allows the generation of peak level estimates for a variety of weather conditions. The worst case for sound propagation is the Focus Weather Condition, when there is a stiff wind blowing in the direction of the receiver, during extreme cold weather, or when a low cloud layer causes sound to reflect further distances. Peak contours are independent of the number of rounds fired (they would be the same size whether one round or one thousand rounds are fired). Thus, these peak noise levels are not an appropriate evaluation of land use compatibility, but a tool to evaluate if under certain conditions an activity may be loud enough to generate complaints.

For peak levels, from high-energy impulsive sounds such as a 105mm tank gun, the threshold for complaint potential is 115 dBP for moderate risk and 130 dBP for high risk (Pater 1976). Even under Focus Weather Conditions, noise levels would still vary. The peak 10 contour was developed to encompass areas where 90 percent of events would fall at (or below) the levels shown. In other words, the threshold levels (115 for moderate risk and 130 for high risk) would be reached only 10 percent of the time, and only under the Focus Weather Condition. A peak 50 contour would depict the average (median) noise levels (50 percent larger/50 percent smaller) under Focus Weather Conditions.

4.2.4.1.2 Small Arms Noise

Specific noise contours for the BAX and CACTF have been developed for small arms (up to .50 caliber) use. Though only the quieter short range training ammunition (SRTA) would be used at the CACTF, all small arms modeling was conducted based on firing of full range ammunition. This was done due to lack of source data for the SRTA in the noise model. Therefore, the small arms contours in the proposed CACTF locations are larger than they would be if the SRTA rounds were incorporated. USARAK also has addressed the levels of small arms noise in the Installation Environmental Noise Management Plan for DTA East. The acceptable noise contours for small arms stay well within the installation. The increase in small arms training associated with the use of the BAX and CACTF would not extend noise contours off of the installation. For the BAX, in areas where both small arms and heavy weapons noise contours exist, the small arms contours are overshadowed by the heavy weapons and demolition contours. In areas within the BAX where heavy weapons are not used, small arms noise contours are shown.

4.2.4.1.3 Vehicle Noise

Traffic noise models do exist, but they are generally used only for highway traffic analysis. Noise from Army vehicles is not modeled for two reasons. The first is because of the comparatively short distance that vehicle noise travels. Secondly, even when vehicles are driven in close proximity to noise-sensitive receptors, the number of vehicles is not enough to generate a NZ.

As part of transformation at USARAK, the Army utilizes a new family of light armored vehicles known as the Stryker. The Stryker is an eight-wheel-drive, hard-steel vehicle designed to greatly increase ground mobility and firepower over the current light infantry brigade vehicle. Noise levels for the Stryker are defined here to show how their noise levels compare to those of other Army vehicles. The noise levels generated by Stryker vehicles are less than (or equal to) the noise generated by other equipment used by the Army (Table 4.2.4.a). For example, the noise level of a Stryker moving at 50 miles per hour (mph) is approximately 85 dBA at 60 feet away, compared to 89 dBA for a moving M1A1 tank (speed unspecified) at 50 feet away (USARAK 2004a).

Table 4.2.4.a Comparison of Noise Levels (dBA) of the Stryker Compared with Other Common Army Vehicles.

Type	Distance[1]: 50 ft		Distance[1]: 100 ft
	Moving Maximum (dBA)	Idle Maximum (dBA)	Moving Maximum (dBA)
Stryker	85[2]	78[3]	No data
Howitzer M109	96	76	92
D-8K Dozer	92	73	87
M548 Ammo Carrier	85	70	79
M88 Recovery Vehicle	97	70	92
M113 Personnel Carrier	87	76	82
ABLV Bridge Launcher	96	70	91
M1A1 Tank[4]	89	75	85

[1]Distance from noise source to recording device.
[2]Distance is 60 feet. Source: Project Manager Brigade Combat Team 2002.
[3]Distance is 20 feet. Source: Project Manager Brigade Combat Team 2002.
[4]Not used in Alaska, but included for comparative purposes.
Source: SAIC 2001

4.2.4.1.4 Aircraft Noise

The overall number of sorties flown in the airspace above (and in the vicinity of) DTA East is not anticipated to increase due to the construction and use of the BAX and CACTF. Rather, some of these existing operations would be used to simulate close air support to training exercises at the BAX and CACTF. The Air Force and Army flyovers and use of the drop zones and air-to-ground ranges would continue under each alternative. Both Army and Air Force aircraft would continue to utilize established mitigation measures to prevent noise impacts off of the installation. Table 4.2.4.b shows the noise levels from C-130 aircraft overflights.

Table 4.2.4.b Maximum Noise Level for C-130 Aircraft.

Slant Distance Feet[1]	C-130 Maximum Level dBA	Approximate Percentage (%) Highly Annoyed
200	101	No data
500	94	40
1,000	89	33
2,000	83	30
5,000	73	15

[1]Distance from noise source to recording device.
Source: USACHPPM 2002; Stewart 2003.

Existing Air Force operations do not generate a NZ II or III. For routine daily training operations, the A-weighted day-night average sound level (ADNL) from Air Force activity in the immediate vicinity of the existing impact areas (located across the Delta River within DTA West) range from 60 to 63 dBA (below the 65 ADNL needed for NZ II). (There are no existing impact areas within DTA East.) Two to three miles away, the sound levels decrease to 55 dBA (USARAK 2001). During a major training exercise, the ADNL may increase from 62 to 65 dBA, but still drops to 55 dBA outside of the immediate target areas. This drop in noise levels (out of the immediate area) is due to the wide dispersion of flights throughout the Military Operation Areas (MOAs) and the loitering (or flying) of aircraft at higher altitudes when not directly participating in the training at impact areas.

Additional use of C-130 transport planes may occur at Allen Army Airfield during training, but would not generate a NZ II or III beyond the Allen Army Airfield runway. Noise levels for individual C-130 operations are listed in Table 4.2.4.b.

Close air support, including rotary-wing and fixed-wing assets and Unmanned Aerial Vehicles (UAV), would be incorporated using dry (no live fire) runs over the BAX and CACTF.

The UAV is designed to remain undetected by the human ear when it is in flight. See Table 4.2.4.c and the *Final Environmental Impact Statement for Transformation of U.S. Army Alaska, Vol. 2*, Appendix F (USARAK 2004a) for comparative testing data of the noise levels generated by a stationary UAV.

Table 4.2.4.c Comparison of Noise Levels of the UAV Compared with Other Common Noise Sources.

Type	Distance (feet)[1]	Noise Level
UAV	204	85 dBA
UAV	28	108 dBA
Passenger Car (65 mph)	25	77 dBA
Motorcycle	25	90 dBA
Air Conditioner	60	60 dBA

[1]Distance from noise source to recording device.
Source: USACHPPM 2002; Stewart 2003.

4.2.4.2 Comparison of Alternatives

The following analysis estimates the total acreage of NZ levels falling outside of the military installation by alternative. Table 4.2.4.d presents a summary of quantitative impacts for each alternative. Further discussions of environmental consequences for each alternative are within Table 4.2.4.e and subsequent sections.

Table 4.2.4.d Quantitative Summary of Impacts from Noise.

Alternatives/Footprint	Parameters (acres)			
	Peak Blast Noise Levels During Adverse Weather Conditions – Occurring 50% of the Time		Peak Blast Noise Levels During Adverse Weather Conditions – Occurring 10% of the Time	
	115 DBP (acres)	130 DBP (acres)	115 DBP (acres)	130 DBP (acres)
Eddy Drop Zone – BAX				
Area Off of DTA East	0	0	5,607	0
Donnelly Drop Zone – BAX				
Area Off of DTA East	2,305	0	19,951	39
North Texas Range – BAX				
Area Off of DTA East	0	0	3,249	0
North Texas Range and Eddy Drop Zone Combination				
Area Off of DTA East	0	0	975	0

Table 4.2.4.e Summary of Environmental Consequences from Noise.

Alternatives/ Footprints	Resource Issues				
	Small Arms Noise – Average	Large Caliber Weapons and Demo Noise – Average	Single Noise Event	Vehicle Noise	Aircraft Noise
Alternative 1: No Action					
Impact within DTA East (104,601 acres)	Training occurs at least two miles from residential areas	Training primarily occurs in Washington and Mississippi impact areas; noise contours from high-explosive munitions remain within the training areas	No information available	Short-term increases during deployments and large-scale training exercises	Aircraft flyovers occur during training exercises, including helicopters and C-130 transport planes; short-term increases during deployments and large-scale training exercises
Alternative 2: Eddy Drop Zone					
Construction Footprint *Impact*	Average contour does not leave military installation boundary *Minor*	Average contour does not leave military installation boundary *Minor*	Noise levels would be outside of military boundary 10% of time during adverse conditions, approximately 24 days per year (10% of 238 training days) *Moderate*	Noise does not leave military installation boundary *Minor*	Most activity focused near DTA West impact area away from inhabited areas *Minor*
Maneuver Area *Impact*	Average contour does not leave military installation boundary *Minor*	Average contour does not leave military installation boundary *Minor*	Noise levels would be outside of military boundary 10% of time during adverse conditions, approximately 24 days per year (10% of 238 training days) *Moderate*	Noise does not leave military installation boundary *Minor*	Most activity focused near DTA West impact area away from inhabited areas *Minor*

Alternatives/ Footprints	Resource Issues				
	Small Arms Noise – Average	**Large Caliber Weapons and Demo Noise – Average**	**Single Noise Event**	**Vehicle Noise**	**Aircraft Noise**
Surface Danger Zone	No secondary explosion to produce noise in this area	No secondary explosion to produce noise in this area	No secondary explosion to produce noise in this area	Noise does not leave military installation boundary	Most activity focused near DTA West impact area away from inhabited areas
Impact	*None*	*None*	*None*	*Minor*	*Minor*
Alternative 3: Donnelly Drop Zone					
Construction Footprint	Average contour does not leave military installation boundary	Average contour does not leave military installation boundary	Noise levels would be outside of military boundary 50% of time during adverse conditions, approximately 121 days per year (50% of 238 training days)	Noise does not leave military installation boundary	Most activity focused near DTA West impact area away from inhabited areas
Impact	*Minor*	*Minor*	*Severe*	*Minor*	*Minor*
Maneuver Area	Average contour does not leave military installation boundary	Average contour does not leave military installation boundary	Noise levels would be outside of military boundary 50% of time during adverse conditions, approximately 121 days per year (50% of 238 training days)	Noise does not leave military installation boundary	Most activity focused near DTA West impact area away from inhabited areas
Impact	*Minor*	*Minor*	*Severe*	*Minor*	*Minor*
Surface Danger Zone	No secondary explosion to produce noise in this area	No secondary explosion to produce noise in this area	No secondary explosion to produce noise in this area	Noise does not leave military installation boundary	Most activity focused near impact area away from inhabited areas
Impact	*None*	*None*	*None*	*Minor*	*Minor*
Alternative 4: North Texas Range					
Construction Footprint	Average contour does not leave military installation boundary	Average contour does not leave military installation boundary	Noise levels would be outside of military boundary 10% of time during adverse conditions, approximately 24 days per year (10% of 238 training days)	Noise does not leave military installation boundary	Most activity focused near DTA West impact area away from inhabited areas
Impact	*Minor*	*Minor*	*Moderate*	*Minor*	*Minor*
Maneuver Area	Average contour does not leave military installation boundary	Average contour does not leave military installation boundary	Noise levels would be outside of military boundary 10% of time during adverse conditions, approximately 24 days per year (10% of 238 training days)	Noise does not leave military installation boundary	Most activity focused near DTA West impact area away from inhabited areas
Impact	*Minor*	*Minor*	*Moderate*	*Minor*	*Minor*

Alternatives/ Footprints	Resource Issues				
	Small Arms Noise – Average	**Large Caliber Weapons and Demo Noise – Average**	**Single Noise Event**	**Vehicle Noise**	**Aircraft Noise**
Surface Danger Zone	Secondary explosions within exiting impact area not greater than existing levels; would not leave boundary	Secondary explosions within exiting impact area not greater than existing levels; would not leave boundary	Secondary explosions within exiting impact area not greater than existing levels; would not leave boundary	Vehicles not allowed to travel within exiting impact areas	Aircraft noise within exiting impact areas not greater than existing levels; noise would not leave military installation boundary
Impact	*Minor*	*Minor*	*Minor*	*None*	*Minor*
Alternative 5: North Texas Range/Eddy Drop Zone Combination					
Construction Footprint (NTR BAX)	Average contour does not leave military installation boundary	Average contour does not leave military installation boundary	Noise levels would be outside of military boundary 10% of time during adverse conditions, approximately 24 days per year (10% of 238 training days)	Noise does not leave military installation boundary	Most activity focused near impact area away from inhabited areas
Impact	*Minor*	*Minor*	*Moderate*	*Minor*	*Minor*
Construction Footprint (EDZ CACTF)	Average contour does not leave military installation boundary	Average contour does not leave military installation boundary	Noise levels would be outside of military boundary 10% of time during adverse conditions, approximately 24 days per year (10% of 238 training days)	Noise does not leave military installation boundary	Most activity focused near DTA West impact area away from inhabited areas
Impact	*Minor*	*Minor*	*Moderate*	*Minor*	*Minor*
Maneuver Area (NTR BAX)	Average contour does not leave military installation boundary	Average contour does not leave military installation boundary	Noise levels would be outside of military boundary 10% of time during adverse conditions, approximately 24 days per year (10% of 238 training days)	Noise does not leave military installation boundary	Most activity focused near impact area away from inhabited areas
Impact	*Minor*	*Minor*	*Moderate*	*Minor*	*Minor*
Maneuver Area (EDZ CACTF)	Average contour does not leave military installation boundary	Average contour does not leave military installation boundary	Noise levels would be outside of military boundary 10% of time during adverse conditions, approximately 24 days per year (10% of 238 training days)	Noise does not leave military installation boundary	Most activity focused near impact area away from inhabited areas
Impact	*Minor*	*Minor*	*Moderate*	*Minor*	*Minor*
Surface Danger Zone (NTR BAX)	Secondary explosions within exiting impact area not greater than existing levels; would not leave boundary	Secondary explosions within exiting impact area not greater than existing levels; would not leave boundary	Secondary explosions within exiting impact area not greater than existing levels; would not leave boundary	Vehicles not allowed to travel within exiting impact areas	Aircraft noise within exiting impact areas not greater than existing levels; noise would not leave military installation boundary
Impact	*Minor*	*Minor*	*Minor*	*None*	*Minor*

Alternatives/ Footprints	Resource Issues				
	Small Arms Noise – Average	**Large Caliber Weapons and Demo Noise – Average**	**Single Noise Event**	**Vehicle Noise**	**Aircraft Noise**
Surface Danger Zone (EDZ CACTF) *Impact*	No secondary explosion to produce noise in this area *None*	No secondary explosion to produce noise in this area *None*	No secondary explosion to produce noise in this area *None*	Noise does not leave military installation boundary *Minor*	Most activity focused near impact area away from inhabited areas *Minor*

4.2.4.2.1 Impacts Common to All Alternatives

Although noise is not a resource, the effects of noise can impact other resources or activities including recreation, subsistence, land use, and wildlife (USAF 1995). Fidell et al. (1992) studied the effects of aircraft noise on recreation and reported that 1 to 12 percent of wilderness visitors were annoyed by aircraft noise, but usually other factors detracted more from the experience (e.g., trail condition, weather, crowding). Jets and helicopters were considered most annoying.

Noise effects on wildlife range from startle response and behavior change (including movement from habitat or disruption of activity patterns), to physiological stress response, and possibly increased mortality. In extreme cases, population-level effects could occur. However, many species can readily habituate to noise and the populations of affected species (none of which are considered sensitive) are very high. As a result, this section focuses on impacts to humans. Each species of wildlife has unique sensitivities and responses to noise, and without empirical data it is impossible to extrapolate information from human annoyance (USARAK 2004a). Additional information on wildlife response to noise can be found in Section 4.2.6.1.2.

Army Regulation (AR) 200-1, *Environmental Protection and Enhancement*, defines the requirements for the Army's Environmental Noise Management Program. Three NZ are defined in the regulation:

Noise Zone I (compatible): Housing, schools, medical facilities, and other noise-sensitive land uses are compatible with noise levels in this zone (all areas not contained within NZ II or NZ III).

Noise Zone II (normally incompatible): Noise-sensitive land uses (e.g., housing, schools, medical facilities) are normally incompatible with noise levels in this zone unless measures have been taken to attenuate interior noise levels.

Noise Zone III (incompatible): Noise-sensitive land uses (e.g., housing, schools, medical facilities) are incompatible in this zone.

The NZ criteria, and corresponding annoyance levels, are summarized in Table 4.2.4.f. Land use compatibility criteria for noise exposure for DTA activities, and the noise metrics used, are summarized in Table 4.2.4.g.

Table 4.2.4.f Noise Zone Criteria and Population Highly Annoyed.

	Percent Population Highly Annoyed	**Equipment Operations, Transportation, Aircraft and Small Arms (up to .50 caliber) (ADNL)**	**Impulsive Noise from Large Caliber Weapons (larger than 20mm) and Demolitions (CDNL)**
NZ I	less than 15	less than 65	less than 62
NZ II	15 - 39	65 - 75	62 - 70
NZ III	greater than 39	greater than 75	greater than 70

Source: AR 200-1, Chapter 7

Table 4.2.4.g Noise Zones for Land Uses in the Vicinity of DTA East.

Land Use	**Noise Zones**		
	NZ I (ADNL less than 65)[1] (CDNL less than 62)[2]	**NZ II (ADNL 65-75) (CDNL 62-70)**	**NZ III (ADNL greater than 75) (CDNL greater than 70)**
Residential	Compatible	Normally Incompatible [3]	Incompatible
Manufacturing	Compatible	Compatible	Compatible [4]
Transportation, communication, and utilities	Compatible	Compatible	Compatible
Trade	Compatible	Compatible	Compatible [4]
Public services	Compatible	Normally Incompatible [3]	Incompatible
Cultural, recreational, and entertainment	Compatible	Normally Incompatible [3]	Incompatible
Agricultural	Compatible	Compatible	Compatible
Livestock farming and animal breeding	Compatible	Compatible	Incompatible

[1]ADNL is the A-weighted sound level averaged over a 24-hour period, with a 10 dB penalty for events occurring between 2200 and 0700.
[2]CDNL is the C-weighted sound level averaged over a 24-hour period, with a 10 dB penalty for events occurring between 2200 and 0700.
[3]Use is generally discouraged; however, if allowed, sound attenuation techniques should be required.
[4]For an ADNL level above 75 dBA, sound attenuation techniques should be required.
Sources: FICON 1992; AR 200-1, Chapter 7

There is not one model that can combine all types of noise generated by the military (large caliber weapons, aircraft, small arms, and traffic) because of the differences in the types of noise produced (impulsive, steady-state) and how humans react to these differences. The noise of tank firing only reaches its peak level for a fraction of a second, whereas a helicopter flyover is considered a more “steady-state” sound. In previous studies, humans have been shown to react differently to these various stimuli.

However, the furthest extent for each noise contour (how far the source will be heard) does represent a true picture of the combined impact. Given the logarithmic nature of noise, doubling of sound energy will increase noise levels by 3 dB. So, when two sources of equal sound levels occur at the same time, the sound levels will not double but will only increase by 3 dB. Therefore, if two tank rounds that measure 100 dBP each were fired simultaneously, a sound level meter would record 103 dBP. If two noise events with much different noise levels occur at the same time, their effects are not additive. If one source is 85 dBP and the other is 100 dBP, both occurring at the same time, a sound level meter would register 100 dBP. Therefore, when looking at the combined impact of noise, the loudest noise source can be used.

4.2.4.2.2 Impacts Attributed to Alternative 1 (No Action)

Potential impacts under the No Action Alternative take into account Army transformation activities at USARAK. The ROD on the transformation of USARAK was signed on May 27, 2004. Full transformation of USARAK was selected as the preferred alternative. The overall impact of transformation on noise at DTA was determined to be minor (USARAK 2004a).

Construction of USARAK mission-essential projects at DTA East contribute to temporary localized increases in noise levels. Construction would occur away from the installation boundaries and would not result in long-term negative impacts on the surrounding communities.

The frequency and intensity of maneuver and weapons training would increase as part of USARAK transformation. Noise sources from military training would occur from maneuvers, small arms (up to .50 caliber), large caliber weapons firing (larger than 20mm), and demolition activities. The types of small arms used would remain the same. Although the intensity of maneuver training would increase, the noise levels associated with maneuver training would not increase significantly (USARAK 2004a).

Weapons firing would cause most of the increase in noise levels. The noise contours for the proposed transformation show minimal impact upon noise-sensitive land uses both off and on the installations. However, there is still the potential that neighbors would hear the training, especially if weather conditions carry the sound to residential areas (USARAK 2004a).

New equipment would be used under transformation, including the Stryker vehicle and its variants and the UAV. The Army would also acquire additional vehicles such as the HMMWV (i.e., Humvee) and medium-weight tactical vehicle (MTV). The 105mm Mobile Gun System would produce loud impulse noise on ranges. The Stryker vehicle itself produces noise levels similar to trucks. Use of the UAV would not create loud noise levels (USARAK 2004a).

Transformation at USARAK would result in increased out-of-state and overseas training at DTA. Air deployments would likely result in short-term negative impacts at airfields, primarily from jets. Noise levels would increase temporarily during DTA training, primarily from jets landing and taking off at Allen Army Airfield (USARAK 2004a).

Military aircraft would continue as a noise source at DTA, especially at Oklahoma Impact Area (which is used primarily by the U.S. Air Force) and nearby areas (USARAK 1999a). In addition, periodic helicopter flights from FWA Main Post to DTA, which follow the Tanana River and Richardson Highway corridor, would also contribute to noise levels in the area. Noise levels

would increase during large-scale training exercises, but such impacts would be short-term (USARAK 2004a).

4.2.4.2.3 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

The noise contours for operations at the Eddy Drop Zone alternative are shown in Appendix, Figure 4.b. The use of artillery and demolition at the BAX would cause a NZ II and III blast contour at DTA surrounding the BAX. Concurrent training would continue at the Washington and Mississippi impact areas and nearby ranges and firing points. Although the total acreage of the contours would increase, the NZ II and III contours would stay within the training areas, and the land use is compatible with federal guidelines (Appendix, Figure 4.b). Also, NZ II and III from small arms firing would occur at the CACTF and in areas of the BAX where dismounted training takes place. In both of these locations, the NZ would not leave the confines of the range complex (Appendix, Figure 4.b). Therefore, noise levels from both small arms firing and blank noise would be compatible with land use off of the installation at the BAX and CACTF (Table 4.2.4.g). For the BAX, in areas where both small arms and heavy weapons noise contours exist, the small arms noise contours are overshadowed by the heavy weapons and demolition noise contours. In areas within the BAX where heavy weapons are not used, small arms contours noise contours are shown. Overall, the noise impact from small arms and large caliber weapons use would be minor.

Because the Eddy Drop Zone location is closest to the Delta Junction Area, further analysis was conducted on possible noise impacts. Delta Junction is 5.5 miles away from the proposed CACTF and seven miles away from the proposed BAX. Even though the annual average noise contours stay well within the installation boundary, public comments indicate that neighbors are concerned about peak noise level impacts. Pater (1976) showed that there is a low risk of complaints from impulsive noise when levels are below 115 dBP. The peak 50 contours (described in Section 4.2.4.2, *Description of Methodology*) indicate that, even under adverse weather conditions such as winter air inversions, on average, levels from firing should not be high enough to generate complaints off of the installation (Appendix, Figure 4.b). The peak 10 contours associated with individual firing of a 105mm tank gun show, under adverse weather conditions, approximately 10 percent of the time, individual tank gun firing could generate peak levels high enough to have a moderate risk of complaints up to 2,000 meters beyond the installation boundary (Appendix, Figure 4.c). While these peak contours encompass areas off the installation, they remain compatible with noise-sensitive land uses. Rather, they indicate that, under extreme weather conditions, a single event might generate a complaint. An analysis of these peak contours indicates a low risk of single-event noise levels (reaching 115 dBP) off of the installation, given the low number of residences within the peak 10 contour. The overall single-noise event impacts at Eddy Drop Zone would be moderate.

To evaluate the complaint potential from single impulsive sounds, a set of guidelines (Pater 1976) was developed by the Naval Surface Warfare Center. These testing guidelines are based on over 10 years of experience. These guidelines (Table 3.2.4.b) represent the best compromise between cost, efficiency of range operations, and good community relations. Based on how sound decreases with distance, predicted noise levels at different receptor locations in DTA and the Delta Junction community for 105mm tank gun firing are well below the 115 dBP guidance for moderate risk of complaints, thus the risk for complaints would be low (Stewart 2004).

Noise levels generated by the Stryker would be less than (or equal to) the noise generated by other equipment currently used by the Army (Table 4.2.4.a). Noise associated with construction

equipment would be similar to current equipment used by the Army, and would be minor and temporary in nature. The overall vehicle noise impacts at Eddy Drop Zone would be minor.

Close air support, including rotary-wing and fixed-wing assets and UAV, would be incorporated using an "off-set" or virtual methodology (see Section 2.2.1.2.4, *Joint Operations – Air Support at the BAX*, for additional description). The number of operations would not be enough to generate a NZ level of II or III. Aircraft would continue to use existing MOAs and flight routes to access the ranges. The overall aircraft noise impacts at Eddy Drop Zone would be minor.

While noise levels would increase in all the alternatives of the proposed BAX and CACTF, they would not adversely impact noise-sensitive areas either on or off of the installation.

4.2.4.2.4 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

Both small arms and larger caliber weapons/blast noise levels and their impacts would be similar to those described for Alternative 2. The overall noise impact of construction and use of the BAX and CACTF within Donnelly Drop Zone alternative is considered minor. The blast noise contours for training at the BAX and the small arms contours for the CACTF and BAX are shown in Appendix, Figure 4.d. NZ II and III are contained within the installation. The risk of noise complaints from large caliber weapons and small arms fire would be minimal, given the distances from the proposed locations and noise-sensitive receptors. In addition, the proposed ranges at Donnelly Drop Zone alternative are approximately 10.5 miles from the nearest school. This distance and direction of fire, would not generate complaints from nearby schools.

Further analysis was conducted on possible noise impacts to areas off of the installation. Even though the annual average noise contours stay well within the installation boundary at the Donnelly Drop Zone site, public comments indicate that neighbors are concerned about peak noise level impacts. Pater (1976) showed that there is a low risk of complaints from impulsive noise when levels are below 115 dBP. The peak 50 contours at Donnelly Drop Zone (described in Section 4.2.4.1, *Description of Methodology*) indicate that under adverse weather conditions, such as winter air inversions, on average, levels from firing would be high enough to generate complaints off of the installation (Appendix, Figure 4.e). The Peak 10 contours associated with individual firing of a 105mm tank gun show, under adverse weather conditions, approximately 10 percent of the time, individual tank gun firing could generate peak levels high enough to have a moderate risk of complaints beyond the installation boundary (Appendix, Figure 4.e). While these peak contours encompass areas off the installation, they remain compatible with noise-sensitive land uses. Rather, they indicate that, under extreme weather conditions, a single event might generate a complaint. An analysis of these peak contours indicates a low risk of single-event noise levels (reaching 115 dBP) off of the installation, given the low number of residences within the peak 50 and peak 10 contour. The overall single-noise event impacts at Donnelly Drop Zone would be severe.

In addition, predicted levels are well below the 115 dBP guidance for moderate risk of complaints, thus the risk for complaints would be low. However, 10 percent of the time, a peak blast noise level of 130 dBP could be expected. This would increase the complaint risk to severe.

Noise levels generated by the Stryker would be less than (or equal to) the noise generated by other equipment currently used by the Army (Table 4.2.4.a). Noise associated with construction

equipment would be similar to current equipment used by the Army and would be temporary in nature. The overall vehicle noise impacts at Donnelly Drop Zone would be minor.

The aircraft noise at Donnelly Drop Zone alternative would be similar to Alternative 2. The overall aircraft noise impacts at Donnelly Drop Zone would be minor.

While noise levels would increase in all the alternatives of the proposed BAX and CACTF, they would not adversely impact noise-sensitive areas either on or off of the installation.

4.2.4.2.5 Impacts Attributed to Alternative 4 (North Texas Range)

Both small arms and larger caliber weapons/blast noise levels and their impacts would be similar to those described for Alternative 2. The overall noise impact of construction and use of the BAX and CACTF within North Texas Range alternative is considered minor. The blast noise contours for training at the BAX and the small arms contours for the CACTF and the BAX are shown in Appendix, Figure 4.f. Existing operations at the North Texas Range Alternative produce NZ II and NZ III areas. As Appendix, Figure 4.f indicates, the addition of the BAX would still keep the NZ II and NZ III blast noise contours within the DTA boundary. In addition, the proposed ranges at North Texas Range alternative are approximately nine miles from the nearest school. This distance and direction of fire would not generate complaints from nearby schools.

Further analysis was conducted on possible noise impacts to areas off of the installation. Public comments indicate that neighbors are concerned about peak noise level impacts. Pater (1976) showed that there is a low risk of complaints from impulsive noise when levels are below 115 dBP. The Peak 50 contours (described in Section 4.2.4.2, *Description of Methodology*) indicate that, even under adverse weather conditions, such as winter air inversions, on average, levels from firing should not be high enough to generate complaints off of the installation (Appendix, Figure 4.g). The Peak 10 contours associated with individual firing of a 105mm tank gun show, under adverse weather conditions, approximately 10 percent of the time, individual tank gun firing could generate peak levels high enough to have a moderate risk of complaints beyond the installation boundary (Appendix, Figure 4.g). While these peak contours encompass areas off the installation, they remain compatible with noise-sensitive land uses. Rather, they indicate that, under extreme weather conditions, a single event might generate a complaint. An analysis of these peak contours indicates a low risk of single-event noise levels (reaching 115 dBP) off of the installation, given the low number of residences within the peak 10 contour. The overall single-noise event impacts at North Texas Range would be moderate.

In addition, predicted levels are well below the 115 dBP guidance for moderate risk of complaints, thus the risk for complaints would be low.

Noise levels generated by the Stryker would be less than (or equal to) the noise generated by other equipment currently used by the Army (Table 4.2.4.a). Noise associated with construction equipment would be similar to current equipment used by the Army and would be temporary in nature. The overall vehicle noise impacts at North Texas Range would be minor.

The aircraft noise at North Texas Range alternative would be similar to Alternative 2. The overall aircraft noise impacts at the North Texas Range would be minor.

While noise levels would increase in all the alternatives of the proposed BAX and CACTF, they would not adversely impact noise-sensitive areas either on or off of the installation.

4.2.4.2.6 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

Noise impacts from small arms and larger caliber weapons/blast noise, vehicles, and aircraft at both North Texas Range and Eddy Drop Zone would be similar to that previously discussed. The overall impact would be minor as only small arms firing would occur at the CACTF. The NZ would not leave the confines of the range complex (Appendix, Figure 4.h). Therefore, noise levels from small arms firing and blank noise would be compatible with land use off of the installation at the CACTF (Table 4.2.4.g). For the BAX, in areas where both small arms and heavy weapons noise contours exist, the small arms noise contours are overshadowed by the heavy weapons and demolition noise contours. In areas within the BAX where heavy weapons are not used, small arms contours noise contours are shown.

In addition, predicted levels are well below the 115 dBP guidance for moderate risk of complaints, thus the risk for complaints would be low at both the BAX and CACTF. However, 10 percent of the time, a peak blast noise level of 130 dBP could be expected at the BAX (Appendix, Figure 4.i). This would increase the complaint risk to moderate.

4.2.4.3 Mitigation

The current noise environment at DTA, combined with the generation of noise under the proposed action, is such that there are no incompatibilities between noise levels and surrounding land uses. However, USARAK realizes that Army operations and training are not quiet activities and it is impossible to say that there will never be a complaint or annoyance caused by Army training. Therefore, several resource management measures currently exist at DTA East and are incorporated into the mitigation analysis.

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts from noise. The appendix states how the offered mitigation would serve to eliminate or lessen the foreseen impact and offers an assessment of the potential success of the mitigation. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

4.2.4.3.1 Existing Mitigation

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts.

- Continued implementation of existing USARAK Range Regulation 350-2 (July 2002).
- Continued public notification of nighttime firing.

4.2.4.3.2 Proposed Mitigation

The following mitigation measure is essential in addressing impacts associated with the proposed action.

- Provide a 24-hour feedback line to collect comments or complaints regarding noise (similar to the existing Air Force program).

4.2.5 Human Health and Safety

Issue 6: Human health and safety impacts. The impact of construction and operation of the BAX and CACTF on human health and safety was identified as a primary issue of concern during scoping.

This section analyzes and compares the human health and safety impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.2.5.

Human health and safety issues concerning USARAK involve both the public and military and civilian employees/dependents. Concerns include military traffic concerns in and around DTA East, hazardous materials, contaminated sites, unexploded ordnance (UXO), and use of live munitions at firing ranges.

4.2.5.1 Comparison of Alternatives

4.2.5.1.1 Description of Methodology

Qualitative analysis uses scientific and historic data to predict positive or negative changes to human health and safety. The following categories will be used to assess these impacts:

- None – No measurable impacts are expected to occur to human health and safety.
- Minor – Some adverse impacts would occur and would result in a slight change to human health and safety.
- Moderate – Adverse impacts are expected to occur, would be noticeable, and would have a measurable effect on human health and safety, either as increased possibility of risk or increased magnitude of risk.
- Severe – Adverse impacts are highly probable and would have definite and possibly unavoidable effects on human health and safety.
- Beneficial – Impacts are expected to improve human health and safety.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant impacts in this analysis. The next category (severe) is considered a significant impact. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to human health and safety are presented in Section 4.2.5.2, *Mitigation*.

Table 4.2.5.a presents a summary of environmental consequences for each alternative.

Table 4.2.5.a Summary of Environmental Consequences to Human Health and Safety.

Alternatives/ Footprints	Resource Issues				
	Traffic/Convoys	**Hazardous Materials and Wastes**	**Contaminated Sites**	**Use of Munitions**	**Range Safety**
Alternative 1: No Action					
Impact within DTA East (104,601 acres)	Periodic traffic congestion due to company and battalion-sized deployments	Possible petro-chemical spills due to fuel transport and refueling operations; Army procedures and controls minimize impacts	Possible site contamination due to fuel transport and refueling operations; Army procedures and controls minimize impacts	Range safety program and regulations protect Soldiers and civilians	Possible occurrences from airborne training exercises
Alternative 2: Eddy Drop Zone					
Construction Footprint	Temporary increase in traffic during construction of ranges.	Institutional controls, no new waste generated	None exist; if found, established controls and procedures would be followed	Range safety program and regulations protect Soldiers and civilians	Probability of existing UXO is low; no UXO would be produced
Impact	*Minor*	*Minor*	*None*	*Minor*	*Minor*
Maneuver Area	Periodic traffic congestion due to company and battalion-sized deployments	Institutional controls, no new waste generated	None exist; if found, established controls and procedures would be followed	Range safety program and regulations protect Soldiers and civilians	Probability of existing UXO is low; no UXO would be produced
Impact	*Moderate*	*Minor*	*None*	*Minor*	*Minor*
Surface Danger Zone	No public access (i.e. no traffic) allowed during military training.	Institutional controls, no new waste generated	None exist; if found, established controls and procedures would be followed	Range safety program and regulations protect Soldiers and civilians	Probability of existing UXO is low; no UXO would be produced; Army regulations require surface danger zones be contained within installation boundaries
Impact	*None*	*Minor*	*None*	*Minor*	*Minor*
Alternative 3: Donnelly Drop Zone					
Construction Footprint	Temporary increase in traffic during construction of ranges.	Institutional controls, no new waste generated	None exist; if found, established controls and procedures would be followed	Range safety program and regulations protect Soldiers and civilians	Probability of existing UXO is low; no UXO would be produced
Impact	*Minor*	*Minor*	*None*	*Minor*	*Minor*
Maneuver Area	Periodic traffic congestion due to company and battalion-sized deployments	Institutional controls, no new waste generated	None exist; if found, established controls and procedures would be followed	Range safety program and regulations protect Soldiers and civilians	Probability of existing UXO is low; no UXO would be produced
Impact	*Moderate*	*Minor*	*None*	*Minor*	*Minor*
Surface Danger Zone	No public access (i.e. no traffic) allowed during military training.	Institutional controls, no new waste generated	None exist; if found, established controls and procedures would be followed	Range safety program and regulations protect Soldiers and civilians	Probability of existing UXO is low; no UXO would be produced; Army regulations require surface danger zones be contained within installation boundaries
Impact	*None*	*Minor*	*None*	*Minor*	*Minor*

Alternatives/ Footprints	Resource Issues				
	Traffic/Convoys	**Hazardous Materials and Wastes**	**Contaminated Sites**	**Use of Munitions**	**Range Safety**
Alternative 4: North Texas Range					
Construction Footprint	Temporary increase in traffic during construction of ranges.	Institutional controls, no new waste generated	None exist; if found, established controls and procedures would be followed	Range safety program and regulations protect Soldiers and civilians	Probability of existing UXO is low; no UXO would be produced
Impact	*Minor*	*Minor*	*None*	*Minor*	*Minor*
Maneuver Area	Periodic traffic congestion due to company and battalion-sized deployments	Institutional controls, no new waste generated	None exist; if found, established controls and procedures would be followed	Range safety program and regulations protect Soldiers and civilians	Probability of existing UXO is low; no UXO would be produced
Impact	*Moderate*	*Minor*	*None*	*Minor*	*Minor*
Surface Danger Zone	No public access (i.e. no traffic) allowed during military training.	Institutional controls, no new waste generated	None exist; if found, established controls and procedures would be followed	Range safety program and regulations protect Soldiers and civilians	Probability of existing UXO is higher due to surface danger zone overlapping existing impact area, but area off limits to public at all times; no UXO would be produced; Army regulations require surface danger zones be contained within installation boundaries
Impact	*None*	*Minor*	*None*	*Minor*	*Minor*
Alternative 5: North Texas Range/Eddy Drop Zone Combination					
Construction Footprint (NTR BAX)	Temporary increase in traffic during construction of ranges.	Institutional controls, no new waste generated	None exist; if found, established controls and procedures would be followed	Range safety program and regulations protect Soldiers and civilians	Probability of existing UXO is low; no UXO would be produced
Impact	*Minor*	*Minor*	*None*	*Minor*	*Minor*
Construction Footprint (EDZ CACTF)	Temporary increase in traffic during construction of ranges.	Institutional controls, no new waste generated	None exist; if found, established controls and procedures would be followed	Range safety program and regulations protect Soldiers and civilians	Probability of existing UXO is low; no UXO would be produced
Impact	*Minor*	*Minor*	*None*	*Minor*	*Minor*
Maneuver Area (NTR BAX)	Periodic traffic congestion due to company and battalion-sized deployments	Institutional controls, no new waste generated	None exist; if found, established controls and procedures would be followed	Range safety program and regulations protect Soldiers and civilians	Probability of existing UXO is low; no UXO would be produced
Impact	*Moderate*	*Minor*	*None*	*Minor*	*Minor*
Maneuver Area (EDZ CACTF)	Periodic traffic congestion due to company and battalion-sized deployments	Institutional controls, no new waste generated	None exist; if found, established controls and procedures would be followed	Range safety program and regulations protect Soldiers and civilians	Probability of existing UXO is low; no UXO would be produced
Impact	*Moderate*	*Minor*	*None*	*Minor*	*Minor*

Alternatives/ Footprints	Resource Issues				
	Traffic/Convoys	**Hazardous Materials and Wastes**	**Contaminated Sites**	**Use of Munitions**	**Range Safety**
Surface Danger Zone (NTR BAX)	No public access (i.e. no traffic) allowed during military training.	Institutional controls, no new waste generated	None exist; if found, established controls and procedures would be followed	Range safety program and regulations protect Soldiers and civilians	Probability of existing UXO is higher due to surface danger zone overlapping existing impact area, but area off limits to public at all times; no UXO would be produced; Army regulations require surface danger zones be contained within installation boundaries
Impact	*None*	*Minor*	*None*	*Minor*	*Minor*
Surface Danger Zone (EDZ CACTF)	No public access (i.e. no traffic) allowed during military training.	Institutional controls, no new waste generated	None exist; if found, established controls and procedures would be followed	Range safety program and regulations protect Soldiers and civilians	Probability of existing UXO is low; no UXO would be produced; Army regulations require surface danger zones be contained within installation boundaries
Impact	*None*	*Minor*	*None*	*Minor*	*Minor*

4.2.5.1.2 Impacts Common to All Alternatives

USARAK is responsible for the health and safety of its troops, civilian employees, and those who use its properties. Health and safety concerns on USARAK properties come from a number of sources. Traffic is usually a nuisance concern, but may occasionally become severe enough to increase risk to human health and safety. Materials released at contaminated sites tend to be petroleum products and solvents. Contaminated sites pose threats to human health and the environment, as contaminated soil and groundwater could potentially be ingested by animals and humans. Petrochemicals may be carcinogenic or toxic, and require cleanup in accordance with regulatory requirements.

UXOs (duds or dudded munitions) is produced when munitions fail to detonate properly, leaving a potential chemical hazard or explosive at the impact point. None of the BAX or CACTF alternatives are within active or inactive impact areas. However, the surface danger zone associated with North Texas Range is within Oregon Lakes and Mississippi Impact Areas. These impact areas are located in DTA West and are relatively isolated (Appendix, Figure 2.d). Further, these impact areas are off-limits to the public at all times and are marked with warning signs and/or barriers. Passing any of these hazard warnings without approval is prohibited. Unauthorized entry (trespassing), as well as handling or removing UXO/munitions, are punishable offenses. Under the proposed action, munitions would be limited to non-exploding projectiles, which would eliminate the potential for UXO accumulation at any of the proposed locations.

There are no known hazardous waste sites on the proposed BAX and CACTF sites. Any discovery of hazardous material contamination would require appropriate regulatory coordination and compliance. Construction excavation can expose soils contaminated from historic use of sites.

Any such contaminated soils discovered during excavation would be remediated using methods selected by USARAK, EPA, and ADEC.

Neither soil nor groundwater would be removed from construction sites without written approval from an authorized USARAK representative. All operations involving hazardous waste would be accomplished in accordance with USARAK Pamphlet 200-1, *Environmental Quality: Hazardous Waste, Used Oil, and Hazardous Materials Management*.

POLs would be used by equipment and vehicles involved in construction and operation of the BAX and CACTF. POL distribution points and refueling operations would be constructed and operated in accordance with USARAK Regulation 200-4, *Environmental Quality: Hazardous Waste, Used Oil, and Hazardous Materials Management*. During training exercises, each unit is equipped with a spill response kit and drip pans. All POL spills must be reported to the fire department and Range Control and cleaned up.

Military convoy traffic to DTA East is expected to increase as range use increases. Additional convoy traffic would result from USARAK transformation, the stationing of a Stryker Brigade Combat Team (SBCT) and an Airborne Brigade Combat Team (ABCT). Deployment miles to DTA East would increase from 437,600 to approximately 1,042,000 from 2004 through 2009, then decrease to 937,600 in 2010. Company and battalion-sized deployments to DTA would increase from 31 to 62 times per year. Overall, convoy impacts are expected to be moderate (USARAK 2004a). Additional information on convoys can be obtained from the *Final Environmental Impact Statement for Transformation of U.S. Army Alaska, Vols. 1 and 2* (USARAK 2004a). Under the Airborne BCT, deployments within Alaska would not increase on a unit basis. However, the number of units, including platoon, company, and battalion, would increase. Therefore, the total number of unit deployments and miles would increase as a result of the Airborne BCT. The potential for vehicular accidents would increase as the number of vehicles utilizing Alaskan transportation routes increases.

Winter and spring convoys could have a greater impact due to hazardous driving conditions or roadway degradation. Summer convoys could interfere with heavier tourist-season traffic loads. Army doctrine provides a basis for convoy preparation and execution. USARAK standard operation procedures call for large convoys to be broken into groups of no more than 20 vehicles. These groups are then separated by 30-minute gaps between departures to alleviate traffic pressures on Alaska's public highways. Highway speed for a military convoy is not expected to exceed 40 mph with the exception of "catch-up speed," listed at 45 mph. There would be a temporary increase in traffic during construction of the BAX and CACTF.

The Department of the Army Pamphlet 385-63, *Range Safety*, establishes and maintains a comprehensive range safety program for the Army, which would be applicable to units conducting training at both the BAX and CACTF.

The BAX would support fully automated, collective direct live-fire operations. A live-fire operation is defined as a training event that uses service (or real) ammunition as opposed to blank ammunition. A direct fire operation occurs when ammunition is delivered on target by sighting directly on the target using the weapon system's sighting equipment. Training at the BAX would be direct fire. During a direct live-fire event, Soldiers maintain an unimpeded direct line of sight between their location and the targets while shooting real bullets at those targets.

The occurrence of accidental firing of weapons away from a designated target is not impossible; but it is highly unlikely due to the layout of the BAX and CACTF and the design of the surface danger zone (surface danger zone) associated with each range. An on-the-ground surface danger zone would be associated with the BAX. The size of a surface danger zone is based on empirical data and is designed to contain all fired rounds. Within the assortment of weapon systems to be used on the BAX, the Mobile Gun System (firing a 105mm cannon Sabot round), a variant of the Stryker vehicle, requires the largest surface danger zone. This system requires a firing distance of approximately seven and a half miles and a somewhat triangular-shaped, three-dimensional surface danger zone of approximately 24,000 acres.

The surface danger zone associated with the CACTF would be designed to support the use of short range training ammunition, which would require a firing distance of approximately 2,300 feet. The surface danger zone would completely surround the CACTF along its outer border and would be large enough to ensure that the energy of the fired projectile is totally depleted within its boundary.

The objective of a surface danger zone is a residual risk of projectile escape and/or other danger to the public no greater than one in one million. The Department of the Army Pamphlet 385-63 defines the space requirements to safely incorporate weapons in live-fire training events. A range must be designed and targets placed totally within Army installation boundaries. The Army also requires the placement of targets and anticipated firing locations (by weapon type) in an area that is able to accurately contain ricochets and establish a safe impact area for all projectiles. This area is large enough to contain projectiles fired at an optimal elevation and ensure that the energy of the fired projectile is totally depleted within the surface danger zone. For example, an M2 .50 caliber round, fired at an elevation to achieve maximum range, would travel 6,400 meters along the gun target line. To either side of the gun target line, there is a 5-degree dispersion area and an additional 5-degree ricochet area. This additional combined 10-degree fan extends along the entire length of travel. Individual fans were created for each weapon and round to be used at the BAX and combined to create a composite surface danger zone that would safely encompass all weapons possibly used during a training event. The composite surface danger zone was designed to lie totally within installation boundaries.

Members of the Delta Junction community have expressed concern regarding whether surface danger zones associated with the BAX and CACTF ranges would stay within installation boundaries. This is a concern at Eddy Drop Zone due to its proximity to Fleet Street and the Alaska Highway, and at Donnelly Drop Zone and North Texas Range due to their proximity to the keyhole of private land along the Richardson Highway within DTA boundaries. Due to surface danger zone design (as discussed above) and their proposed orientations at each of the study sites (Appendix, Figures 2.e, 2.f, 2.g, and 2.h), all surface danger zones would fall within installation boundaries and would ensure that no projectiles would carry onto neighboring properties.

Training situations require ammunition be used at various locations that are temporary or transient by nature. Distribution of ammunition to Soldiers would occur only in areas designated for that purpose such as ammunition breakdown buildings, ready lines, firing lines, attack positions, assembly areas, or defilade positions. Blank and live-fire ammunition would not be stored in or issued from the same building at the same time. The quantity of ammunition unpacked at the breakdown building or firing line would be kept to the minimum number of rounds needed for efficient firing during the exercise. Packaging material, propellant increments, and fuses would be retained until firing is complete. Units are prohibited from burning wooden

containers or indiscriminately firing or disposing of ammunition to preclude its return to a storage facility. Broken and/or unserviceable munitions increments (powder bags) would be handled in accordance with installation range and environmental requirements. All ammunition unpacked for firing, but not fired, would be repackaged into its original packing configuration prior to return to the ammunition supply point.

4.2.5.1.3 Impacts Attributed to Alternative 1 (No Action)

Potential impacts under the No Action Alternative account for Army transformation activities at USARAK. The ROD on the transformation of USARAK was signed on May 27, 2004. Full transformation of USARAK was selected as the preferred alternative. The overall impact of transformation on human health and safety at DTA was determined to be minor (USARAK 2004a).

As described above, military convoy traffic would increase with increased range use as a result of Army transformation. Overall traffic impacts are expected to be moderate (USARAK 2004a).

Due to the increased number of vehicles to be stationed as a result of Army transformation, it is expected that more petrochemicals would be utilized at DTA. The risk of petrochemical spills and site contamination is expected to increase, given the need to transport fuel and perform refueling operations in the field during training. Due to existing Army procedures and controls, impacts would be minor. USARAK continues to reduce the amount of waste generated on post, and no new types of hazardous wastes would be generated at DTA. Overall impacts would be minor (USARAK 2004a).

USARAK's existing programs, management plans, and regulations governing the handling, use, storage, and disposal of hazardous and non-hazardous materials would remain in place. Army institutional controls would limit access to impact areas and would reduce risk and impact of petrochemical releases on DTA. These controls would remain intact, and the Army would continue to track and control access to these areas. Impacts to range safety and from munitions use would be minor (USARAK 2004a).

4.2.5.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

Impacts to human health and safety are not expected to significantly increase above existing conditions. The overall impact of construction and use of the BAX and CACTF on human health and safety at Eddy Drop Zone, as discussed in Section 4.2.5.1, *Impacts Common to All Alternatives*, is considered minor.

As described above, military convoy traffic would increase with increased range use as a result of Army transformation. Overall traffic impacts are expected to be moderate (USARAK 2004a).

4.2.5.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

Impacts to human health and safety are not expected to significantly increase above existing conditions. Impacts are discussed in Section 4.2.5.1, *Impacts Common to All Alternatives*, and are expected to be minor overall.

As described above, military convoy traffic would increase with increased range use as a result of Army transformation. Overall traffic impacts are expected to be moderate (USARAK 2004a).

4.2.5.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

Impacts to human health and safety are not expected to significantly increase above existing conditions. Impacts are discussed in Section 4.2.5.1, *Impacts Common to All Alternatives*, and are expected to be minor overall.

As described above, military convoy traffic would increase with increased range use as a result of Army transformation. Overall traffic impacts are expected to be moderate (USARAK 2004a).

The surface danger zone associated with the BAX at North Texas Range would extend across the Delta River and overlap an active impact area situated on the west side of the Delta River (Appendix, Figure 2.g). Although the risk of encountering UXO is higher in this impact area, it is off-limits to the public at all times, allowing no opportunity for possible encounters with UXO.

4.2.5.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

Impacts to human health and safety are not expected to significantly increase above existing conditions. Impacts are discussed in Section 4.2.5.1, *Impacts Common to All Alternatives*, and are expected to be minor overall.

As described above, military convoy traffic would increase with increased range use as a result of Army transformation. Overall traffic impacts are expected to be moderate (USARAK 2004a). As the BAX and CACTF would be constructed at separate locations under this alternative, increased military convoy traffic would be expected on local roads. While still in proximity to one another, this option would require different maneuver transition requirements than for the other three siting alternative locations that would allow both facilities closer physical proximity. Instead of using existing maneuver corridors within a particular site and remaining either east or west of the Richardson Highway, units would conduct a more deliberate and longer distance ground movement. For instance, from the CACTF at Eddy Drop Zone, a unit could move to the BAX at North Texas Range north along 33-Mile Loop Road and then west across Jarvis Creek on the Richardson Highway bridge, continuing south to either the Battalion Bivouac Site, and then use a new main supply route to Meadows Road. An alternative means of movement would have the unit continue south on the Richardson Highway to the Meadows Road turnoff, or go further south to the Old Richardson Highway and proceed south to Windy Ridge Road to access the BAX at North Texas Range.

The CACTF at Eddy Drop Zone would not be located near an existing impact area. Thus, the risk of encountering UXO is low. However, the surface danger zone associated with the BAX at North Texas Range would extend across the Delta River and overlap an active impact area situated on the west side of the Delta River (Appendix, Figure 2.h). Although the risk of encountering UXO is higher in this impact area, it is off-limits to the public at all times, allowing no opportunity for possible encounters with UXO.

4.2.5.2 Mitigation

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts to human health and safety. The appendix states how the offered mitigation would serve to eliminate or lessen the foreseen impact and offers an assessment of the potential success of the mitigation. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

4.2.5.2.1 Existing Mitigation

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts.

- Maintenance of current institutional control policy that limits access to contaminated sites, and maintenance of an active restoration program to clean up contaminated sites on USARAK lands. These policies reduce health and safety risks from exposure to contaminated areas.
- Continued compliance with Alaska state law (18 AAC 75.300-.380), which requires responsible parties to notify the Alaska Department of Environmental Consideration when an oil or hazardous substance discharge or release to the environment occurs and requires site characterization and cleanup (18 AAC 75.325-.380).
- Continued management of environmental programs listed in current INRMPs (USARAK 2002b,c) and continued provision of environmental awareness training to troops and civilians. The INRMPs list specific actions designed to alleviate human health and safety risks.
- Splitting of convoys into smaller vehicle groups and staggering of departure times, per USARAK Regulation 55-2, *Transportation Operations and Planning in Alaska*, to ease traffic congestion problems.
- Continued provision of portable containment systems for use at in-field refueling points that would be capable of containing potential fuel releases from fuel tanker vehicles. This would minimize the risk of area contamination from inadvertent petrochemical release.
- Continue convoy-permitting processes with Alaska Department of Transportation and Public Facilities.
- Consideration of alternate travel routes and methods for military convoys, including line haul, airlift, and rail, if available to help avoid traffic risks and impacts.
- Expansion of public notification of imminent convoy activity, including specific days of convoy activity. This would allow the public avoid highway travel concurrent with military convoys.

4.2.5.2.2 Proposed Mitigation

Established mitigation measures and management practices are sufficient to address any additional impact resulting from constructing the BAX and CACTF within DTA East. Under the proposed action, munitions would be limited to non-explosive projectiles within the BAX and training ammunition within the CACTF. This would significantly reduce potential hazards.

4.2.6 Wildlife and Fisheries

Issue 7: Wildlife and fisheries impacts. The impact of construction and operation of the BAX and CACTF to moose migration and migratory birds was identified as a concern during tribal consultations.

This section includes analyses of impacts to ecosystem management priority mammal and bird species, amphibians, and fisheries. The analysis for mammals and birds considers direct quantitative impacts to preferred habitats and projected population level changes. The methodology for assigning preferred habitats was described in Section 3.2.6 and in Section 4.2.6.2.1 below.

No state or federally listed endangered or threatened wildlife species occur on USARAK lands, although the American peregrine falcon and Arctic peregrine falcon (delisted within the past decade) are present. Further discussion of threatened or endangered species and species of concern is presented in Section 4.3.5. Under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703), it is illegal to "take" migratory birds, their eggs, feathers or nests. In Alaska, all native birds except grouse and ptarmigan (which are protected by the State of Alaska) are protected under the MBTA. No threatened or endangered fish species, from federal or Alaska state listings, occur in waterways on lands used by USARAK. Fish stocking on lakes, ponds, or streams, and management of wild fisheries are described in Section 3.2.6.

USARAK Range Regulation 350-2 (July 2002) requires units that discover wildlife on training ranges or in training areas while conducting live-fire exercises to immediately cease firing and report the location and number of animals to the Range Control office. Extreme care will be taken to prevent the harassment of wildlife, including the notification of Army Conservation Officers when wildlife are present. Aircraft would not be used to herd (chase) wildlife off of ranges or training areas. Once the area is clear of wildlife and the Range Control office grants permission, training may resume (USARAK 2004a).

4.2.6.1 Comparison of Alternatives

4.2.6.1.1 Description of Methodology

The following definitions will be used to categorize potential impacts to mammals, birds, amphibians, and fisheries. Not all criteria included in the definitions need to be met for that particular category to apply.

- None – No measurable adverse impacts are expected to occur.
- Minor – Adverse impacts would occur on less than 10 percent of preferred habitat (of a priority species) within DTA East. Temporary or localized displacement could affect individuals or less than 10 percent of the population on DTA East. Actions would result in 10 percent or less loss of population on DTA East over the long-term (five years and beyond).

- Moderate – Adverse impacts would be between 11 to 25 percent of preferred habitat within DTA East. Temporary or regional displacement of the local population, resulting changes in distribution or population loss of 11 to 25 percent over the long-term (five years and beyond).
- Severe – Adverse impacts would occur on more than 25 percent of preferred habitat on DTA East. Actions would result in permanent or long-term displacement of local population; or impacts would result in a 25 percent or greater loss to population on DTA East over the long-term (five years and beyond).
- Beneficial – Impacts would benefit wildlife resources.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant in this analysis. The next category (severe) is considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to wildlife is presented in 4.2.6.2, *Mitigation*.

Ecosystem Management Approach

USARAK is using an ecosystem management process to maintain ecosystem integrity on DTA by managing for a large number of species simultaneously, managing for a variety of habitats and structural vegetation types, and striving to maintain natural processes on the landscape. USARAK's INRMP is the primary vehicle to implement protection of ecosystem integrity on Alaska military lands.

The ecosystem management program at DTA uses a habitat-based approach. A list of priority species for management was developed using four objectively determined criteria representing both biological and human social attributes. The list of priority species focuses on species of conservation concern, important predator and prey species, and game species. Habitat preferences for priority species were assigned based on literature reviews and knowledge from biologists familiar with the ecology at DTA (USARAK 2003c). The Ecological Land Classification delineations (Jorgenson et al. 2001) were evaluated as potential habitat for each priority species using the following criteria: vegetation types that the species avoid were given a ranking of 1, vegetation types that species use but are not vital for life history requirements were ranked as a 2, and vegetation types that are critical for a species life history requirements were given a ranking of 3. Only the acreage of habitats was calculated. Habitats that were used by a species were given a ranking of 2, habitats critical for life history requirements were given a ranking of 3, and habitats typically avoided were ranked as 1 and were not calculated as usable habitat.

Habitats within the construction footprint or maneuver area for each alternative are considered to be directly impacted by the proposed action. Impacts to habitats within the surface danger zone can be direct or indirect. The predicted qualitative impacts to habitats within the surface danger zones are discussed within the following sections. Table 4.2.6.a summarizes predicted loss of quality habitat for the selected ecosystem management priority mammal species within the construction footprint and maneuver area. Table 4.2.6.b summarizes predicted loss of quality habitat for the selected ecosystem management priority bird species. Table 4.2.6.c summarizes predicted loss of quality habitat for the selected ecosystem management priority amphibians and fisheries.

Table 4.2.6.a Acres of Quality Habitat Affected, by Ecosystem Management Priority Mammal Species and Alternative, at DTA[1].

Species[2]	Alternatives							
	Alternative 2: Eddy Drop Zone		Alternative 3: Donnelly Drop Zone		Alternative 4: North Texas Range		Alternative 5: North Texas Range/Eddy Drop Zone Combination	
	Acres	%	Acres	%	Acres	%	Acres	%
Bison (47,317 acres)								
Construction	111	0.2	183	0.4	403	0.9	352	0.7
Maneuver	653	1.4	1,713	3.6	2,388	5.0	1,983	4.2
Black Bear (56,177 acres)								
Construction	296	0.5	327	0.6	211	0.4	279	0.5
Maneuver	3,773	6.7	2,376	4.2	1,309	2.3	2,256	4.0
Brown Bear (79,880 acres)								
Construction	313	0.4	414	0.5	223	0.3	265	0.3
Maneuver	3,936	4.9	3,037	3.8	2,936	3.7	3,544	4.4
Caribou (39,190 acres)								
Construction	52	0.1	228	0.6	537	1.4	450	1.1
Maneuver	335	0.9	1,847	4.7	3,616	9.2	2,805	7.2
Gray Wolf (85,112 acres)								
Construction	111	0.1	183	0.2	403	0.5	111	0.1
Maneuver	653	0.8	1,713	2.0	2,388	2.8	652	0.8
Little Brown Bat (20,921 acres)								
Construction	136	0.7	66	0.3	27	0.1	113	0.5
Maneuver	1,643	7.9	514	2.5	303	1.4	1,132	5.4
Lynx (56,696 acres)								
Construction	242	0.4	276	0.5	110	0.2	176	0.3
Maneuver	3,423	6.0	1,774	3.1	1,168	2.1	2,022	3.6
Meadow Jumping Mouse (38,397 acres)								
Construction	191	0.5	119	0.3	59	0.2	127	0.3
Maneuver	2,273	5.9	877	2.3	757	2.0	1,485	3.9
Moose (76,443 acres)								
Construction	242	0.3	276	0.4	110	0.1	242	0.3
Maneuver	3,423	4.5	1,774	2.3	1,168	1.5	3,423	4.5
Wolverine (95,439 acres)								
Construction	290	0.3	529	0.6	588	0.6	586	0.6
Maneuver	3,757	3.9	3,885	4.1	3,983	4.2	4,208	4.4

[1]Total acres of quality habitat in DTA East available to each species.
[2]Acres of habitat impacted within the surface danger zone are not listed because there are no impacts to habitat expected to occur within the surface danger zone. The impacts within the surface danger zone would be dispersed and not extensive. Lanes of tall-standing vegetation within "dispersion areas" would be impacted, possibly rendering some formerly forested areas to tall shrub, scrub-shrub, or early seral habitats.

Table 4.2.6.b Acres of Quality Habitat Affected, by Ecosystem Management Priority Bird Species and Alternative, at DTA[1].

Species[2]	Alternatives							
	Alternative 2: Eddy Drop Zone		Alternative 3: Donnelly Drop Zone		Alternative 4: North Texas Range		Alternative 5: North Texas Range/Eddy Drop Zone Combination	
	Acres	%	Acres	%	Acres	%	Acres	%
Boreal Owl (42,197 acres)								
Construction	228	0.5	252	0.6	49	0.1	136	0.3
Maneuver	3,277	7.8	1,625	3.8	312	0.7	1,354	3.2
Great Gray Owl (42,356 acres)								
Construction	228	0.5	252	0.6	49	0.1	136	0.3
Maneuver	3,277	7.7	1,625	3.8	312	0.7	1,354	3.2
Northern Goshawk (53,755 acres)								
Construction	281	0.5	185	0.3	157	0.3	228	0.4
Maneuver	3,400	6.3	1,754	3.3	943	1.8	1,733	3.2
Olive-sided Flycatcher (28,178 acres)								
Construction	73	0.3	235	0.8	28	0.1	57	0.2
Maneuver	1,406	5.0	1,454	5.2	207	0.7	805	2.92
Rusty Blackbird (820 acres)								
Construction	20	2.4	0	0.0	0	0.0	0	0.0
Maneuver	94	11.5	0	0.0	0	0.0	0	0.0
Sandhill Crane (21,282 acres)								
Construction	37	0.2	178	0.8	367	1.7	312	1.5
Maneuver	279	1.3	1,232	5.8	2,204	10.4	1,732	8.1
Sharp-tailed Grouse (29,386 acres)								
Construction	76	0.3	88	0.3	161	0.5	148	0.5
Maneuver	496	1.7	1,038	3.5	942	3.2	892	3.0
Trumpeter Swan (689 acres)								
Construction	0.0	0.0	0.0	0.0	5	0.7	5	0.7
Maneuver	0.0	0.0	0.0	0.0	86	12.5	69	10.0

[1]Total acres of quality habitat in DTA East available to each species.
[2]Acres of habitat impacted within the surface danger zone are not listed because there are no impacts to habitat expected to occur within the surface danger zone. The impacts within the surface danger zone would be dispersed and not extensive. Lanes of tall-standing vegetation within "dispersion areas" would be impacted, possibly rendering some formerly forested areas to tall shrub, scrub-shrub, or early seral habitats.

Table 4.2.6.c Acres of Quality Habitat Affected, by Ecosystem Management Priority Fisheries and Alternative, at DTA[1].

Species[2]	Alternatives							
	Alternative 2: Eddy Drop Zone		Alternative 3: Donnelly Drop Zone		Alternative 4: North Texas Range		Alternative 5: North Texas Range/Eddy Drop Zone Combination	
	Acres	%	Acres	%	Acres	%	Acres	%
Stocked Lakes (25 acres)								
Construction	0	0.0	0	0.0	.02	0.1	0	0.0
Maneuver	0	0.0	0	0.0	25	100.0	25	100.0
Wild Fisheries (1,217 acres)								
Construction	0	0.0	0	0.0	7	0.6	0.6	0.0
Maneuver	0	0.0	0	0.0	99	8.1	8	13.2

[1]Total acres of quality habitat in DTA East available to each species/fishery.
[2]Acres of habitat impacted within the surface danger zone are not listed because there are no impacts to habitat expected to occur within the surface danger zone. The impacts within the surface danger zone would be dispersed and not extensive. Lanes of tall-standing vegetation within "dispersion areas" would be impacted, possibly rendering some formerly forested areas to tall shrub, scrub-shrub, or early seral habitats.

Most research on the impacts of human disturbance to wildlife has focused on evaluating short-term behavioral effects. Considering the current state of knowledge, predicting population-level responses to military activities for many species requires qualitative evaluation. Nevertheless, an understanding of population-level responses is important (Tazik et al. 1992).

Table 4.2.6.d summarizes impacts to mammals by alternative. Impacts to most priority mammal species are localized and minor when compared at the population level within DTA East or Game Management Unit (GMU) 20D. However, selection of either Alternative 4 (North Texas Range) or Alternative 5 (North Texas Range/Eddy Drop Zone Combination) could result in a severe impact to the Delta bison herd. Construction of the ranges and subsequent training could cause a significant change in distribution patterns, leading to increased crop depredation on the Delta Agricultural Project (located northeast of DTA East). In addition, training activities would have the potential to affect the population dynamics of the herd.

Table 4.2.6.d Summary of Environmental Consequences to Ecosystem Management Priority Mammal Species at DTA.

Species*	Alternatives				
	Alternative 1: No Action	Alternative 2: Eddy Drop Zone	Alternative 3: Donnelly Drop Zone	Alternative 4: North Texas Range	Alternative 5: North Texas Range/Eddy Drop Zone Combination
Bison (47,317 acres)					
Construction Footprint and Maneuver Area	Army training and infrastructure affect Delta bison herd, but populations have been sustained at current levels up until 2004, when a population decline has been observed.	Affected habitat within migration corridor but not in important calving/ feeding areas; no food plots impacted	Affected habitat within migration corridor but not in important calving/ feeding areas; no food plots impacted	Affected habitats within important calving and summer feeding areas; 7 food plots impacted; actions could affect calving/summer distribution at population level	Affected habitats within important calving and summer feeding areas; 7 food plots impacted; actions could affect calving/summer distribution at population level
Impact		*Minor*	*Minor*	*Severe*	*Severe*

Species*	Alternatives				
	Alternative 1: No Action	**Alternative 2: Eddy Drop Zone**	**Alternative 3: Donnelly Drop Zone**	**Alternative 4: North Texas Range**	**Alternative 5: North Texas Range/Eddy Drop Zone Combination**
Black Bear (56,177 acres)					
Construction Footprint and Maneuver Area *Impact*	Training activities may disturb individual animals	Range construction and use would impact a few individuals *Minor*	Range construction and use would impact a few individuals *Minor*	Range construction and use would impact a few individuals *Minor*	Range construction and use would impact a few individuals *Minor*
Brown Bear (79,880 acres)					
Construction Footprint and Maneuver Area *Impact*	Training activities may disturb individual animals	Small portion of available habitat affected; construction and training would affect individual bears but not population *Minor*	Small portion of available habitat affected; construction and training would affect individual bears but not population *Minor*	Small portion of available habitat affected; construction and training would affect individual bears but not population *Minor*	Small portion of available habitat affected; construction and training would affect individual bears but not population *Minor*
Caribou (31,190 acres)					
Construction Footprint and Maneuver Area *Impact*	Caribou are sensitive to habitat alteration and disturbance; Army training may influence distribution and habitat use	Small portion of available habitat affected; location not in critical area *Minor*	Area does not appear to be a critical calving or feeding ground; relatively small portion of available habitat affected *Moderate*	Area does not appear to be a critical calving or feeding ground; caribou use is relatively low. *Moderate*	Area does not appear to be a critical calving or feeding ground; caribou use is relatively low *Moderate*
Gray Wolf (85,112 acres)					
Construction Footprint and Maneuver Area *Impact*	Army training and infrastructure affect the distribution of wolves	A small portion of habitat would be affected by construction; training could affect individuals or packs *Minor*	A small portion of habitat would be affected by construction; training could affect individuals or packs *Minor*	A small portion of habitat would be affected by construction; training could affect individuals or packs *Minor*	A small portion of habitat would be affected by construction; training could affect individuals or packs *Minor*
Little Brown Bat (20,921 acres)					
Construction Footprint and Maneuver Area *Impact*	Information on distribution and abundance of bats in interior Alaska are not well known; these bats are susceptible to logging and habitat disturbance	Construction and firing into surface danger zone could fragment habitat *Minor*	A small portion of habitat would be affected by construction; firing into surface danger zone would fragment some habitat *Minor*	Firing into surface danger zone could fragment habitat *Minor*	Construction and firing into surface danger zone could fragment habitat *Minor*
Lynx (56,696 acres)					
Construction Footprint and Maneuver Area *Impact*	Army training and infrastructure would affect some individuals	Combination of habitat alteration and training could affect portions of local population *Minor*	A small portion of habitat would be affected by construction; training could affect individuals *Minor*	A small portion of habitat would be affected by construction; training could affect individuals *Minor*	Combination of habitat alteration and training could affect portions of local population *Minor*

Species*	Alternatives				
	Alternative 1: No Action	**Alternative 2: Eddy Drop Zone**	**Alternative 3: Donnelly Drop Zone**	**Alternative 4: North Texas Range**	**Alternative 5: North Texas Range/Eddy Drop Zone Combination**
Meadow Jumping Mouse (38,397 acres)					
Construction Footprint and Maneuver Area *Impact*	Army activities would impact some portions of the population.	A small portion of habitat would be affected by construction and maneuvers; training would affect individuals *Minor*	A small portion of habitat would be affected by construction and maneuvers; training would affect individuals *Minor*	A small portion of habitat would be affected by construction and maneuvers; training would affect individuals *Minor*	A small portion of habitat would be affected by construction and maneuvers; training would affect individuals *Minor*
Moose 76,433 acres)					
Construction Footprint and Maneuver Area *Impact*	Army training and infrastructure would affect some individuals, but moose are tolerant to disturbance	A small portion of habitat would be affected by construction, but additional habitat created *Minor*	A small portion of habitat would be affected by construction, but additional habitat created *Minor*	A small portion of habitat would be affected by construction, but additional habitat created *Minor*	A small portion of habitat would be affected by construction, but additional habitat created *Minor*
Wolverine (95,439 acres)					
Construction Footprint and Maneuver Area *Impact*	Army training and infrastructure would disturb individual wolverine and local population	A small portion of habitat would be affected by construction; activities could affect individuals *Minor*	A small portion of habitat would be affected by construction; activities could affect individuals *Minor*	A small portion of habitat would be affected by construction; activities could affect individuals *Minor*	A small portion of habitat would be affected by construction; activities could affect individuals *Minor*

* Total acres of quality habitat in DTA East available to each species.

Likewise, the impacts to most priority bird species would be minor for each alternative (Table 4.2.6.e). However, sandhill cranes could be moderately impacted by selection of either Alternative 4 (North Texas Range) or Alternative 5 (North Texas Range BAX, Eddy Drop Zone CACTF). Sharp tail-grouse would be moderately affected by range construction and training activities at Eddy Drop Zone, thus there would be moderate impacts with selection of Alternative 2 or Alternative 5.

Table 4.2.6.e Summary of Environmental Consequences to Ecosystem Management Priority Bird Species at DTA.

Species*	Alternatives				
	Alternative 1: No Action	**Alternative 2: Eddy Drop Zone**	**Alternative 3: Donnelly Drop Zone**	**Alternative 4: North Texas Range**	**Alternative 5: North Texas Range/Eddy Drop Zone Combination**
Boreal Owl (42,197 acres)					
Construction Footprint and Maneuver Area *Impact*	Susceptible to forest thinning and clearing, but large scale clearing not planned	Impact from construction and maneuver footprint could affect local population and individual birds *Minor*	Construction and maneuver footprints relatively small, and surface danger zone impacts not extensive *Minor*	Construction and maneuver footprints relatively small; and surface danger zone impacts not extensive *Minor*	Construction and maneuver footprints relatively small; and surface danger zone impacts not extensive *Minor*

Species*	Alternatives				
	Alternative 1: No Action	**Alternative 2: Eddy Drop Zone**	**Alternative 3: Donnelly Drop Zone**	**Alternative 4: North Texas Range**	**Alternative 5: North Texas Range/Eddy Drop Zone Combination**
Great Gray Owl (42,356 acres)					
Construction Footprint and Maneuver Area *Impact*	Susceptible to forest thinning and clearing, but large scale clearing not planned	Impact from construction and maneuver footprint could affect local population and individual birds *Minor*	Construction and maneuver footprints relatively small, and surface danger zone impact not extensive *Minor*	Construction and maneuver footprints relatively small; and surface danger zone impacts not extensive *Minor*	Construction and maneuver footprints relatively small; and surface danger zone impacts not extensive *Minor*
Northern Goshawk (53,755 acres)					
Construction Footprint and Maneuver Area *Impact*	Susceptible to forest thinning and clearing, but large scale clearing not planned	Combined impact from construction and maneuver footprint and surface danger zone impacts not extensive *Minor*	Construction and maneuver footprints relatively small, and surface danger zone impacts not extensive *Minor*	Construction and maneuver footprints relatively small, and surface danger zone impacts not extensive *Minor*	Construction and maneuver footprints relatively small, and surface danger zone impacts not extensive *Minor*
Olive-sided flycatcher (26,178 acres)					
Construction Footprint and Maneuver Area *Impact*	Susceptible to habitat disturbance, but not common on DTA	Construction and maneuver footprints relatively small, and surface danger zone impacts not extensive *Minor*	Construction and maneuver footprints relatively small, and surface danger zone impacts not extensive *Minor*	Construction and maneuver footprints relatively small, and surface danger zone impacts not extensive *Minor*	Construction and maneuver footprints relatively small, and surface danger zone impacts not extensive *Minor*
Rusty Blackbird (820 acres)					
Construction Footprint and Maneuver Area *Impact*	Susceptible to habitat disturbance, but not common on DTA	Impact from construction and maneuver footprint could affect local population and individual birds *Moderate*	Minimal impact to habitat *Minor*	No impact to quality habitat *Minor*	No impact to quality habitat *Minor*
Sandhill Crane (21,282 acres)					
Construction Footprint and Maneuver Area *Impact*	Susceptible to habitat disturbance, but cranes can adapt to human activity	Construction and maneuver footprints relatively small, and surface danger zone impact not extensive *Minor*	Construction and maneuver footprints relatively small, and surface danger zone impact not extensive *Minor*	Impact from construction and maneuver footprint could affect cranes during migration *Moderate*	Impact from construction and maneuver footprint could affect cranes during migration *Moderate*
Sharp-tailed Grouse (29,386 acres)					
Construction Footprint and Maneuver Area *Impact*	Susceptible to disturbance during breeding; disturbance rates relatively infrequent	Construction and maneuver footprints relatively small, but activities within important habitat *Moderate*	Construction and maneuver footprints relatively small, and surface danger zone impact not extensive *Moderate*	Construction and maneuver footprints relatively small, and surface danger zone impact not extensive *Minor*	Construction and maneuver footprints relatively small, but activities within important habitat *Moderate*

Species*	Alternatives				
	Alternative 1: No Action	**Alternative 2: Eddy Drop Zone**	**Alternative 3: Donnelly Drop Zone**	**Alternative 4: North Texas Range**	**Alternative 5: North Texas Range/Eddy Drop Zone Combination**
Trumpeter Swan (689 acres)					
Construction Footprint and Maneuver Area *Impact*	Susceptible to disturbance during breeding; disturbance rates relatively infrequent	No impacts in construction and maneuver footprints; impacts within surface danger zone not extensive *Minor*	No impacts in construction and maneuver footprints; impacts within surface danger zone not extensive *Minor*	Impact from construction and maneuver footprint could affect local nesting pairs, but few swans nest on DTA East *Minor*	Impact from construction and maneuver footprint could affect nesting pairs but few swans nest on DTA East *Minor*

* Total acres of quality habitat in DTA East available to each species are listed.

Impacts to fisheries would be minor, but locally moderate impacts could occur to wood frog habitat with Alternative 2 (Eddy Drop Zone), locally severe impacts with Alternatives 3 (Donnelly Drop Zone) and 4 (North Texas Range), and locally minor impacts with Alternative 5 (North Texas Range/Eddy Drop Zone Combination) (Table 4.2.6.f).

Table 4.2.6.f Summary of Environmental Consequences to Ecosystem Management Priority Amphibians and Fisheries at DTA.

Species*	Alternatives				
	Alternative 1: No Action	**Alternative 2: Eddy Drop Zone**	**Alternative 3: Donnelly Drop Zone**	**Alternative 4: North Texas Range**	**Alternative 5: North Texas Range/Eddy Drop Zone Combination**
Wood Frog (24,048 acres)					
Construction Footprint and Maneuver Area *Impact*	Training and construction would affect local habitat and populations	Moderate impacts to wood frog habitat on DTA East, due to construction and habitat alteration *Moderate*	Severe impacts to wood frog habitat on DTA East, due to construction and habitat alteration *Severe*	Severe impacts to wood frog habitat on DTA East, due to construction and habitat alteration *Severe*	Minor impacts to wood frog habitat on DTA East, due to construction and habitat alteration *Minor*
Stocked Fisheries (24.5 acres)					
Construction Footprint and Maneuver Area *Impact*	Fish stocking and use on stocked lakes would continue	The alternative does not have any stocked lakes *Minor*	The alternative does not have any stocked lakes *Minor*	The alternative includes 3 stocked lakes totaling 24.5 acres. Construction and training would not impact these lakes. Lack of continued stocking would cause population decline. *Severe*	The alternative includes 3 stocked lakes totaling 24.5 acres. Construction and training would not impact these lakes. Lack of continued stocking would cause population decline. *Severe*
Wild Fisheries (1,217 acres)					
Construction Footprint and Maneuver Area *Impact*	Training and construction would not affect local habitat and populations (esp. anadromous populations)	The Jarvis Creek waterways would be avoided *Minor*	The Jarvis Creek waterways would be avoided *Minor*	There would be no construction or maneuvers to directly affect fisheries within the alternative *Minor*	The waterways would be avoided *Minor*

* Total acres of quality habitat in DTA East available to each species are listed.

4.2.6.1.2 Impacts Common to All Alternatives

Research to evaluate the effects of human disturbance on wildlife has increased in recent decades. Human disturbance can cause behavioral changes, alteration of activity patterns, or abandonment of habitats. Some species respond by under-utilizing available habitats near developments while overusing areas away from development, resulting in poor nutrition and survival, and thus lowering carrying capacity (Nelleman et al. 2000; Vistnes and Nelleman 2001). Disturbances can also result in release of stress hormones, which can affect organ function and metabolism. If animals do not adapt to disturbances, populations could decline (Harrington and Veitch 1992). However, some species, such as moose, have been documented to habituate to human disturbance (Andersen et al. 1996). Disturbance can also affect bird populations directly through increased mortality and habitat loss, increased vigilance and stress, as well as more subtle or indirect effects such as loss of effective habitat due to increased disturbance (Reijnen et al. 1997; Forman et al. 2002).

Military activities, from training or construction, can affect individual animals and possibly populations. Direct effects include disturbance from aerial bombing, artillery, mortar firing, or small arms firing. Mortality to individual animals may result from these activities; some animals may be disturbed from noise and some may habituate. However, impact areas and associated buffer zones are not impacted by ground-based disturbance (i.e., construction, maneuver, roads) or recreational access, although these same areas are subject to military training, including munitions firing. In maneuver areas, Soldiers may disturb animals when traveling on foot or by various types of vehicles. Development of training lands, including maneuver areas, firing points, bivouac sites, firing ranges, assault strips, and drop zones, may result in alteration of habitats and/or disruption of behavior. Development of ranges would provide habitat for species that prefer edge habitat, open areas, or early successional vegetative communities. Construction creates noise and may displace some animals from their habitat, although some species readily habituate to disturbance. Mortality may occur to individual animals that are small or less mobile.

Construction of the BAX and CACTF ranges would result in direct loss of habitat due to construction of buildings, roads, and targets. These activities would permanently remove habitat for wildlife. Vegetation clearing, site preparation, or other construction activities could result in the destruction of active bird nests or nestlings if vegetation clearing timing guidelines set by the U.S. Fish and Wildlife Service (USFWS) to comply with the MBTA were not taken into consideration. The proposed action would also result in impacts from vegetation removal due to vehicle maneuver and training within maneuver areas. These impacts would change the structure of vegetation, to the detriment of some local wildlife species, but to the benefit of others (e.g., those that prefer open or early seral stages). The impacts within the surface danger zone would be dispersed and not extensive. Lanes of tall-standing vegetation within “dispersion areas” would be impacted, possibly rendering some formerly forested areas to tall shrub, scrub-shrub, or early seral habitats.

Military activities can also lead to indirect impacts to wildlife. Damage to soils or water quality could lead to degradation of habitats, increased stress levels, mortality, lower reproductive success, and population declines.

Mammals

Large Mammals – These analyses will include the following large mammals present at DTA East: bison, moose, caribou, brown (grizzly) bear, and black bear.

Few studies have documented the effects of military activity to bison (USARAK 1999a). Bison respond to low flying civilian aircraft by behaving nervously and moving away from the noise (Golden et al. 1979). However, in another study, bison habituated to noise from military aircraft (Frazier 1972). Delta bison are reported to rarely exhibit a flight response to low flying single engine survey aircraft (Ajmi and Payne 2005). Effects of military training and activities on the Delta bison herd are not known (DuBois and Rogers 2000). A study in Yellowstone National Park reported that bison were not affected negatively by road grooming during winter (Bjornlie and Garrott 2001). Increased maneuver and weapons training could disturb the herd. Changes in distribution could cause the herd to overgraze portions of their range, resulting in habitat degradation and possible population decline. A change in distribution could also lead to greater use of agricultural lands and result in increased crop depredation.

Wildlife managers, Alaska Native tribes and the public are also concerned about potential impacts to moose. Few studies have evaluated the effect of human disturbance on moose, and research on the impacts of human disturbance to ungulates has been mixed. Andersen et al. (1996) reported that moose responded to humans on foot (including pedestrians, infantry troops, and skiers) with stronger heart rate responses and flush distances, when compared to various mechanical disturbances such as snowmachines, all-terrain vehicles, and helicopters. In the same study, the home range of moose nearly doubled in size during maneuver exercises and did not return to near normal for one week. This has also been observed on USARAK lands after intense training activities (USARAK 1980). Krausman et al. 2001 demonstrated that pronghorn (*Antilocapra americana*), bighorn sheep (*Ovis canadensis*), and mule deer (*Odocolius virginianus*) exhibit a higher threshold of hearing compared to humans. That is, brainstem activity in these ungulates was less responsive to loud blast noise and aircraft than humans. The effect of noise to moose would likely be similar to pronghorn, bighorn sheep, and mule deer.

Studies in Wyoming (Colescott and Gillingham 1998) showed that the frequency of snowmachine traffic did not appear to affect the average percent of moose activity or the number of moose in the study area. Moose appeared to move away from the active snowmachine trail as the day progressed. Although the snowmachine traffic did not appear to alter moose activity significantly, it did influence the behavior of moose positioned within 300 meters of a trail and did displace moose to less favorable habitats. Moose appear well adapted to multiple use management (forestry, hunting and military activities), and military training seems no more detrimental to moose populations than other land uses (Andersen et al. 1996). However, impacts to moose on DTA could be potentially moderate if winter habitat is disturbed.

However, Creel et al. 2002 studied elk in Yellowstone National Park and documented a correlation between glucocorticoid hormones (which indicate stress) and snowmobile activity rates. Although this study did measure traffic rates, it did not measure rates of disturbance among sampled animals, nor did it determine cause and effect. The differences may have been due to seasonal changes, individual variation among animals, sampling, or some other factors that were not controlled.

Ultimately, additional field experiments that control the rates and types of disturbance, and measurement of stress levels and reproductive success of known individual animals, would be needed to determine the impact of disturbance on large ungulates such as moose. Moose appear well adapted to multiple use management (forestry, hunting and military activities), and military training seems no more detrimental to moose populations than other land uses (Andersen et al. 1996). However, impacts to moose on DTA could be potentially moderate if winter habitat is disturbed.

Less is known about the effects of military weapons and maneuver training or military facilities on caribou, but research has documented the effects of human activities and infrastructure. Caribou exposed to winter tourists demonstrated increased vigilance at the expense of resting and foraging (Duchesne et al. 2000). In Norway, reindeer exhibited a 70-80 percent reduction in the use of winter foraging habitats within two and a half to four miles of power lines (Nellemann et al. 2000; Vistnes and Nellemann 2001). Cumulative impacts may be even greater (Nellemann et al. 2000; Vistnes and Nelleman 2001). Reindeer avoided developed areas with as low as 0.5 – 0.9 miles of linear structures (i.e., roads or power lines). Moreover, female reindeer with calves maintained a distance of six miles from resort areas. The implication is that available habitats near developments would be under-utilized while areas away from development would be overused, resulting in poor nutrition and survival, thus a lower carrying capacity. Wolf predation on caribou is higher near these corridors (James and Stuart-Smith 2000).

Another potential cumulative impact to caribou is degradation of habitat from range construction and repeated use. Caribou forage almost exclusively on lichen in winter. Lichens are fragile and slow growing. Impacts to lichens can be long lasting and have negative impacts to caribou populations (Chapman and Feldhamer 1982; Swanson et al. 1985). Lichens are very susceptible to disturbance from vehicles. They are the most fragile component of tundra vegetation communities and take the longest to recover. Vehicle disturbance could quickly degrade caribou winter range, making it unsuitable to caribou for many years.

With regard to military activities, Davis et al. (1985) reported that the Delta caribou herd had become habituated to military training. However, Maier et al. (1998) demonstrated that low flying jets during late winter disrupted resting patterns of caribou and that caribou reaction to jet aircraft was greatest during the post calving period. Harrington and Veitch (1992) reported decreased woodland caribou calf survival following controlled disturbance trials from military aircraft. Research in Norway showed that reindeer (i.e., caribou) avoided winter foraging habitats due to infrastructure development near resorts. Brigade-level winter training exercises could result in temporary dispersal of the herd segment that winters in DTA East and DTA West. Although the long-term impacts are not known, there is potential for moderate impacts to that wintering herd segment. Note that Army training on DTA would not directly affect caribou calving areas because these areas are currently 20-40 miles off post. Overall, impacts to caribou on DTA East are moderate (USARAK 2004a).

Effects of military maneuvers and training on brown bears have not been documented (USAF 1995; USARAK 1999a). Grizzly bears have been documented to flee from low flying civilian aircraft (Golden et al. 1979), but studies of impacts from military aircraft have not been documented. Gibeau et al. (2002) evaluated the distribution of grizzly bears in relation to high use highways, secondary paved roads, high use trails, and non-transportation developments (e.g., campgrounds and lodges or other buildings). Black and grizzly bears apparently learn to avoid trails or roads during times of high human use (Gibeau et al. 2002). Adult bears avoided busy highway corridors. Females avoided roads and humans at the expense of using high quality habitats. Mattson et al. (1987) and Mace et al. (1996) documented that avoidance of high quality habitats adjacent to roads resulted in the poor body condition of females; and subsequent lower fecundity and survival rates. Increased maneuver and weapons training could disturb individual grizzlies or local populations, and the impacts could be moderate in heavily used areas.

Furbearers and Small Mammals – These analyses will include the following furbearers and small mammals present at DTA East: gray wolf, little brown bat, lynx, meadow jumping mouse, and wolverine.

Gray wolves are adapted to a wide variety of ecosystems. The majority of documented wolf mortality in the lower 48 states is human-related, but they are moderately resilient to human disturbance because populations can rebound quickly and animals readily occupy vacant habitat (Weaver et al. 1996). Wolves tend to avoid roads with traffic but would use roads with limited vehicular use (Thurber et al. 1994). Wolf packs tend to utilize areas with low road densities (Fuller et al. 1992). Wolves demonstrated increased glucocorticoid activity (physiological stress response) during snowmachine activity (Creel et al. 2002), but the relationship between snowmobile activity and survival/reproduction of wolves was not determined.

Little brown bats are sensitive to disturbance during hibernation, habitat loss from deforestation, and destruction of caves (Thomas 1995). Lynx are tolerant of humans, including snowmobile, ski area activities, and lightly roaded areas (Staples 1995; Ruediger et al. 2000; Roe et al. 1999). However, lynx tend to avoid heavily roaded areas and highways with high traffic volume (McKelvey et al. 2000). Meadow jumping mice are relatively uncommon on DTA and are susceptible to habitat loss.

Wolverines in central Alaska are habitat generalists but avoid tundra during winter and forests during summer (Whitman et al. 1986). Little is known about impacts of anthropogenic disturbance, but wolverines appear to have low resilience to disturbance (Banci 1994; Weaver et al. 1996). Wolverines appear to be susceptible to habitat fragmentation associated with forestry, livestock grazing, energy extraction, and human settlement. Use of snowmachines during winter appears to negatively affect wolverines (Hornocker and Hash 1981).

Birds

Raptors – Boreal owls are susceptible to forest cutting (Hayward and Hayward 1993). Great gray owls can be affected by timber management when large-diameter trees are harvested. Foraging habitat declines if perches are not left in clearcuts (Bull and Duncan 1993). Habitat degradation, including timber harvest, can affect nesting populations of goshawks (Squires and Reynolds 1997), especially if forest canopy is reduced to less than 40 percent. Timber/human activities near nest sites (55-110 yards) can cause nesting failure (Squires and Reynolds 1997).

Game Birds and Waterfowl – A wide variety of waterfowl and waterbirds use wetlands, waterways, and nearby habitats on USARAK installations. Research suggests that aircraft flying low over concentrated breeding or staging areas could affect waterfowl and result in increased stress and lower reproductive success (USAF 1995). In one study in Maryland, black ducks habituated to noise from low-flying jet aircraft but wood ducks did not habituate, indicating that the responses may be species specific (Conomy et al. 1998).

Motorized recreational devices can have negative impacts on waterfowl. Educational programs aimed at operators of such crafts can reduce the frequency of disturbances and result in increased reproductive success of water birds (Burger and Leonard 2000). In a study of effects of personal watercraft and outboard motors, Rodgers and Schwikert (2002), recommended buffer zones of 200 yards for wading birds, 155 yards for terns and gulls, 110 yards for plovers and sandpipers, and 165 yards for ospreys. Sandhill cranes can be affected by low-flying airplanes (Herter 1992), but can habituate to human disturbance (Dwyer and Tanner 1992).

Songbirds – Relatively few studies have been conducted on the effects of military training on neotropical birds. However, an ongoing research project is documenting the effects of aircraft noise on neotropical birds near Eielson Air Force Base (Bartecchi 2003).

Preliminary results indicate that aircraft noise does not affect the density of breeding birds, physiological stress levels, or nesting success rates. In a study of urban birds in Colorado, lower avian species richness was observed in areas where noise levels were higher (Stone 2000). High noise levels might interfere with habitat use and reproductive success of birds, but definitive scientific evidence is lacking. A recent study has indicated that human use of campgrounds led to increased use by predatory birds; however, predation rates were not quantified (Gutzwiller and Anderson 1999).

Olive-sided flycatchers could benefit from some forest management practices (Altman and Sallabanks 2000). Declines may be due to loss of wintering habitat (Central America), but studies have not confirmed this. Rusty blackbirds can be affected by land use practices that reduce wet woodlands in wintering areas (Avery 1995). Clearcutting removes preferred habitat there and increases competition from other species (e.g., red-winged blackbird and common grackle). Impacts to rusty blackbirds habitat would be locally moderate. However, these birds are not common on DTA East.

Vegetation clearing, site preparation, or other construction activities that may result in the destruction of active bird nests or nestlings would violate the MBTA. Timing guidelines (current for 2005) have been developed by the USFWS as recommendations to assist in compliance with the Act (Chapter 3.2.6).

Special Interest Management Areas

The DTA INRMP (2002-2006) recognizes important habitat for several wildlife species (USARAK 2002b). In the past bison, caribou, and sandhill cranes were monitored during crucial times to ensure minimal disturbance under a cooperative agreement between USARAK and ADF&G (USARAK 1980). However, the Army now manages the areas utilized by these species as special interest management areas. USARAK Range Regulation 350-2 (July 2002) states that all firing will cease when animals are present on the range, regardless of season for special interest management areas.

Special interest management areas on DTA East include the Delta bison area and the sandhill crane roosting area. Two other special interest management areas for Dall sheep and caribou are located on DTA. These areas are located on DTA West and are not directly affected by the proposed actions and alternatives.

Fish and Amphibians

Military activities can negatively impact fisheries. Damage to streambanks result in erosion. Land disturbance affects aquatic habitats and riparian areas, and pollution from unexploded weapons or chemical spills can enter water bodies. Fires can also contribute to degraded water quality through sedimentation and bank erosion. Recreational fishing also impacts fisheries resources through trail compaction of emergent vegetation or loss of bank stability.

4.2.6.1.3 Impacts Attributed to Alternative 1 (No Action)

Potential impacts under the No Action Alternative must incorporate Army transformation activities at USARAK. The ROD on the transformation of USARAK was signed on May 27, 2004. Full transformation of USARAK was selected as the preferred alternative. The overall impact of transformation on wildlife and fisheries at DTA was determined to be minor (USARAK 2004a).

Mammals

Transformation has resulted in construction of the UAV maintenance support facility within Training Area 57 in DTA East. The construction of the facility impacted approximately 0.5 acres. The area burned in 1981 and is currently dominated by small diameter aspen, young spruce, dwarf birch, and grasses. Existing disturbances in the area include roads, firing points, maneuver trails, and clearings to improve bison and moose habitat. Species that could be affected by this site include bison, moose, and sharp-tailed grouse. Due to the small size of the site, the impact has been highly localized (USARAK 2004a).

Use of new equipment (the Stryker, 105mm Mobile Gun System, 155mm howitzer, and UAV), and increased maneuver and weapons training under transformation could affect individuals, groups, or localized wildlife populations by disrupting activity cycles or movements. Due to increased training levels, higher wildlife mortality could be expected. Direct mortality would be localized and relatively infrequent. Any increases in mortality would unlikely result in severe impacts to any wildlife at the population level.

The primary spatial change resulting from USARAK transformation would be associated with road upgrades and improvements to handle the Stryker vehicles, which would effectively expand the training area available and result in higher use of roads that currently receive little traffic. Bivouac and foot use in these areas would also increase.

Although these kinds of disturbances do not represent physical destruction of habitat, they can compromise habitat quality for some individual animals or localized populations. Certain species can habituate to disturbance from vehicle traffic. USARAK's ecosystem management program would continue to develop methodologies to analyze the impacts of road construction and use on priority wildlife populations. Some wildlife might be more susceptible to disturbance from road development or training, and the effects to localized populations at DTA could be moderate. The overall impact of military training on DTA on caribou, grizzly bear, gray wolf, and moose are considered to be moderate (USARAK 2004a).

The increase in size or frequency of major deployments to DTA could also affect some animals. However, any increase in direct mortality from training would not likely affect wildlife at population levels. In summary, transformation could result in minor impacts at the population level for most other wildlife species at DTA (USARAK 2004a).

Range management, the ITAM program, environmental management, and sustainable range management would continue as a result of transformation. Other management actions would also include soil and water quality monitoring, a training area recovery program, ecosystem management, and full implementation of INRMPs. This would result in improved environmental management of USARAK lands, to the benefit of wildlife resources.

Birds

The impacts to ecosystem management priority species would be minor under the No Action Alternative (USARAK 2004a). Most disturbances would be localized and intermittent. Traffic rates on DTA roads, including the Richardson Highway, are probably not sufficient to cause population-level impacts. Forest dwelling species could be affected by large tracts of forest clearing or by forest fires. The impacts to priority bird species are summarized in Table 4.2.6.e.

Special Interest Management Areas

Impacts to special interest management areas would remain similar to current levels, and policies for management in these areas would also remain the same.

Fish and Amphibians

Training activities would impact fisheries resources at DTA, although the effects to fish stocking or wild fisheries would be minor (USARAK 2004a). The increase in maneuver training compared to pre-2004 could result in higher rates of erosion and sedimentation. Frequent training with Strykers or other vehicles could increase the possibility of petrochemical spills during refueling. Higher training intensities could also result in increased frequency of fires, which could cause erosion into streams, ponds, and waterways. Weapons training could increase levels of munitions constituents from dudded ordnance (in impact areas outside of DTA East), although no impacts to fisheries would be expected.

Overall, fishing pressure could increase as a result of increased Army personnel in the region, as well as cumulative increases in personnel from other projects such as the Space Missile Defense Command at Fort Greely or Pogo Gold Mine.

Range management, the ITAM program, environmental management, and sustainable range management are continuing. Other management actions would include soil and water quality monitoring, a training area recovery program, ecosystem management, and continued implementation of INRMPs. This would result in improved environmental management of USARAK lands, to the benefit of fisheries resources.

4.2.6.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

Mammals

The overall impact of construction and use of the BAX and CACTF on mammals at Eddy Drop Zone alternative is considered minor.

Range construction would impact less than 1 percent of preferred bison habitat, and vehicle maneuvers would cause a short-term adverse impact to about 1 percent of preferred bison habitat. Bison do not use the area regularly or for extended periods of time. The Eddy Drop Zone area is primarily a migration area for portions of the bison herd. No bison food plots would be impacted by construction, maneuver, or munitions training within the Eddy Drop Zone alternative. Impacts to bison would be minor.

Most of DTA East, including the Eddy Drop Zone alternative, is a high density area for moose where densities typically exceed four moose per square mile (USARAK 2004a). The proposed

project would affect less than 10 percent of the high quality moose habitat, and the construction and training activities would affect only a small portion of the population, with no long-term impacts to the sustainability of moose on DTA or within GMU 20. At the Eddy Drop Zone alternative, moose habitat could be enhanced by the addition of small arms ranges as such actions create and maintain early successional vegetation on firing ranges. Direct disturbance resulting from maneuver and firing use of the range would keep vegetation in early successional stages. This would benefit moose, which may be attracted to the vegetation within the range complex. Training activities would be limited or suspended if moose were in the firing lanes. However, takes of animals could occur as trees and shrubs can conceal their locations. Impacts to moose on DTA East could be potentially moderate if winter habitat is disturbed. Overall, impacts to moose would be minor.

USARAK Range Regulation 350-2 (July 2002) requires units that discover wildlife on training ranges or in training areas while conducting live-fire exercises to immediately cease firing and report the location and number of animals to the Range Control office.

Construction and use of the BAX and CACTF at Eddy Drop Zone could result in a minor impact to the local brown bear, black bear, gray wolf, little brown bat, meadow jumping mouse, wolverine, and lynx populations by impacting between 4 and 8 percent of the available preferred habitat on DTA East. Populations of these species elsewhere on DTA and throughout interior Alaska are stable and sustainable. Impacts to caribou would be minor because the Eddy Drop Zone alternative is not heavily used by caribou (Table 4.2.6.d).

Birds

The overall impact to birds from construction and use of the BAX and CACTF at the Eddy Drop Zone alternative would be minor.

Sandhill cranes use Eddy Drop Zone as a feeding area and occasionally as a roosting area during fall migration. Some of the other wetlands within the alternative are also used as roost sites. Development and use of Eddy Drop Zone alternative could be expected to degrade portions of foraging habitat over time, but the area is not critical nor would the impact be extensive. Roosts could be most affected by use of the range at night, but, coupled with the limited time cranes are present, negative impacts would be minimal. Overall, impacts to cranes would be minor.

Although only 2 percent of DTA East's sharp-tailed grouse habitat would be directly affected by construction and activities at the Eddy Drop Zone alternative, the impact to the local population could be moderate because Eddy Drop Zone is an important breeding ground for grouse and possibly a nesting and brood rearing area (Mason 2004). The area also appears to be important as winter habitat. The drop zone itself is the only optimal habitat for this species within the Eddy Drop Zone alternative and the surrounding area in general. Optimal winter habitat for sharp-tailed grouse includes areas with abundant dwarf birch (*Betula nana*) and ericaceous shrubs including kinnikinick (*Arctostaphylos uva-ursi*) (Raymond 2001). Range development and use could eventually degrade winter habitat within the Eddy Drop Zone area and make it unsuitable for sharp-tailed grouse. Conversely, it is possible that range development could enhance sharp-tailed grouse habitat, creating early successional habitat, though of lesser quality than optimal dwarf birch habitat.

Of the other ecosystem management priority species, the rusty blackbird would be moderately susceptible. Approximately 14 percent of the rusty blackbird's potential local habitat could be

affected. Impacts to forest dwelling raptors such as the goshawk, boreal owl, and great gray owl would be minor on DTA East as less than 10 percent of available habitat would be affected. Negative effects to these species could be caused by forest clearing. Densities of these species are believed to be low and impacts would be localized.

The impacts to other ecosystem management priority bird species would be minor (see Table 4.2.6.e for a summary). Waterfowl are common on the many lakes in the eastern and southern portions of the Eddy Drop Zone alternative. These lakes may also be important as migratory stopovers.

Special Interest Management Areas

A large portion of the Eddy Drop Zone alternative lies within the Bison Special Interest Management Area, but the site is not frequently used by the bison herd and is not considered to be an important area (DuBois 2005). Impacts to bison would probably be minor, as these are not heavily used areas (Ajmi and Payne 2005). The construction footprint and maneuver area would not lie within crane or caribou special interest management areas.

Fish and Amphibians

The overall impact of construction and use of the BAX and CACTF on fish at Eddy Drop Zone alternative is considered minor.

Approximately 228 acres of ponds lie within the surface danger zone, but these ponds do not support fisheries. The waters of Jarvis Creek are glacially fed and flow from the north side of the Alaska Range to the Tanana River. Grayling migrate through Jarvis Creek to clear tributaries to spawn (Parker 2004), although these tributaries are not within the boundary of the Eddy Drop Zone alternative. Impacts to fish in the Jarvis Creek watershed are believed to be insignificant. Care would be taken to avoid erosion into Jarvis Creek (see Sections 3.2.1, *Soil Resources,* and 3.2.2, *Surface Water*).

Wood frogs are the only known amphibian in interior Alaska. Moderate impacts from Alternative 2 would result from disruption of habitat during construction or maneuvers. Higher function wetlands (i.e., ponds with margins of emergent vegetation) are high quality habitats for wood frogs. Overall, impacts to wood frog habitat would be minimized due to use of the environmental limitations overlays, which require avoidance of higher function wetlands. However, about 10 percent of DTA East's preferred wood frog habitat would be within the maneuver area. Impacts to wood frog habitat would be moderate.

4.2.6.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

Mammals

The overall impact of construction and use of the BAX and CACTF on mammals at Donnelly Drop Zone alternative is considered minor.

Portions of the Delta bison herd use a large portion of the Donnelly Drop Zone alternative in early spring and late summer as the main corridor between the Delta River and surrounding uplands. Construction of the BAX and CACTF would directly impact about 4 percent of high quality bison habitat, but alteration of vegetation may create additional bison habitat. Impacts to the Delta herd

by development and use of this site would be minimal and short-term. Any negative effects would only occur if bison were present during large intensive training events. Impacts to bison would be minor.

The Donnelly Drop Zone alternative, and all of DTA east, is a "high density area" for moose. Moose densities are estimated to be greater than four moose per square mile (USARAK 2004a). The construction footprint and maneuver area would impact about 3 percent of high quality moose habitat. At the Donnelly Drop Zone alternative, moose habitat could be enhanced by the addition of small arms ranges as such activities create and maintain early successional vegetation on firing ranges. Direct disturbance resulting from maneuver and firing use of the range would keep vegetation in early successional stages. This would benefit moose, which may be attracted to the vegetation within the range complex. Training activities would be limited or suspended if moose were in the firing lanes. However, takes of animals could occur as trees and shrubs can conceal their locations. Impacts to moose on DTA East could be potentially moderate if winter habitat is disturbed. Overall, impacts to moose would be minor.

Caribou from the Macomb and Delta herds have begun to use this area in recent years, but the area is not considered to be critical habitat (DuBois 2005). The construction footprint and maneuver area would impact about 5 percent of high quality caribou habitat on DTA East. Details of caribou use within the alternative and the importance of this area are unknown (DuBois 2005). Research on human disturbance to caribou is extensive compared to other wildlife species. The Delta caribou herd, which uses DTA, has been subjected to widespread disturbance for decades. Davis et al. (1985) indicated that the Delta caribou herd had become habituated to military training. However, Meier et al. (1998) demonstrated that low flying jets during late winter disrupted resting patterns of caribou and that caribou reaction to jet aircraft were greatest during post calving. The impacts of military infrastructure and training have a locally moderate impact on caribou on DTA East (USARAK 2004a). The impacts would continue to be moderate with the addition of the BAX/CACTF at the Donnelly Drop Zone alternative. However, this area is not considered to be critical caribou habitat.

Other priority mammal species such as black and brown bear, gray wolf, little brown bat, meadow jumping mouse, lynx and wolverine would lose between 3 percent and 5 percent of their preferred habitat on DTA East. The impacts to these ecosystem management priority mammal species would be minor (Table 4.2.6.d). Creation and maintenance of early successional habitats could be beneficial to species like snowshoe hares and their predators, including lynx and coyote. Conversely, as large mammals such as bison or moose are attracted to the vegetation within the range complex, training activities would be limited or suspended until animals are no longer present.

USARAK Range Regulation 350-2 (July 2002) requires units that discover wildlife on training ranges or in training areas while conducting live-fire exercises to immediately cease firing and report the location and number of animals to the Range Control office.

Birds

The overall impact of construction and use of the BAX and CACTF on birds at the Donnelly Drop Zone alternative is considered minor. The impacts to other ecosystem management priority bird species would be minor (Table 4.2.6.e).

The bird species likely to be most affected is sharp-tailed grouse, which prefer shrub habitats, open areas for breeding grounds, and regenerating areas previously burned by wildfire. Suitable habitat in this area is widespread. Grouse densities and the importance of the construction footprint and maneuver area to grouse are unknown. Development and use of the range during grouse breeding periods could disrupt breeding and be detrimental to local populations (Baydack and Hein 1987). However, it is possible that range development could also enhance portions of sharp-tailed grouse habitat, creating early successional habitat, though of lesser quality than habitat currently available. Impacts to sharp-tailed grouse would be moderate for the grouse population within DTA East.

This area is also within the territory of a golden eagle nest on Donnelly Dome (2.5 miles to the southwest) that is irregularly active. Golden eagle nesting territories are large, and it is believed construction and use of this range would not negatively impact this nest.

Special Interest Management Areas

Most of the Donnelly Drop Zone alternative lies within the Bison Special Interest Management Area. However the impacts to bison would probably be minor because these are not heavily used areas (Ajmi and Payne 2005; DuBois 2005).

Fish and Amphibians

The overall impact of construction and use of the BAX and CACTF on fish and amphibians at the Donnelly Drop Zone alternative is considered minor.

The surface danger zone portion of the alternative includes about 125 acres of ponds but these do not support fish populations. Jarvis Creek, as well as two intermittent streams, cross the Donnelly Drop Zone alternative. Jarvis Creek is an important migration route for grayling moving between spawning habitat in mountain steams to the south, and winter habitat, lower in the drainage. In addition to Butch Lake, only a few small lakes (smaller than two acres) are located on the far eastern edge of the maneuver area of the alternative. Impacts would be higher at this location alternative as Jarvis and Ober creeks bisect the proposed construction footprint and maneuver area. Several stream crossings or bridges would be utilized to access the portions of the range located east of Jarvis and Ober creeks. However, impacts to fish in the Jarvis Creek watershed are believed to be insignificant. Care would be taken to avoid erosion into Jarvis Creek and maintenance of riparian vegetation buffers would occur (see Sections 3.2.1, *Soil Resources*, and 3.2.2, *Surface Water*).

Severe impacts to wood frog habitat from Alternative 3 would result from disruption of habitat during construction or maneuvers, as Alternative 3 has a larger amount of preferred habitat (higher function wetlands), as compared to Alternative 2 (Eddy Drop Zone). Higher function wetlands (i.e., ponds with margins of emergent vegetation) are high quality habitats for wood frogs. Overall, impacts to wood frog habitat would be minimized due to use of the environmental limitations overlays, which require avoidance to higher function wetlands. However, about 10 percent of DTA East's preferred wood frog habitat would be within the maneuver area. Impacts to wood frog habitat would be severe.

4.2.6.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

Mammals

The overall impact of construction and use of the BAX and CACTF on mammals, excluding bison, at the North Texas Range alternative is considered moderate. Military training range operations could disturb bison and are expected to be severe without mitigation.

The North Texas Range alternative is within the traditional spring-summer range for the Delta Bison herd, and it is within core areas used by the bison herd (DuBois 2005). A majority of the bison (approximately 90 percent of the population) use areas along the Delta River within DTA from approximately mid-February to mid-August (Mason 2004). A particular area, which is considered important for late winter and spring/summer use by bison, is situated within the proposed construction and maneuver areas along the Delta River (DuBois 2005). An estimated 70 percent of the herd uses this area during late winter pre-calving (March and April) and during calving (April to June).

Bison forage plots have been planted along Meadows Road to try and entice the bison to stay within their traditional spring/summer range. These plots were created in 1988 to ensure that the bison had access to high quality forage during the spring/summer season. This helps keep the animals in good physical condition and prevents early crop depredation on the Delta Agricultural Project. Approximately 59 acres of these food plots would be within the maneuver area. Maintenance of these food plots would most likely not occur if the BAX were located at North Texas Range. However, additional plots would be established in alternate locations within their spring/summer range as mitigation. Relocation of food plots may not cause bison to relocate to another area.

Due to infrequent training and commitments to minimize training impacts on the herd, bison disturbance rates are currently low in this area. Construction and use of the BAX and CACTF at North Texas Range could result in changes in distribution of the Delta bison herd, and the bison could move to the agricultural projects earlier than the July-August time frame. This could lead to extensive economic damage (see Section 4.3.6, *Socioeconomics*). Herd disruption and loss of food plots and habitat could result in population-level impacts to bison. These impacts could also impact hunting opportunities (see Section 4.3.6, *Socioeconomics*).

Military training range operations could disturb bison and are expected to be severe without mitigation. The Delta bison herd provides important wildlife viewing opportunities and is extremely popular as a hunting resource. The ADF&G, the Delta Bison Working Group, and the Delta Junction Fish and Game Advisory Committee, as well as local farming and business interests, have expressed concern over displacement of bison from traditional summer range. As bison prematurely leave their summer range along the Delta River at DTA, crop depredation in the Delta Agriculture Project increases. Some bison have recently been staying longer in the Delta Agricultural Project than in previous years (DuBois 2005). Increased military training could cause bison to stop using DTA as their summer range and begin using the Delta Agricultural Project throughout the year. Hunting and wildlife viewing opportunities at DTA East would also be adversely impacted if bison are disturbed and affected at the population level.

Although the North Texas Range construction footprint and maneuver area would only impact about six percent of high quality bison habitat, the surrounding areas are very important for

the herd. However, bison habitat could be enhanced by the proposed action, as areas around construction sites (facilities and targets) would be planted and maintained in native grasses. This planting could be used as forage by bison and serve to increase the amount of time they spend within North Texas Range alternative. Conversely, if bison are attracted to the vegetation within the range complex, training activities would be limited or suspended until animals are no longer present.

USARAK is committed to ensuring that training activities do not cause significant adverse impacts to the bison herd or the State's bison herd management goals. The ADF&G has established a minimum disturbance period (mid-February to early September) for bison on that part of DTA that is west of the Richardson Highway. USARAK has agreed not to conduct activities or operations in or near bison habitat during this time period when bison are present to minimize adverse effects on bison (USARAK 1999a).

USARAK Range Regulation 350-2 (July 2002) does not allow firing on ranges when bison are present. This restriction would not be altered as a consequence of development and use of this site. Additionally, restrictions imposed by Army agreements with the state of Alaska for the protection of the Delta bison herd obligates the Army to refrain from engaging in training activities and operations when bison are present (USARAK 1999a). As designed, the BAX would orient weapons fire in the direction of the Delta River basin, the most likely area of bison use. As a consequence, the need to protect the bison herd has the potential to limit and disrupt training and firing operations at the range at any time bison are present (generally between mid-February and mid-August of each year).

The North Texas Range alternative is a high density area for moose. Moose use the area for calving, rutting and as winter habitat. This area provides important, year-round moose habitat (DuBois 2005). Moose numbers are estimated to be greater than four moose per square mile (USARAK 2004a). The construction footprint and maneuver area would impact about 2 percent of high quality moose habitat. At the North Texas Range alternative, moose habitat could be enhanced by the addition of small arms ranges as such activities create and maintain early successional vegetation on firing ranges. Direct disturbance resulting from maneuver and firing use of the range would keep vegetation in early successional stages. This would benefit moose, which may be attracted to the vegetation within the range complex. Training activities would be limited or suspended if moose were in the firing lanes. However, takes of animals could occur as trees and shrubs can conceal their locations. Impacts to moose on DTA East could be potentially moderate if winter habitat is disturbed. Overall, impacts to moose would be minor.

Nearly 11 percent of the higher quality caribou habitat on DTA East would be impacted at North Texas Range by the construction and operation of the BAX and CACTF. However, the area does not appear to be an important calving or feeding ground and caribou use is relatively low. The impacts of military infrastructure and training have a locally moderate impact on caribou on DTA East (USARAK 2004a). The impacts would continue to be moderate with the addition of the BAX/CACTF at the North Texas Range alternative. However, this area is not considered to be critical caribou habitat.

The North Texas Range alternative is used by grizzly bears, although the higher elevations to the south probably provide better denning areas. Effects of military maneuvers and training on grizzly bears have not been documented (USAF 1995; USARAK 1999a). About 4 percent of the preferred habitat would be disturbed by construction and maneuver activities. Grizzly bear

densities in the region average between 5 and 10 bears per 1,000 square miles (ADF&G 1998a). The BAX/CACTF would affect relatively few bears. Overall, there would be a minor impact to grizzly bears.

Although only 3 percent of high quality wolf habitat would be directly impacted by the proposed action, construction and training activities could affect the behavior and distribution of two wolf packs within the North Texas Range area (DuBois 2005). This area provides important wolf habitat. Wolves tend to avoid areas with high activity and road densities (Thurber 1994; Fuller et al. 1992). Locally the impacts could be moderate, but within GMU 20D or GMU 20A, the effect would be none to minor.

Impacts to other mammals, including meadow jumping mouse, little brown bat, black bear, lynx, and wolverines, would be minor. Between 2 percent and 5 percent of preferred habitat of these species would be affected by construction and use of the BAX and CACTF.

Birds

The overall impact of construction and use of the BAX and CACTF on birds at North Texas Range alternative is considered moderate.

Approximately 300,000 sandhill cranes, a large portion of the world's population, migrate through DTA from late-April through mid-May and again in August and September (Anderson et al. 2000). The region surrounding Delta Junction and DTA East is an important migratory stop over and is used for roosting and feeding. The North Texas Range alternative includes a small portion of the Sandhill Crane Special Interest Management Area. In addition, weapons fire is oriented in the direction of Delta River, putting the Sandhill Crane Special Interest Management Area within the surface danger zone. As a consequence, the presence of sandhill cranes along the Delta River floodplain would likely require Army units to stop all weapons fire whenever cranes are present. Activities at the BAX and CACTF could be curtailed at any point between late April and mid-May, and August through September.

Sandhill cranes use the floodplain of the Delta River as a feeding area and as a roosting area during fall migration. Approximately 12 percent of preferred crane habitat could be affected by development and use of the BAX/CACTF at the North Texas Range alternative. Some of the other wetlands within the construction footprint, maneuver area and surface danger zone are also used as roost sites. Development and use of North Texas Range alternative could be expected to degrade portions of foraging habitat over time. Roosts could be most affected by use of the range at night, but considering the limited time cranes are present, overall impacts to cranes would be moderate.

Sharp-tailed grouse are found in shrub habitats and regenerating burns in the North Texas Range area. The BAX/CACTF would impact about 4 percent of sharp-tailed preferred habitat. Grouse hunting is popular in this area and field observations indicate high numbers of grouse (Mason 2005; DuBois 2005. Development and use of a range during the grouse breeding periods could disrupt breeding and be detrimental to local populations (Baydack and Hein 1987). However, the project could create additional early succession and edge habitat. The impacts would be moderate on DTA East.

As trumpeter swan populations continue to increase, the lakes in the study area could be used for nesting, as was seen in 2003 and 2004. Nesting swans can acclimate to human presence and activities, as observed on the Copper River Delta (Mason 2004). The effects of military training on nesting have not been documented. Risks from disturbance during the nesting season can include nest abandonment, resulting in egg mortality or increased risk of predation (Henson and Grant 1991).

Approximately 10 percent of high quality trumpeter swan habitat would be impacted by the BAX and CACTF construction and maneuver areas at the North Texas Range. Although disturbance rates would increase, swan habitat would not frequently be adversely affected within the surface danger zones. Impacts to swans would be minor because DTA East does not include high swan populations.

This area is also within the territory of a golden eagle nest on Donnelly Dome (five miles to the south east) that is active irregularly. Golden eagle nesting territories are large, and it is believed construction and use of this range would not negatively impact this nest.

Waterfowl are common on the many lakes in this area. USARAK maintains duck nest boxes on four lakes within the maneuver area. Few studies have addressed the effects of ground-based military training on waterfowl. A study in Maryland demonstrated that black ducks habituated to noise from low flying jet aircraft but wood ducks did not habituate, suggesting that the responses to disturbance may be species-specific (Conomy et al. 1998). Additional research suggests that low flying aircraft over concentrated breeding or staging areas could affect waterfowl and result in increased stress and lower reproductive success (USAF 1995). In 2003, there were several sightings of one or more great gray owls in the area, and a pair was believed to be nesting in the area. The effect of disturbance on great gray owls is unknown. There are no known significant effects on documented populations of other birds at this site, and the overall impact would be minor.

Special Interest Management Areas

Much of the North Texas Range alternative lies within the Bison Special Interest Management Area. The construction footprint and maneuver area would affect important portions of the Bison Special Interest Management Area. The impacts to bison would be severe because these are heavily used calving and feeding areas (Ajmi and Payne 2005).

In addition, a portion of the North Texas Range alternative would be within the Sandhill Crane Special Interest Management Area.

Fish and Amphibians

The overall impact of construction and use of the BAX and CACTF on fish and amphibians at the North Texas Range alternative is considered moderate.

The multiple kettle lakes in and around the North Texas Range alternative support important local fisheries. Fourteen stocked lakes are located along Meadows and Windy Ridge roads. Big Lake and Lone Star Lake are used by ADF&G as rearing nurseries for rainbow trout as they are too shallow for stocking. If all access were limited, ADF&G would discontinue stocking these lakes,

creating increased pressure on nearby native fisheries and other stocked lakes within the area. This would be a severe impact.

Severe impacts to wood frog habitat from Alternative 4 would result from disruption of habitat during construction or maneuvers, as Alternative 4 has a larger amount of preferred habitat (higher function wetlands), as compared to Alternative 2 (Eddy Drop Zone). Higher function wetlands (i.e., ponds with margins of emergent vegetation) are high quality habitats for wood frogs. Overall, impacts to wood frog habitat would be minimized due to use of the environmental limitations overlays, which require avoidance of higher function wetlands. However, about 10 percent of DTA East's preferred wood frog habitat would be within the maneuver area. Impacts to wood frog habitat would be severe.

4.2.6.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

Mammals

Overall impacts from construction of the BAX at North Texas Range and the CACTF at Eddy Drop Zone would be moderate.

The construction of the range and use of the maneuver area would directly impact about 5 percent of bison preferred habitat on DTA East. In addition, the proposed BAX location at North Texas Range would include approximately 59 acres of bison food plots within the construction footprint and maneuver area (see Section 4.2.6.2.6). Maintenance of these food plots would most likely not occur, but new ones would be created if the BAX were located at North Texas Range. As with Alternative 4 (Section 4.2.6.2.6), impacts to bison would be severe due to the construction and training at the BAX altering the distribution of bison, possibly resulting in increased crop depredation at the Delta Agricultural Project. The potential impacts to population productivity are also a concern (DuBois 2005). Development of the CACTF at Eddy Drop Zone would not impact bison.

Approximately 5 percent of preferred moose habitat would be impacted by development of the range. The alternative is within a moose high density area where populations exceed four animals per square mile (USARAK 2004a). Moose habitat could be enhanced by the addition of small arms ranges as such activities create and maintain early successional vegetation on firing ranges. Direct disturbance resulting from maneuver and firing use of the range would keep vegetation in early successional stages. This would benefit moose, which may be attracted to the vegetation within the range complex. Training activities would be limited or suspended if moose were in the firing lanes. However, takes of animals could occur as trees and shrubs can conceal their locations. Impacts to moose on DTA East could be potentially moderate if winter habitat is disturbed. Overall, impacts to moose would be minor.

Nearly 11 percent of the potential caribou habitat on DTA East would be impacted at North Texas Range by the construction and operation of the BAX. However, the area does not appear to be an important calving or feeding ground and caribou use is relatively low. The impacts of military infrastructure and training have a locally moderate impact on caribou on DTA East (USARAK 2004a). The impacts would continue to be moderate with the addition of the BAX/CACTF at the North Texas Range alternative. However, this area is not considered to be critical caribou habitat.

Less than 1 percent of preferred wolf habitat would be directly impacted by Alternative 5, but the North Texas BAX site would be within important wolf habitat. The project could result in decreased use within the construction footprint and maneuver area, but it would not affect the animals at a population level. Impacts would be minor.

Development and use of the BAX at North Texas Range and the CACTF at Eddy Drop Zone could have a minor impact to other mammals, including the little brown bat, meadow jumping mouse, lynx, and wolverines. Between 4 percent and 5 percent of preferred habitat of these species would be affected by construction and use of the BAX and CACTF. Some individuals or local populations would be affected, but the overall population would not be negatively impacted. The impacts for priority mammal species are described in Table 4.2.6.d.

Birds

The construction footprint and maneuver area would only affect a fraction of high quality habitat of the great gray owl (1 percent) and boreal owl (3 percent). The impact to local great gray owl and boreal owl populations would be minor. Similarly, about 3 percent of the high quality habitat of the olive-sided flycatcher would be impacted by construction footprint and maneuver area. This could result in a moderate impact to local populations of olive-sided flycatchers. Approximately 10 percent of high quality trumpeter swan habitat would be impacted by the construction and maneuver areas at the North Texas Range BAX. Although disturbance rates would increase, swan habitat would not be adversely affected within the surface danger zones. Impacts to swans would be minor because DTA East does not include high swan populations.

Approximately 10 percent of preferred sandhill crane habitat could be affected by development and use of the BAX/CACTF at the North Texas Range alternative. Impacts to cranes would be minor.

Both Eddy Drop Zone (CACTF) and North Texas Range (BAX) alternative areas include important sharp-tailed grouse habitat. About 3.5 percent of preferred habitat would be impacted by construction footprint and maneuver area. Impacts to these birds would be moderate because of the importance of the nearby breeding areas and habitat.

A summary of impacts for other priority bird species is presented in Table 4.2.6.e.

Special Interest Management Areas

Most of the BAX construction footprint and maneuver area are within the Bison Special Interest Management Area. A portion of the Sandhill Crane Special Interest Management Area would be within the BAX construction footprint and maneuver area.

Fish and Amphibians

The overall impact of construction and use of the BAX and CACTF on fish and amphibians at the North Texas Range-Eddy Drop Zone alternative would be moderate.

The multiple kettle lakes in and around the North Texas Range alternative are important local fisheries resources. Fourteen stocked lakes are stocked along Meadows and Windy Ridge roads. Big Lake is used by ADF&G as a rearing nursery for rainbow trout as it is too shallow for

stocking. If all access were limited, ADF&G would discontinue stocking these lakes, which would create increased pressure on nearby native fisheries and other stocked lake systems within the area. This would be a severe impact.

Minor impacts from Alternative 5 would result from disruption of habitat during construction or maneuvers as the amount of preferred habitat within this area is small. Higher function wetlands (i.e., ponds with margins of emergent vegetation) are high quality habitats for wood frogs. Overall, impacts to wood frog habitat would be minimized due to use of the environmental limitations overlays, which require avoidance to higher function wetlands. However, about 10 percent of DTA East's preferred wood frog habitat would be within the maneuver area.

4.2.6.2 Mitigation

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts to wildlife and fisheries. The appendix states how the offered mitigation would serve to eliminate or lessen foreseen adverse impacts, and offers an assessment of the potential success of the mitigation to lessen the potential impacts. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

4.2.6.2.1 Existing Mitigation

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts.

Wildlife

- Continued implementation of INRMPs. These contain specific actions to inventory, maintain, and improve wildlife habitat.
- Continued monitoring of effects of military training on select wildlife species (especially herd animals and waterfowl) during vital seasons such as breeding, rearing of young, and migration. This knowledge would be used to develop and implement management strategies that minimize disturbance to priority wildlife. This would allow natural resources and range managers to coordinate training schedules to minimize impacts on wildlife populations.
- Continue annual moose, bison, and caribou surveys in partnership with ADF&D and swan surveys with the USFWS.
- Continued implementation of USARAK natural resources conservation programs, including INRMPs and ecosystem management. This would improve management of wildlife resources.
- Continued development and implementation of an information and education program for personnel using USARAK lands. This program would emphasize conservation of wildlife and natural resources as well as reduction of wildlife disturbance and negative wildlife-human interactions (e.g., bear or moose attacks). This would enhance the conservation of wildlife resources on USARAK lands.
- Continued compliance with USARAK Range Regulation 350-2 (July 2002) which requires units that discover wildlife on training ranges or in training areas while conducting live-fire exercises to immediately cease firing and report the location and number of animals to the Range Control office.

- USARAK has agreed not to conduct activities or operations in or near bison habitat during mid-February to early September when bison are present to minimize adverse effects on bison (USARAK 1999a).
- Continued compliance with federal and state laws and regulations relating to fish and wildlife conservation or management.
- Continue to maintain existing bison food plots at DTA East.

Fisheries

- Continued implementation of INRMPs. These contain specific actions to inventory, maintain, and improve fisheries resources.
- Full implementation of natural resources conservation programs, INRMPs, and ecosystem management. This would improve management of fisheries resources.
- Continued development and implementation of an information and education program for personnel using USARAK lands. This would enhance the conservation of fisheries resources on USARAK lands.

4.2.6.2.2 Proposed Mitigation

The following mitigation measures are essential in addressing impacts associated with the proposed action. Mitigation can be achieved through different combinations of the measures noted below.

Wildlife

- Develop monitoring and adaptive management strategies for species that would be moderately or severely impacted by the selected alternative.
- Replace and maintain a minimum of 50 acres of bison food plots on DTA East if Alternative 4 or 5 is selected.
- Increase bison monitoring surveys between the months of April and September in partnership with ADF&G.
- Conduct bison habitat studies.
- Conduct prescribed burning on DTA East to improve or maintain habitat.
- Provide additional radio collars for systematic radio-telemetry surveys of bison.
- Conduct trumpeter swan brood surveys in DTA West if Alternative 4 or 5 is selected.
- Determine placement of access gates along Meadows Road and Windy Ridge Road, 12-Mile Crossing and 33-Mile Loop Road to allow for maximum continued recreational use and maximum public safety.
- Allow all other recreational activities outside of the construction footprint and maneuver area per current USAG-AK management policies.
- Consider placing bison food plots within DTA West (west side of Delta River) excluding existing dedicated impact areas if Alternative 4 or 5 is selected as a means of altering bison calving and summer grazing locations.
- Consider fertilization of the Delta River floodplain to encourage growth of vegetation for bison forage if Alternative 4 or 5 is selected.
- Consider establishing additional bison food plots along 33-Mile Loop Road and Butch Lake area if Alternative 4 or 5 is selected.
- Consider prescribed burn at DTA West (west site of Delta River) near Buffalo Dome to increase bison forage area.
- Conduct crane surveys during spring and fall migration periods.

Fisheries

- Determine the placement of access gates along Meadows Road and Windy Ridge Road to allow for maximum continued recreational use and maximum public safety to allow ADF&G access to stocked lakes and regulated hunting areas.
- Maintain access to all 14 stocked lakes.
- Allow all other recreational activities outside of the construction footprint and maneuver area per current USAG-AK management policies.
- Conduct baseline fish surveys in Ober Creek.
- Support additional baseline fish surveys in Jarvis Creek and the Delta River.

4.2.7 Cultural Resources

Issue 8: Cultural resources impacts. The impact of construction and operation of the BAX and CACTF to cultural, historical, and grave sites was identified as a concern during tribal consultations.

This section analyzes and compares the cultural resource impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.2.7.

Cultural resources on USARAK properties are inclusive of historic structures, archaeological (both prehistoric and historic) sites, and traditional cultural properties (TCPs). Cultural resources are found on almost all Army lands.

4.2.7.1 Comparison of Alternatives

4.2.7.1.1 Description of Methodology

Analysis of potential cultural resource impacts is based on the nature of proposed activities and their potential to affect cultural resources. The inherent nature of cultural resources makes any impact potentially irreversible and the data that is lost irretrievable. The relative severity of impacts has been defined based on the probability of disturbance to sites considered eligible for listing on the National Register of Historic Places (NRHP) and those sites identified but yet to be evaluated for eligibility for listing on the NRHP. Sites not eligible for listing on the NRHP were not considered in the analysis as they did not provide any additional cultural resource information or all available data has been extracted or recorded from that location. The following categories will be used in assessing potential impacts resulting from construction of the range, vehicle maneuver during training activities, and munitions training within the surface danger zone. Different definitions were assigned to each activity area (construction footprint, maneuver area, and surface danger zone) as the severity of impact from the different activities conducted within each area is unique. Percentage levels of impacts were determined from professional evaluations and assessments.

- None – No measurable adverse impacts on cultural resources are expected from this action.
- Minor – Less than 2 percent of the total sites located within DTA East would be impacted during construction; less than 5 percent of the total sites located within DTA East would be impacted during maneuver activities; or less than 7 percent of the total sites located

within DTA East would be impacted during munitions training within the surface danger zone.

- Moderate – Between 2-5 percent of the total sites located within DTA East would be impacted during construction; between 5-10 percent of the total sites located within DTA East would be impacted during maneuver activities; or between 7-15 percent of the total sites located within DTA East would be impacted during munitions training within the surface danger zone.
- Severe – More than 5 percent of the total sites located within DTA East would be impacted during construction; more than 10 percent of the total sites located within DTA East would be impacted during maneuver activities; or more than 15 percent of the total sites located within DTA East would be impacted during munitions training within the surface danger zone.
- Beneficial – Impacts are expected to support, upgrade, or further protect cultural resources.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant in this analysis. The next category (severe) is considered significant. Mitigation measures have been developed to offset adverse impacts. Existing and proposed mitigation for impacts to cultural resources is presented in Section 4.2.7.2, *Mitigation*.

A quantitative summary of impacts to cultural resources is presented in Table 4.2.7.a.

Table 4.2.7.a Quantitative Summary of Impacts to Cultural Resources.

Alternatives/Footprints	Parameter				
	Area	Surveyed Area (acres)	Sites Determined Eligible for NRHP	Sites Determined Not Eligible	Sites Not Evaluated
Eddy Drop Zone – BAX					
Construction Footprint	254	250	1	2	0
Maneuver Area	2,872	2,872	0	2	0
Surface Danger Zone	23,741	21,355	24	16	81
Eddy Drop Zone – CACTF					
Construction Footprint	96	96	0	0	0
Maneuver Area	1,184	1,162	0	0	0
Surface Danger Zone	1,123	1,030	0	0	0
Donnelly Drop Zone – BAX					
Construction Footprint	508	277	0	1	0
Maneuver Area	3,413	1,508	0	0	0
Surface Danger Zone	19,313	13,433	16	14	71
Donnelly Drop Zone – CACTF					
Construction Footprint	44	27	0	0	0
Maneuver Area	694	430	0	0	0
Surface Danger Zone	871	548	0	0	0

Alternatives/Footprints	Parameter				
	Area	**Surveyed Area (acres)**	**Sites Determined Eligible for NRHP**	**Sites Determined Not Eligible**	**Sites Not Evaluated**
North Texas Range – BAX					
Construction Footprint	552	552	1	3	0
Maneuver Area	2,548	2,548	3	8	0
Surface Danger Zone	22,041	3,990	6	8	0
North Texas Range – CACTF					
Construction Footprint	105	105	0	1	0
Maneuver Area	771	771	1	4	0
Surface Danger Zone	1,318	1,318	0	0	0
North Texas Range and Eddy Drop Zone Combination					
Construction Footprint – NTR BAX	727	727	0	2	0
Construction Footprint – EDZ CACTF	96	96	0	0	0
Maneuver Area – NTR BAX	4,081	3,959	5	13	0
Maneuver Area – EDZ CACTF	1,184	1,162	0	0	0
Surface Danger Zone – NTR BAX	23,741	4,997	4	2	1
Surface Danger Zone – EDZ CACTF	1,123	1,030	0	0	0

Table 4.2.7.b presents a summary of environmental consequences associated with each alternative.

Table 4.2.7.b Summary of Environmental Consequences to Cultural Resources.

Alternatives/ Footprints	Resource Issues		
	Historic Structures	**Prehistoric Archaeological Sites**	**Traditional Cultural Properties/ Grave Sites**
Alternative 1: No Action			
Impact within DTA East (104,601 acres)	No impacts have been identified	Impacts resulting from ongoing vehicular off-road traffic, live-fire munitions, and other training activities	No TCPs have been identified: Consultations indicate probability of presence is undetermined
Alternative 2: Eddy Drop Zone			
Construction Footprint *Impact*	No historic properties were identified *None*	No sites were identified *None*	No TCPs have been identified: Consultations indicate probability of presence is undetermined *Unknown*
Maneuver Area *Impact*	No historic properties were identified *None*	Vehicle traffic could disturb unprotected sites; Less than 5% of total sites within DTA East impacted *Minor*	No TCPs have been identified: Consultations indicate probability of presence is undetermined *Unknown*
Surface Danger Zone *Impact*	No historic properties were identified *None*	Sites on south slopes, buffered from direct line of fire; Potential to impact more than 15% of total sites within DTA East *Severe*	No TCPs have been identified: Consultations indicate probability of presence is undetermined *Unknown*

Alternatives/ Footprints	Resource Issues		
	Historic Structures	**Prehistoric Archaeological Sites**	**Traditional Cultural Properties/ Grave Sites**
Alternative 3: Donnelly Drop Zone			
Construction Footprint *Impact*	No historic properties were identified *None*	No sites were identified *None*	No TCPs surveys have been completed: Consultations indicate probability of presence is undetermined *Unknown*
Maneuver Area *Impact*	No historic properties were identified *None*	Vehicle traffic could disturb unprotected sites; Potential to impact 5-10% of total sites within DTA East *Moderate*	No TCPs surveys have been completed: Consultations indicate probability of presence is undetermined *Unknown*
Surface Danger Zone *Impact*	No historic properties were identified *None*	Sites on south slopes, not buffered from direct line of fire; Potential to impact more than 15% of total sites within DTA East *Severe*	No TCPs surveys have been completed: Consultations indicate probability of presence is undetermined *Unknown*
Alternative 4: North Texas Range			
Construction Footprint *Impact*	No historic properties were identified *None*	Sites avoided or mitigated; Less than 2% of total sites within DTA East impacted *Minor*	No TCPs surveys have been completed: Consultations indicate probability of presence is undetermined *Unknown*
Maneuver Area *Impact*	No historic properties were identified *None*	Vehicle traffic could disturb unprotected sites; Less than 5% of total sites within DTA East impacted *Minor*	No TCPs surveys have been completed: Consultations indicate probability of presence is undetermined *Unknown*
Surface Danger Zone *Impact*	No historic properties were identified *None*	Unknown existing environment; Probably that less than 7% of total sites within DTA East impacted *Minor*	No TCPs surveys have been completed: Consultations indicate probability of presence is undetermined *Unknown*
Alternative 5: North Texas Range/Eddy Drop Zone Combination			
Construction Footprint (NTR BAX) *Impact*	No historic properties were identified *None*	Sites avoided or mitigated; Less than 2% of total sites within DTA East impacted *Minor*	No TCPs surveys have been completed: Consultations indicate probability of presence is undetermined *Unknown*
Construction Footprint (EDZ CACTF) *Impact*	No historic properties were identified *None*	No sites were identified *None*	No TCPs surveys have been completed: Consultations indicate probability of presence is undetermined *Unknown*
Maneuver Area (NTR BAX) *Impact*	No historic properties were identified *None*	Vehicle traffic could disturb unprotected sites; Less than 5% of total sites within DTA East impacted *Minor*	No TCPs surveys have been completed: Consultations indicate probability of presence is undetermined *Unknown*
Maneuver Area (EDZ CACTF) *Impact*	No historic properties were identified *None*	No sites were identified *None*	No TCPs surveys have been completed: Consultations indicate probability of presence is undetermined *Unknown*
Surface Danger Zone (NTR BAX) *Impact*	No historic properties were identified *None*	Unknown existing environment; Probably that less than 7% of total sites within DTA East impacted *Minor*	No TCPs surveys have been completed: Consultations indicate probability of presence is undetermined *Unknown*
Surface Danger Zone (EDZ CACTF) *Impact*	No historic properties were identified *None*	No sites were identified *None*	No TCPs surveys have been completed: Consultations indicate probability of presence is undetermined *Unknown*

4.2.7.1.2 Impacts Common to All Alternatives

The primary impacts to cultural resources would involve a number of factors, including (but not limited to) ground disturbance at identified archaeological sites or restricted access to known sacred sites. Archaeological surveys, conducted in 2002, 2003, 2004 and 2005, have identified a large number of sites near kettle lakes located to the east and west of the Richardson Highway on DTA East. Certain localities in these same areas may also be identified as TCPs.

Military and non-military activities on USARAK lands can affect cultural resources in a number of ways. USARAK acts as a steward for cultural resources on its properties and is responsible for the management for both military and non-military activities that affect cultural resources on Army lands. Some of the ways in which impacts can occur are:

- Placement of new buildings adjacent to or in historic districts that are unsympathetic to the historic characteristics that make that district eligible for listing in the NRHP.
- Demolition of a building that is eligible for listing in or that is already listed in the NRHP.
- Renovation of historic buildings in a manner that changes the historic characteristics that make it eligible for listing in the NRHP.
- Use of a historic building in a manner that endangers the historic characteristics that make it eligible for listing in the NRHP.
- Destruction of archaeological sites eligible for listing in or already listed in the NRHP through activities that cause ground disturbance.
- Damage to archaeological sites eligible for listing in or already listed in the NRHP through activities that cause ground disturbance.
- Removal of artifacts from sites that are eligible for listing in or that are listed in the NRHP.
- Unsympathetic use or destruction of properties that are considered to have traditional, religious, and/or cultural significance to Alaska Native tribes.
- Opening of archaeologically sensitive areas through development of trails or roads, thus providing greater accessibility to activities that may cause ground disturbances.

Adverse impacts would result from construction of the range, maneuver of vehicles during training operations, and the firing of weapons and surface impacts associated munitions within the construction footprint and maneuver area and the surface danger zone. All of these activities would compromise the integrity of surface or subsurface archaeological sites located within the range construction footprint and maneuver area through the destruction or displacement of artifacts, features, and site boundaries. However, these sites can be avoided or mitigated to lessen the overall impact (see Section 4.2.7.2, *Mitigation*).

All site preparation activities associated with construction of the range complex, such as earthmoving, construction of foundations, hardening of roads, etc., would create severe impacts to individual surface and subsurface archaeological sites. Sites located directly within the construction footprint have a high certainty of impact.

Off-road vehicle maneuvers within the range construction footprint and maneuver area would adversely impact both surface and subsurface archaeological sites. A single pass of a vehicle over a surface site would cause adverse impacts, but may not adversely impact a subsurface site. Subsurface sites would be impacted when vehicles become stuck, create ruts or repeatedly pass over a single area. Heavier vehicles have a greater likelihood of impacting subsurface sites.

Both surface and subsurface sites would be adversely affected by the surface impact of a fired munition. The degree of impact to archaeological sites within the surface danger zone would vary with the size and type of munition. Disturbance to subsurface sites would be more likely with the use of larger sized munitions, as they create a larger impact crater. The certainty of disturbance to archaeological sites located behind or near target areas is greater than those not located near a target.

4.2.7.1.3 Impacts Attributed to Alternative 1 (No Action)

Potential impacts under the No Action Alternative must incorporate Army transformation activities at USARAK. The ROD on the transformation of USARAK was signed on May 27, 2004. Full transformation of USARAK was selected as the preferred alternative. The overall impact of transformation on cultural resources at DTA was determined to be moderate (USARAK 2004a).

Increased training activities associated with Army transformation would have a high potential to adversely affect cultural resources at DTA. Increased training could expose additional areas that contain archaeological sites to potential impacts. Many areas, including those appropriate for training activities, also have a high probability of containing archaeological sites. Maneuver impacts to cultural resources are expected to be most severe at DTA. The combination of vehicular off-road traffic, live-fire munitions, training facilities and other activities associated with SBCT training activities could impact archaeological sites. This is expected to be a moderate impact (impacts are possible and may have measurable or irreversible and irretrievable impacts on cultural resources) to prehistoric cultural resources due to risk of disturbance. No impacts would occur to historic period resources (USARAK 2004a).

USARAK would meet its obligations under Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended, Public Law 89-665, 16 USC 270 et seq.) upon selection of a preferred alternative. Additional Section 106 consultations with the Alaska State Historic Preservation Office would occur as undertakings relating to construction and use of the BAX and CACTF are defined. Further consultations with Alaska Native tribes would occur as well.

4.2.7.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

Surveys have been completed within all of the Eddy Drop Zone alternative (Appendix, Figure 4.j). Determinations of Eligibility (DOE) have been completed for all sites that have been determined to be potentially impacted by construction and use of the BAX and CACTF at this location. In addition, all sites within the surface danger zone that have a high probability of impact from munitions within the line of sight from proposed firing points have been evaluated. Sites within these high probability impact areas are not protected by topographic features (i.e., archaeological sites are located on northern portions of hills), which would block ammunition fired from weapons on the range. Sites that were determined to have no potential for impact (i.e., those archaeological sites located on southern portions of hills) have not been evaluated.

No eligible sites or sites that have yet to be evaluated for eligibility for listing on the NRHP are located within the construction footprint portion of the BAX at Eddy Drop Zone. One eligible site is located within the Eddy Drop Zone BAX maneuver area. Operation of vehicles within the maneuver area and their potential to impact cultural resources constitutes a minor impact (less

than 1 percent of the total sites within DTA East) within the BAX maneuver area at Eddy Drop Zone.

There are 105 sites that are eligible or that have yet to be evaluated for eligibility for listing on the NRHP within the Eddy Drop Zone BAX surface danger zone area. This is a relatively large number of sites when compared to other areas of DTA East. This large number of sites increases the probability of rounds making contact with a site within the surface danger zone. However, the likelihood of a munition not engaging a target (located within the maneuver area) and landing within the surface danger zone is very low. Damage to all archaeological sites due to munitions training within the surface danger zone would be severe and would represent the worst case scenario.

No eligible sites or sites that have yet to be evaluated for eligibility for listing on the NRHP are located within the construction, maneuver, or surface danger zone areas of the CACTF at Eddy Drop Zone. No impacts to cultural resources are expected.

No historic properties were identified at the proposed BAX or CACTF site. Thus, no impacts to cultural resources are expected.

A comprehensive survey for the presence of TCPs at DTA has not been completed. It is expected that TCPs would be identified on DTA and would consist of sites and landmarks that have traditional, cultural and religious significance to tribes. The likelihood of TCPs within the proposed alternative sites is unknown. Tribal members have not yet determined the probability of TCPs occurring specifically within the alternative study areas during consultations with tribes. Consultations with Alaska Native tribes to identify and evaluate TCPs that may be present on military managed lands in the interior of Alaska would continue under this alternative.

4.2.7.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

Surveys have been completed on over 65 percent of the Donnelly Drop Zone alternative (Appendix, Figure 4.j). Surveys would be completed if this site is chosen as the preferred alternative within the ROD. DOEs would be completed for all sites that have been determined to be potentially impacted by construction and use of the BAX and CACTF if this alternative is chosen as the preferred alternative within the ROD. In addition, all sites within the surface danger zone that have a high probability of impact from munitions within the line-of-sight from proposed firing points would be evaluated. Sites within these high probability areas are not protected by topographic features (i.e., archaeological sites are located on southern portions of hills) which would block ammunition fired from weapons on the range. Sites that were determined to have no potential for impact (i.e., those archaeological sites located on southern portions of hills) would not be evaluated.

No eligible sites or sites that have yet to be evaluated for eligibility for listing on the NRHP are located within the construction footprint portion of the BAX at Donnelly Drop Zone. More than half of the Donnelly Drop Zone BAX maneuver area has not been surveyed. However, it is anticipated that a large number of sites would be present within the unsurveyed area. The anticipated sites would likely be located along the moraines east of Jarvis Creek. A high concentration of sites along this same moraine feature were located during surveys within the Eddy Drop Zone alternative. Impacts associated with vehicular maneuver within the BAX

maneuver area at Donnelly Drop Zone is predicted to be moderate with the assumption that 5-10 percent of the total sites located within DTA East would be impacted during maneuver activities.

There are 87 sites that are eligible or have yet to be evaluated for eligibility with the Donnelly Drop Zone BAX surface danger zone area. This large number of sites increases the probability of rounds making contact with a site within the surface danger zone. However, the likelihood of a munition not engaging a target (located within the maneuver area) and landing within the surface danger zone is very low. Damage to all archaeological sites due to munitions training within the surface danger zone would be severe and would represent the worst case scenario.

No eligible sites or sites yet to be evaluated for eligibility for listing on the NRHP are located within the construction, maneuver, or surface danger zone areas of the CACTF at Donnelly Drop Zone. No impacts to cultural resources are expected. However, approximately 10 percent of the Donnelly Drop Zone CACTF construction footprint and maneuver area has not been surveyed. Sites could be found within the southwest portion of this unsurveyed area. Surveys and DOEs would be completed if this site is chosen as the preferred alternative within the ROD.

The Donnelly Flats MIDAS site is located in and to the south of the Donnelly Drop Zone alternative. Due to past demolitions at the site, the property is not eligible for inclusion in the NRHP. No other potential architectural resources have been reported in other field surveys within in the alternative. No impacts to cultural resources are expected.

A comprehensive survey for the presence of TCPs at DTA has not been completed. It is expected that TCPs would be identified on DTA and would consist of sites and landmarks that have traditional, cultural and religious significance to tribes. The likelihood of TCPs within the proposed alternative sites is unknown. Tribal members have not yet determined the probability of TCPs occurring specifically within the alternative study areas during consultations with tribes. Consultations with Alaska Native tribes to identify and evaluate TCPs that may be present on military managed lands in the interior of Alaska would continue under this alternative.

4.2.7.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

Surveys have been completed within the construction footprint and maneuver area of the North Texas Range study area (Appendix, Figure 4.j). Approximately 18 percent of the BAX surface danger zone at North Texas Range was surveyed. Cultural resource surveys were not conducted within those portions of the proposed surface danger zone boundary that fell within existing impact areas for safety reasons. The majority of the proposed surface danger zone at North Texas Range would be located within an existing dudded impact area. DOEs have been completed for all sites that have been determined to be potentially impacted by construction and use of the BAX and CACTF.

There are a total of 10 sites that are eligible within the North Texas Range BAX construction, maneuver and surface danger zone study areas. This is a lower number when compared to other areas of DTA East. Impacts would be minor within the construction footprint (less than 2 percent of the total sites within DTA East would be impacted). Impacts would also be minor within the maneuver area and surface danger zone as less than 5 percent and less than 7 percent of the total sites within DTA East would be impacted, respectively.

One site is eligible within the surveyed portion of North Texas Range CACTF maneuver area. This is a lower number when compared to other areas of DTA East. Impacts would be minor in the surface danger zone (less than 7 percent of the total sites within DTA East would be impacted). No eligible or unevaluated sites are located within the construction footprint or surface danger zone CACTF of the North Texas Range study area.

No historic properties were identified at the proposed BAX or CACTF site. Thus no cultural resource impacts are expected.

A comprehensive survey for the presence of TCPs at DTA has not been completed. It is expected that TCPs would be identified on DTA and would consist of sites and landmarks that have traditional, cultural and religious significance to tribes. The likelihood of TCPs within the proposed alternative sites is unknown. Tribal members have not yet determined the probability of TCPs occurring specifically within the alternative study areas during consultations with tribes. Consultations with Alaska Native tribes to identify and evaluate TCPs that may be present on military managed lands in the interior of Alaska would continue under this alternative.

4.2.7.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

Surveys have been completed within the construction footprint and maneuver area and a portion of the surface danger zone at the North Texas Range study area under Alternative 5. The BAX construction footprint, maneuver area and surface danger zone under this alternative differ from the BAX layout proposed under Alternative 4. Approximately 21 percent of the surface danger zone under this alternative was surveyed. Cultural resource surveys were not conducted within those portions of the proposed surface danger zone boundary that fell within existing impact areas for safety reasons. The majority of the proposed surface danger zone would be located within an existing dudded impact area. A DOE has not been completed for one site that has been determined to be potentially impacted by construction and use of the BAX.

There are a total of 10 sites that are eligible or have yet to be evaluated for eligibility within the North Texas Range BAX construction, maneuver and surface danger zone study areas. This is a lower number when compared to other areas of DTA East. Impacts would be minor within the construction footprint (less than 2 percent of the total sites within DTA East would be impacted). Impacts would also be minor within the maneuver area and surface danger zone as less than 5 percent and less than 7 percent of the total sites within DTA East would be impacted, respectively.

Surveys have been completed within all of the CACTF area of the Eddy Drop Zone study area. No eligible sites or sites that have yet to be evaluated for eligibility for listing on the NRHP are located within the construction, maneuver, or surface danger zone areas of the CACTF at Eddy Drop Zone. No impacts to cultural resources are expected.

No historic properties were identified at the proposed BAX or CACTF site. Thus no impacts to cultural resources are expected.

A comprehensive survey for the presence of TCPs at DTA has not been completed. It is expected that TCPs would be identified on DTA and would consist of sites and landmarks that have traditional, cultural and religious significance to tribes. The likelihood of TCPs within the proposed alternative sites is unknown. Tribal members have not yet determined the probability

of TCPs occurring specifically within the alternative study areas during consultations with tribes. Consultations with Alaska Native tribes to identify and evaluate TCPs that may be present on military managed lands in the interior of Alaska would continue under this alternative.

4.2.7.2 Mitigation

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts to cultural resources. The appendix states how the offered mitigation would serve to eliminate or lessen the foreseen impact and offers an assessment of the potential success of the mitigation. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

4.2.7.2.1 Existing Mitigation

The following existing mitigation measures are continually revised and reviewed to respond to new or increasing impacts to cultural resources.

- Development and implementation of the Historic Properties Component of the Integrated Cultural Resources Management Plan, to comply with Army Alternate Procedures to 36 CFR Part 800.
- Continued development and implementation of an information and education program for personnel using USARAK lands and the public. This would enhance the conservation of cultural resources on USARAK lands.
- Continued evaluation for eligibility for inclusion in the NRHP of archaeological sites potentially impacted by placing ranges in use.
- Initiate and continue consultations with Alaska Native tribes to identify and evaluate TCPs that may be present on military managed lands in the interior of Alaska.
- Continued consultations with Alaska Native tribes on cultural resource management issues.

4.2.7.2.2 Proposed Mitigation

The following mitigation measures are essential in addressing impacts associated with the proposed action. Mitigation can be achieved through different combinations of the measures noted below.

- Conduct a comprehensive survey for the presence of TCPs at DTA to properly locate the sites and landmarks that have traditional, cultural and religious significance to tribes. Survey should include an oral history component in cooperation with Alaska Native tribes. Tribes that could assist with this project due to their expertise on the subject would include Tanacross, Northway, Healy Lake, and possibly Tetlin and Dot Lake.
- Avoid cultural sites during maneuver, where practicable, using existing environmental limitations overlays which would indicate sensitive areas to be avoided, derived from on-the-ground surveys.
- Avoid cultural sites eligible for listing in the NRHP by adjusting range design and location.
- Avoid cultural sites eligible for listing in the NRHP during construction by monitoring the building site and workers to prevent disturbance by construction equipment, providing construction contractors with maps indicating specific areas to avoid, and demarking areas that are off-limits.

- Adjust training operations if archaeological sites are discovered after placing the range in operation until sites are evaluated for eligibility for inclusion in the NRHP. If eligible, appropriate mitigation would be conducted.
- Adjust training operations within the maneuver areas to avoid cultural sites eligible for listing in the NRHP by installing permanent barriers (such as stakes) to prevent access and incorporating site locations into existing environmental limitations overlays to limit vehicle maneuvers within certain areas.
- Adjust berms and targets to avoid cultural sites eligible for listing in the NRHP by locating them away from known sites, installing berms between the target and the cultural site, installing berms around the target to capture munitions or installing berms around the site to shield it from weapons fire and maintaining the berms over time.
- Retrieve information from archaeological sites through complete excavation of sites determined eligible for inclusion in the NRHP and impacted by range placement and use, per consultation with the Advisory Council on Historic Preservation, Alaska Native tribes, the Alaska State Historic Preservation Officer and other interested parties.
- Retrieve information from archaeological sites through partial excavation of sites determined eligible for inclusion in the NRHP and impacted by range placement and use, in conjunction with protection of the remainder of the site, per consultation with the Advisory Council on Historic Preservation, Alaska Native tribes, the Alaska State Historic Preservation Officer and other interested parties.
- Retrieve information from archaeological sites through complete excavation of a sample of the sites determined eligible for inclusion in the NRHP and impacted by range placement and use, and the protection of the rest, per consultation with the Advisory Council on Historic Preservation, Alaska Native tribes, Alaska State Historic Preservation Officer and other interested parties.
- Conduct off-site mitigation by excavation of an eligible site, comparable in size, age, composition and setting, other than the site to be destroyed.
- Cap a site to be impacted by range use.
- Curation of archaeological material recovered per Memorandum of Agreement between USARAK and the University of Alaska Museum.
- Develop public education material(s) to provide information to the public and Army personnel on the archaeological information retrieved from investigations of eligible sites, in combination with one or more additional mitigation measure.

4.2.8 Airspace

Issue 9: Airspace use and compatibility of range operations with other airspace users. The impact of construction and operation of the BAX and CACTF to airspace was identified as an issue of concern during the Draft EIS public comment period.

This section analyzes and compares the impacts to airspace associated with the proposed alternatives. Baseline data for this comparison are presented in Section 3.2.8.

The discussion of airspace includes both terminal and en route airspace and special use airspace. This section analyzes the potential impacts of construction and use of a BAX and CACTF on existing airspace and its users.

4.2.8.1 Comparison of Alternatives

4.2.8.1.1 Description of Methodology

The primary variables of interest for this analysis include the various airspace categories listed in Section 3.2.8, *Airspace*. The qualitative terms used in the matrix are defined as:

- None – No measurable impacts are expected to occur to airspace.
- Minor – Some adverse impact would occur and would result in a slight change in airspace availability. Airspace could be used up to 33 percent of the year (zero to 120 days).
- Moderate – Adverse impacts are expected to occur, would be noticeable, and would have a measurable effect on availability of airspace. Airspace could be used between 34 percent and 65 percent of the year (121 to 240 days).
- Severe – Adverse impacts are highly probable and could greatly limit access or modify size/location of airspace. Airspace could be used for more than 66 percent of the year (241 days or more).
- Beneficial – Impacts are expected to improve airspace and airfield infrastructure.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant in this analysis. The next category (severe) is considered significant. Mitigation measures have been developed to offset adverse impacts. Existing mitigation for impacts to airspace resources are presented in Section 4.2.8.2, *Mitigation*.

Table 4.2.8.a presents a summary of quantitative impacts to several airspace parameters for each alternative. Further discussions of environmental consequences for each alternative are within Table 4.2.8.b and subsequent sections.

Table 4.2.8.a Quantitative Summary of Impacts to Airspace.

Alternatives/Footprints	Parameter Impacted (acres)				
	Area	Restricted Airspace (RA2202)	Military Operations Area	VFR Corridor Richardson Highway	FAA Class D Airspace
Eddy Drop Zone – BAX					
Construction Footprint	254	0	0	0	254
Maneuver Area	2,872	0	0	0	2,872
Surface Danger Zone	23,741	0	15,509	1,869	7,774
Eddy Drop Zone – CACTF					
Construction Footprint	96	0	0	0	96
Maneuver Area	1,184	0	0	0	1,184
Surface Danger Zone	1,123	0	0	0	1,123
Donnelly Drop Zone – BAX					
Construction Footprint	508	0	508	234	0
Maneuver Area	3,413	0	3,413	1,331	0
Surface Danger Zone	19,313	0	18,398	4,399	775
Donnelly Drop Zone – CACTF					
Construction Footprint	44	0	44	44	0
Maneuver Area	694	0	694	694	0
Surface Danger Zone	871	0	871	871	0

Alternatives/Footprints	Parameter Impacted (acres)				
	Area	Restricted Airspace (RA2202)	Military Operations Area	VFR Corridor Richardson Highway	FAA Class D Airspace
North Texas Range – BAX					
Construction Footprint	552	552	0	0	0
Maneuver Area	2,548	2,548	0	0	0
Surface Danger Zone	22,041	22,041	0	0	0
North Texas Range – CACTF					
Construction Footprint	105	105	0	0	0
Maneuver Area	771	771	0	0	0
Surface Danger Zone	1,318	1,318	0	0	0
Combined North Texas Range and Eddy Drop Zone					
Construction Footprint – NTR BAX	727	727	0	0	0
Construction Footprint – EDZ CACTF	96	0	0	0	96
Maneuver Area – NTR BAX	4,081	4,081	0	0	0
Maneuver Area – EDZ CACTF	1,184	0	0	0	1,184
Surface Danger Zone – NTR BAX	23,741	23,741	0	0	0
Surface Danger Zone – EDZ CACTF	1,123	0	0	0	1,123

Table 4.2.8.b Summary of Environmental Consequences to Airspace.

Alternatives/ Footprints	Resource Issues	
	Terminal and En Route Airspace	Special Use Airspace
Alternative 1: No Action		
Impact within DTA East (104,601 acres)	A Class D area is centralized over the Allen Army Airfield located on Fort Greely	The types of special use airspace are Restricted Areas and MOAs including civilian flight corridors; CFAs and SARSAs are also used by the Army to ensure the safety of aircraft transiting the area
Alternative 2: Eddy Drop Zone		
Construction Footprint *Impact*	Conflicts reduced with Class D airspace; several safety features associated with CFA or SARSA *Minor*	Not located within special use airspace. *None*
Maneuver Area *Impact*	Conflicts reduced with Class D airspace; several safety features associated with CFA or SARSA requirements to cease fire when aircraft enter *Minor*	Not located within special use airspace. *None*
Surface Danger Zone *Impact*	Conflicts reduced with Class D airspace; several safety features associated with CFA or SARSA requirements to cease fire when aircraft enter *Minor*	Firing would be suspended whenever an aircraft approaches the area in order not to impede general aviation traffic. *Minor*
Alternative 3: Donnelly Drop Zone		
Construction Footprint *Impact*	Conflicts reduced with Class D airspace; several safety features associated with CFA or SARSA requirements to cease fire when aircraft enter *Minor*	Firing would be suspended whenever an aircraft approaches the area in order not to impede general aviation traffic. *Minor*
Maneuver Area *Impact*	Conflicts reduced with Class D airspace; several safety features associated with CFA or SARSA requirements to cease fire when aircraft enter *Minor*	Firing would be suspended whenever an aircraft approaches the area in order not to impede general aviation traffic. *Minor*

Alternatives/ Footprints	Resource Issues	
	Terminal and En Route Airspace	**Special Use Airspace**
Surface Danger Zone *Impact*	Conflicts reduced with Class D airspace; several safety features associated with CFA or SARSA requirements to cease fire when aircraft enter *Minor*	Firing would be suspended whenever an aircraft approaches the area in order not to impede general aviation traffic. *Minor*
Alternative 4: North Texas Range		
Construction Footprint *Impact*	Not located within terminal or en route airspace. *None*	Training and restricted airspace use would increase, but within existing evaluated parameters; no change to airspace or airfield restrictions *None*
Maneuver Area *Impact*	Not located within terminal or en route airspace. *None*	Training and restricted airspace use would increase, but within existing evaluated parameters; no change to airspace or airfield restrictions *None*
Surface Danger Zone *Impact*	Not located within terminal or en route airspace. *None*	Training and restricted airspace use would increase, but within existing evaluated parameters; no change to airspace or airfield restrictions *None*
Alternative 5: North Texas Range/Eddy Drop Zone Combination		
Construction Footprint (NTR BAX) *Impact*	Not located within terminal or en route airspace. *None*	Training and restricted airspace use would increase, but within existing evaluated parameters; no change to airspace or airfield restrictions *None*
Construction Footprint (EDZ CACTF) *Impact*	Conflicts reduced with Class D airspace; several safety features associated with CFA or SARSA requirements to cease fire when aircraft enter *Minor*	Not located within special use airspace. *None*
Maneuver Area (NTR BAX) *Impact*	Not located within terminal or en route airspace. *None*	Training and restricted airspace use would increase, but within existing evaluated parameters; no change to airspace or airfield restrictions *None*
Maneuver Area (EDZ CACTF) *Impact*	Conflicts reduced with Class D airspace; several safety features associated with CFA or SARSA requirements to cease fire when aircraft enter *Minor*	Not located within special use airspace. *None*
Surface Danger Zone (NTR BAX) *Impact*	Not located within terminal or en route airspace. *None*	Training and restricted airspace use would increase, but within existing evaluated parameters; no change to airspace or airfield restrictions *None*
Surface Danger Zone (EDZ CACTF) *Impact*	Conflicts reduced with Class D airspace; several safety features associated with CFA or SARSA requirements to cease fire when aircraft enter *Minor*	Not located within special use airspace. *None*

4.2.8.1.2 Impacts Common to All Alternatives

Current airspace and airfield restrictions would remain in effect at DTA. Procedures established for existing restricted airspace would continue to apply to all aircraft, including UAV operations. No additional restricted airspace areas are proposed as part of the construction and use of the BAX and CACTF. However, due to increased training, closure of current restricted airspace is expected to increase. No impacts on USARAK airspace and airfield infrastructure are anticipated.

To ensure the safety of both civilian and military aviation personnel and assets, permanent and temporary control measures would be associated with training operations at the BAX and

CACTF. Permanent control measures include existing restricted airspace. Existing restricted airspace over Army land would continue to be utilized under the proposed action. No additional restricted airspace areas are proposed as part of the construction and use of the BAX and CACTF. The flight of aircraft is subject to restrictions within the restricted area over USARAK lands (designated as R2202A/B/C). Most military air operations would be conducted within restricted or military operations areas (MOA) airspace in accordance with specific procedures required to maximize flight safety for both military and civilian aircraft. Restricted airspace within DTA East and West would be limited to existing designated areas. USARAK has concluded that no new restrictions are needed for the location of the range projects.

Temporary obligations imposed upon ground training activities utilized under the proposed action include provisions of Controlled Firing Areas (CFA) and/or a Small Arms Range Safety Areas (SARSA). Special use airspace must be designated and activated prior to conducting any activity over 45 meters above ground level (to include ricochet ordnance) that would be hazardous to aircraft. A CFA that encompasses the maximum utilized area would be established to contain activities that, if not conducted in a controlled environment, would be hazardous to aircraft. Special use airspace responsibilities under the CFA require the Army to provide for the safety of persons and property at ground surface and for the safety of aircraft transiting through these areas. The designation of a CFA does not prohibit an aircraft from crossing the area. Firing would be suspended whenever an aircraft approaches the area in order not to impede general aviation traffic. The military unit using the range complex has the obligation to ensure the safety of the general public.

A CFA also provides a means to accommodate military use of special use airspace without adverse impact to civilian, commercial, or other forms of aviation. CFAs are applicable only to those military training activities that can be immediately suspended upon notice that a nonparticipating aircraft is approaching. Minimum visibility (either by sight or radar) distances are established by FAA as a prerequisite to CFA designation.

SARSAs are Army-established and Army-managed areas designed to contain small arms range activities that, if not conducted in a controlled environment, would be hazardous to nonparticipating aircraft. It is the facility user's responsibility to provide for the safety of persons and property on the surface and in the air. No range activities would be conducted that would endanger aircraft in adjacent airspace. Table 4.2.8.c lists standard SARSA use parameters. In addition, aircraft spotters are required for all ranges in a SARSA.

Table 4.2.8.c Small Arms Range Safety Area Utilization Parameters.

Ammunition Type	Horizontal Distance (miles)	Vertical Ceiling Above Ground Level (feet)
.22 caliber	6	1,400
.45 caliber	6	1,400
9mm	6	1,400
5.56mm	8	1,700
7.62mm	8	3,400
.50 caliber	9	4,200

Source: Department of Army Pamphlet 385-63

4.2.8.1.3 Impacts Attributed to Alternative 1 (No Action)

Potential impacts under the No Action Alternative must incorporate Army transformation activities at USARAK. The ROD on the transformation of USARAK was signed on May 27, 2004. Full transformation of USARAK was selected as the preferred alternative. Overall impacts to USARAK airspace would be expected to be minor (USARAK 2004a).

No impacts to USARAK airspace and airfield infrastructure would be expected. The Unmanned Aerial Vehicle (UAV) would comply with existing Federal Aviation Administration (FAA) regulations and would use existing airspace restrictions during training operations. The UAV is not designed to fly during high winds or extremely cold conditions, which would limit the periods during which operation is possible. Operations are expected to have a negligible impact on airspace use. Airspace restrictions and other aircraft would continue to have a minor impact to air access.

Existing flight safety procedures would apply to the UAV. Additionally, flight safety for airspace users would be accomplished through visual observation of the UAV. Flight observer(s) would be located at strategic locations to maintain visual observation throughout the flight corridor. Flight observer(s) would have direct communication with the UAV operator and ground control station through handheld radio equipment (USARAK 2004a).

4.2.8.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

The creation of new restricted airspace is not proposed under this alternative. Overall, the proposed construction and use of a BAX and CACTF at Eddy Drop Zone would most likely not conflict with civilian aviation traffic through the Delta Junction and DTA East area along the Richardson Highway corridor due to the establishment of Class D airspace and the Army's adherence to safety features associated with CFA and SARSA. However, this alternative would impact military training as a consequence of requirements to accommodate civilian aircraft operating within established VFR corridors and within local Class D airspace.

Terminal and En Route Airspace – The entire construction footprint and maneuver area for the BAX and CACTF at Eddy Drop Zone would be located within the Class D controlled airspace. Most of the Eddy Drop Zone surface danger zone would also be located within the Class D area. The Class D area is centralized over the Allen Army Airfield located on Fort Greely, south of Delta Junction. During training at the BAX and CACTF, a CFA or a SARSA would be designated and activated prior to conducting any activity over 45 meters above ground level (to include ricochet ordnance). These areas would not be indicated on aeronautical maps as they are designed to require the ground-based user to terminate the activity when necessary to prevent endangering approaching aircraft. Approaching aircraft would be made aware of training events at the BAX and CACTF through the Air Force's Special Use Airspace Information System (SUAIS) system. Several existing safety features to protect approaching aircraft would continue to be used during operation of a SARSA, including the requirement of cloud height to be at least 305 meters above the highest altitude of fire (maximum ordinance or ricochet height), sufficient visibility to detect nonparticipating aircraft and cease fire prior to entrance of the SARSA, monitoring of the adjacent five miles of airspace, and ceasing of fire upon notification of approaching aircraft.

Construction and use of a BAX and CACTF at Eddy Drop Zone would create blank and live-fire training within a portion of the Class D area. Conflicts between use of Allen Army Airfield

and the BAX and CACTF most likely would not occur as activities conducted within a CFA or SARSA requires suspension when nonparticipating aircraft enter the CFA or SARSA. Disruptions under this scenario would be to Army training at the BAX and CACTF. Potential conflicts between military training and civilian air traffic would be reduced within the Class D airspace as overall communication and coordination between ground (Army units) and airspace users within a 6.3 mile radius of the new Air Traffic Control Tower (ATCT) located at Allen Army Airfield on Fort Greely would be enhanced. The air traffic control facilities are currently co-located with USARAK Range Control at Allen Army Airfield, and would allow for increased coordination and communication during training activities. Dedicated direct phone lines exist between Range Control and the ATCT. In addition to on-the-ground observation requirements associated with use of a CFA or SARSA, the ATCT would also notify Range Control when aircraft are approaching as an additional safety precaution. This notification action between the ATCT and USARAK would need to be outlined in an official agreement, with the knowledge that the ATCT's primary function is the separation of aircraft and issuance to safety alerts. The primary responsibility for aircraft identification during training events rests with the using unit. The overall impact would be minor.

Special Use Airspace – Neither construction nor operation of a BAX or CACTF within a restricted area is proposed as part of the Eddy Drop Zone alternative. During training at the BAX and CACTF, a CFA or a SARSA would be designated and activated prior to conducting any activity over 45 meters above ground level (to include ricochet ordnance). These areas are designed to require the user to terminate the activity when necessary to prevent endangering approaching aircraft. However, firing points located near North Texas Range, within Restricted Area 2202, would most likely be used during training events at the BAX and CACTF located at Eddy Drop Zone. An "off-set" method would be used which allows close air support assets, artillery, mortars and/or attack helicopters to operate using live ordnance in an adjacent, designated impact area while linking (digitally) to a tactical exercise being conducted at the BAX or CACTF, all in a virtual manner. Increased training as a result of the construction of the BAX and CACTF would increase the amount of time R2202 is closed to nonparticipating aircraft. However, increases would not be substantially different than those evaluated in the *Transformation of U.S. Army Alaska Final Environmental Impact Statement* (USARAK 2004a).

Weapons and ammunition use during training at the BAX and CACTF would vary depending on location. No dud-producing munitions would be used at either the BAX or the CACTF. The maximum ranged weapon used on the BAX would be the 105mm Mobile Gun System and at the CACTF it would be a .50 caliber machine gun. A CFA or a SARSA would be designated and activated prior to conducting any activity over 45 meters above ground level (to include ricochet ordnance). Military activities occurring in these areas would be terminated when aircraft approaches to prevent endangering aircraft. Approaching aircraft would be made aware of training events at the BAX and CACTF through the Air Force's SUAIS system.

A portion of the surface danger zone (approximately 1,900 acres) proposed under the Eddy Drop Zone alternative falls within the Richardson Highway Visual Flight Rules (VFR) corridor. Modification of proposed firing point locations (to reduce the amount of encroachment to the corridor by the BAX surface danger zone) would reduce the adverse impact on training operations at the proposed range complex resulting from the requirement to halt weapons use whenever civilian air traffic traveling within the Richardson Highway VFR corridor enter the CFA or SARSA zone.

UAVs could be used during training events at the BAX and CACTF. The Army would safely incorporate UAV use within the approved guidelines jointly developed by the FAA and USARAK.

Under the Eddy Drop Zone alternative, the actual BAX and CACTF range facility would not fall within the Buffalo MOA. However, the BAX surface danger zone does fall within the Buffalo MOA, with the proposed range complex located just outside of the MOA boundary. "Offset" training methods utilizing Air Force assets would require use of existing adjacent MOAs for access to air-to-ground training ranges. Training within existing MOAs would continue to comply with the decisions and mitigation measures set forth in the ROD for the *Final EIS Alaska Military Operations Areas* (USAF 1995).

The Allen Army CFA overlies a small portion of DTA East and West on both sides of the Delta River across from Allen Army Airfield. No activity area would be located within the Allen Army CFA.

4.2.8.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

The creation of new restricted airspace is not proposed under this alternative. Overall, the proposed construction and use of a BAX and CACTF at Donnelly Drop Zone would most likely not conflict with civilian aviation traffic through the Delta Junction and DTA East area along the Richardson Highway corridor due to the establishment of Class D airspace and the Army's adherence to safety features associated with a CFA and a SARSA. This alternative would have the greatest impact to military training as a consequence of requirements to accommodate civilian aircraft use of established VFR corridors through the Delta Junction and DTA East area along the Richardson Highway.

Terminal and En Route Airspace – A portion of the Donnelly Drop Zone surface danger zone is within Class D controlled airspace. During training at the BAX and CACTF, a CFA or a SARSA would be designated and activated prior to conducting any activity over 45 meters above ground level (to include ricochet ordnance). These areas would not be indicated on aeronautical maps as they are designed to require the user to terminate the activity when necessary to prevent endangering approaching aircraft. Approaching aircraft would be made aware of training events at the BAX and CACTF through the Air Force's SUAIS system. Several existing safety features to protect approaching aircraft would continue to be used during operation of a SARSA, including the requirement of cloud height to be at least 305 meters above the highest altitude of fire (maximum ordinance or ricochet height), sufficient visibility to detect nonparticipating aircraft and cease fire prior to entrance of the SARSA, monitoring of the adjacent five miles of airspace, and ceasing of fire upon notification of approaching aircraft.

Construction and use of a BAX and CACTF at Donnelly Drop Zone would create blank and live-fire training within a portion of the Class D area. Conflicts between use of Allen Army Airfield and the BAX and CACTF most likely would not occur as activities conducted within a CFA or SARSA require suspension when nonparticipating aircraft enter the CFA or SARSA area. Disruptions under this scenario would be to Army training at the BAX and CACTF. Potential conflicts between military training and civilian air traffic would be reduced within the Class D airspace as overall communication and coordination between ground (Army units) and airspace users within a 6.3 mile radius of the new ATCT located at Allen Army Airfield on Fort Greely would be enhanced. The air traffic control facilities are currently co-located with

USARAK Range Control at Allen Army Airfield, and would allow for increased coordination and communication during training activities. Dedicated direct phone lines exist between Range Control and the ATCT. In addition to on-the-ground observation requirements associated with use of a CFA or SARSA, the ATCT would also notify Range Control when aircraft are approaching as an additional safety precaution. This notification action between the ATCT and USARAK would need to be outlined in an official agreement, with the knowledge that the ATCT's primary function is the separation of aircraft and issuance to safety alerts. The primary responsibility for aircraft identification during training events rests with the using unit. The overall impact would be minor.

Special Use Airspace – Neither construction nor operation of a BAX or CACTF within a restricted area is proposed as part of the Donnelly Drop Zone alternative. Impacts as a result of "off-set" training at North Texas Range are similar to that discussed under Alternative 2.

All proposed activity areas (construction footprint, maneuver area and surface danger zone) for the BAX and CACTF at Donnelly Drop Zone are located within the Buffalo MOA. The Buffalo MOA overlays the portion of DTA East located east of the Richardson Highway (Appendix, Figure 3.l). This MOA extends from 300 feet above ground level up to but not including 7,000 feet above sea level, excluding certain designated civilian flight corridors (see below). "Offset" training methods utilizing Air Force assets would require use of existing MOAs for access to air-to-ground training ranges. Training within existing MOAs would continue to comply with the decisions and mitigation measures set forth in the ROD for the *Final EIS Alaska Military Operations Areas* (USAF 1995).

All proposed activity areas (construction footprint, maneuver area and surface danger zone) for the BAX and CACTF at Donnelly Drop Zone are located within at least a portion of the Richardson Highway VFR corridor. Responsibilities during use of a CFA or SARSA require the Army to provide for the safety of persons and property at ground surface and for the safety of aircraft transiting through these areas. A CFA or SARSA does not prohibit an aircraft from crossing the area. Firing would be suspended whenever an aircraft approaches the area in order not to impede general aviation traffic. The military unit using the range complex has the obligation to ensure the safety of the general public.

Modification of proposed firing point locations (to reduce the amount of encroachment to the corridor by the BAX surface danger zone) would reduce the adverse impact on training activities occurring within the proposed range complex from the need to frequently halt live-fire activities to accommodate civilian air traffic within the Richardson Highway VFR corridor.

4.2.8.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

The creation of new restricted airspace is not proposed under this alternative. Overall, the proposed construction and use of a BAX and CACTF at North Texas Range would most likely not conflict with civilian aviation traffic through the Delta Junction and DTA East area along the Richardson Highway corridor due to the use of restricted airspace for training. The proposed construction and use of a BAX and CACTF at North Texas Range would have the least impact to military training as a consequence of requirements to accommodate civilian aircraft use of unrestricted airspace.

Terminal and En Route Airspace – No portions of the North Texas Range alternative are within Class D airspace.

Special Use Airspace – All proposed activity areas (construction, maneuver and surface danger zone) for the BAX and CACTF at North Texas Range are located within Restricted Area 2202 A/C. Existing firing points and those associated with the BAX at North Texas Range within Restricted Area 2202 would most likely be used during training events. Close air support assets, artillery, mortars and/or attack helicopters would operate using live ordnance in an adjacent, designated impact area while linking (digitally) to a tactical exercise being conducted at the BAX or CACTF, all in a virtual manner. Increased training as a result of the construction of the BAX and CACTF would increase the amount of time Restricted Area 2202 A/C is closed to nonparticipating aircraft. However, increases would not be substantially different than those evaluated in the *Transformation of U.S. Army Alaska Final Environmental Impact Statement* (USARAK 2004a). Travel by civilian aircraft in Restricted Area 2202 A/C is possible when it is not activated (in use), but permission for entry is required by USARAK.

All proposed activity areas (construction, maneuver and surface danger zone) for the BAX and CACTF at North Texas Range are located within the Buffalo MOA. The Buffalo MOA overlays all of DTA East (Appendix, Figure 3.l). Training methods utilizing Air Force assets would require use of existing MOAs for access to air-to-ground training ranges. Training within existing MOAs would continue to comply with the decisions and mitigation measures set forth in the ROD for the *Final EIS Alaska Military Operations Areas* (USAF 1995).

Proposed actions under the North Texas Range alternative would not construct or operate a BAX or CACTF within either VFR corridor. In addition, no activity area would be located within the Allen Army CFA.

4.2.8.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

The creation of new restricted airspace is not proposed under this alternative. This alternative would have minor to no conflicts with civilian air traffic as military operations would occur within restricted airspace or the Army's adherence to safety features associated with a CFA or SARSA. Overall, the proposed construction and use of a BAX at North Texas Range and a CACTF at Eddy Drop Zone have considerably less impact to military training as a consequence of requirements to accommodate civilian aircraft use of established VFR corridors.

Terminal and En Route Airspace – No portions of the North Texas Range BAX alternative location are within a Class D area.

All proposed activity areas (construction, maneuver and surface danger zone) for the CACTF at Eddy Drop Zone are within Class D controlled airspace. Conflicts between use of Allen Army Airfield and the CACTF most likely would not occur as activities conducted within a CFA or SARSA require suspension when nonparticipating aircraft enter the CFA or SARSA area. Disruptions under this scenario would be to Army training at the CACTF. Potential conflicts between military training and civilian air traffic would be reduced within the Class D airspace as overall communication and coordination between ground (Army units) and airspace users within a 6.3 mile radius of the new ATCT located at Allen Army Airfield on Fort Greely would be enhanced. The air traffic control facilities are currently co-located with USARAK Range Control

at Allen Army Airfield, and would allow for increased coordination and communication during training activities. Dedicated direct phone lines exist between Range Control and the ATCT. In addition to on-the-ground observation requirements associated with use of a CFA or SARSA, the ATCT would also notify Range Control when aircraft are approaching as an additional safety precaution. This notification action between the ATCT and USARAK would need to be outlined in an official agreement, with the knowledge that the ATCT's primary function is the separation of aircraft and issuance to safety alerts. The primary responsibility for aircraft identification during training events rests with the using unit. The overall impact would be minor.

Special Use Airspace – All proposed activity areas (construction, maneuver and surface danger zone) for the BAX at North Texas Range are located within Restricted Area 2202 A/C. Existing firing points and those associated with the BAX at North Texas Range within Restricted Area 2202 would most likely be used during training events at the BAX located at North Texas Range. Close air support assets, artillery, mortars and/or attack helicopters would operate using live ordnance in an adjacent, designated impact area while linking (digitally) to a tactical exercise being conducted at the BAX, all in a virtual manner. Increased training as a result of the construction of the BAX would increase the amount of time Restricted Area 2202 A/C is closed to nonparticipating aircraft. However, increases would not be substantially different than those evaluated in the *Transformation of U.S. Army Alaska Final Environmental Impact Statement* (USARAK 2004a). Travel by civilian aircraft in Restricted Area 2202 A/C is possible when it is not activated (in use), but permission for entry is required by USARAK.

Neither construction nor operation of a CACTF at Eddy Drop Zone within a restricted area or MOA is proposed as part of this alternative.

4.2.8.2 Mitigation

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts to airspace use. The appendix states how the offered mitigation would serve to eliminate or lessen the foreseen impact and offers an assessment of the potential success of the mitigation. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

4.2.8.2.1 Existing Mitigations

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts.

- Continued use of Notice to Airmen system, where possible and applicable.
- Continued compliance with Final EIS Alaska Military Operations Areas (USAF 1995).
- Continued participation in Alaska Civil Military Aviation Council meetings.
- Safely incorporate UAV use within the approved guidelines jointly developed by the FAA and US Army Alaska.

4.2.8.2.2 Proposed Mitigation

Existing facilities management practices and mitigation measures are sufficient to mitigate any additional impact to airspace resulting from the construction and operation of the BAX and CACTF within DTA East.

- Support and participate in U.S. Air Force SUAIS program.

- Modify proposed firing point locations to reduce the adverse impact on training operations at the proposed range complex resulting from the requirement to halt weapons use whenever civilian air traffic traveling within the Richardson Highway VFR corridor enter the CFA or SARSA zone.

4.3 SECONDARY ISSUES OF CONCERN

4.3.1 Air Quality

This section provides an analysis and comparison of the air quality impacts associated with each alternative. Additional DTA air quality information is presented in Appendix F of the *Transformation of U.S. Army Alaska Final Environmental Impact Statement, Vol. 2.*

Ambient air quality refers to the atmospheric concentration of specific pollutants for a particular geographic location, and is influenced by many factors. Local, regional, and global meteorological patterns influence the movement and dispersion of air contaminants over time and space. Activity rates and the physical attributes of air emission sources also influence air quality.

Actions that could affect air quality at each alternative site include the construction of each facility and the operation of stationary and mobile emission sources at the BAX and CACTF. Most of the impacts associated with the proposed action will be the same for each alternative. For example, if a stationary generator or heater is required for the facility, that emission source would be installed regardless of the final preferred location of the BAX and CACTF. Impacts from fog oil and obscurant smoke utilization would vary slightly for each alternative because of their proximity to the installation boundary and other sensitive areas.

4.3.1.1 Comparison of Alternatives

4.3.1.1.1 Description of Methodology

The following definitions will be used to qualitatively categorize potential impacts:

- None – No measurable adverse impacts are expected to occur.
- Minor – Temporary but measurable adverse impacts are expected.
- Moderate – Noticeable adverse impacts that would have a measurable effect on air quality. This type of impact would include the addition of small, measurable emission sources that may require construction permitting, but no state sanctioned ambient air monitoring or emissions offsets. Air impacts would be below screening levels without the requirement for complex ambient air modeling.
- Severe – Adverse impacts would be obvious with serious consequences to air quality, requiring complex modeling, emissions offsets, Best Available Control Technology (BACT) and full Prevention of Significant Deterioration (PSD) permitting.
- Beneficial – Impacts would be beneficial to air quality.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant in this analysis. The next category (severe) is considered significant. Mitigation measures have been developed to offset adverse impacts. Existing mitigation for impacts to air quality are presented in Section 4.3.1.2, *Mitigation*.

Table 4.3.1.a presents a summary of environmental consequences for each alternative.

Table 4.3.1.a Summary of Environmental Consequences to Air Quality.

Alternatives/ Footprints	Resource Issues		
	Stationary Source Emissions	**Mobile Source Emissions**	**Fugitive Dust**
Alternative 1: No Action			
Impact within DTA East (104,601 acres)	Temporary impacts to air quality	No information available	Levels are below the standard
Alternative 2: Eddy Drop Zone			
Construction Footprint *Impact*	Does not trigger additional construction or operation permitting *Minor*	Localized, temporary, below NAAQS *Minor*	Localized, temporary, impact to local visibility during training events; minor impact to nearby Class I area *Moderate*
Maneuver Area *Impact*	Does not trigger additional construction or operation permitting *Minor*	Localized, temporary, below NAAQS *Minor*	Localized, temporary, impact to local visibility during training events; minor impact to nearby Class I area *Moderate*
Surface Danger Zone *Impact*	Does not trigger additional construction or operation permitting *Minor*	Localized, temporary, below NAAQS *Minor*	Localized, temporary, impact to local visibility during training events; minor impact to nearby Class I area *Moderate*
Alternative 3: Donnelly Drop Zone			
Construction Footprint *Impact*	Does not trigger additional construction or operation permitting *Minor*	Localized, temporary, below NAAQS *Minor*	Localized, temporary, impact to local visibility during training events; minor impact to nearby Class I area *Moderate*
Maneuver Area *Impact*	Does not trigger additional construction or operation permitting *Minor*	Localized, temporary, below NAAQS *Minor*	Localized, temporary, impact to local visibility during training events; minor impact to nearby Class I area *Moderate*
Surface Danger Zone *Impact*	Does not trigger additional construction or operation permitting *Minor*	Localized, temporary, below NAAQS *Minor*	Localized, temporary, impact to local visibility during training events; minor impact to nearby Class I area *Moderate*
Alternative 4: North Texas Range			
Construction Footprint *Impact*	Does not trigger additional construction or operation permitting *Minor*	Localized, temporary, below NAAQS *Minor*	Localized, temporary, impact to local visibility during training events; minor impact to nearby Class I area *Moderate*
Maneuver Area *Impact*	Does not trigger additional construction or operation permitting *Minor*	Localized, temporary, below NAAQS *Minor*	Localized, temporary, impact to local visibility during training events; minor impact to nearby Class I area *Moderate*
Surface Danger Zone *Impact*	Does not trigger additional construction or operation permitting *Minor*	Localized, temporary, below NAAQS *Minor*	Localized, temporary, impact to local visibility during training events; minor impact to nearby Class I area *Moderate*
Alternative 5: North Texas Range/Eddy Drop Zone Combination			
Construction Footprint (NTR BAX) *Impact*	Does not trigger additional construction or operation permitting *Minor*	Localized, temporary, below NAAQS *Minor*	Localized, temporary, impact to local visibility during training events; minor impact to nearby Class I area *Moderate*
Construction Footprint (EDZ CACTF) *Impact*	Does not trigger additional construction or operation permitting *Minor*	Localized, temporary, below NAAQS *Minor*	Localized, temporary, impact to local visibility during training events; minor impact to nearby Class I area *Moderate*

Alternatives/ Footprints	Resource Issues		
	Stationary Source Emissions	**Mobile Source Emissions**	**Fugitive Dust**
Maneuver Area (NTR BAX) *Impact*	Does not trigger additional construction or operation permitting *Minor*	Localized, temporary, below NAAQS *Minor*	Localized, temporary, impact to local visibility during training events; minor impact to nearby Class I area *Moderate*
Maneuver Area (EDZ CACTF) *Impact*	Does not trigger additional construction or operation permitting *Minor*	Localized, temporary, below NAAQS *Minor*	Localized, temporary, impact to local visibility during training events; minor impact to nearby Class I area *Moderate*
Surface Danger Zone (NTR BAX) *Impact*	Does not trigger additional construction or operation permitting *Minor*	Localized, temporary, below NAAQS *Minor*	Localized, temporary, impact to local visibility during training events; minor impact to nearby Class I area *Moderate*
Surface Danger Zone (EDZ CACTF) *Impact*	Does not trigger additional construction or operation permitting *Minor*	Localized, temporary, below NAAQS *Minor*	Localized, temporary, impact to local visibility during training events; minor impact to nearby Class I area *Moderate*

Various analyses were conducted and used to assess the ambient air quality impacts. These analyses entailed using several EPA models, which indicated impacts to visibility, mobile and stationary source, and vehicle emissions would occur as a result of the Army transformation. For additional information on these studies, see *Transformation of U.S. Army Alaska Final Environmental Impact Statement* (USARAK 2004a).

Some of the impacts described in this document are exclusive to the impacts associated with Army transformation, while other impacts associated with the BAX and CACTF are inclusive and therefore do not contribute additional impacts to those determined by the analysis of transformation at USARAK. Stationary source impacts are considered exclusive since these sources, proposed as part of proposed action, would be considered additive to the emission baseline (Army transformation). The mobile source emission impacts described for transformation are considered inclusive of the impacts associated with the proposed BAX and CACTF. Under transformation, it was anticipated that the increased training would occur at DTA; however, the exact location of this SBCT training was not specifically defined. The proposed BAX and CACTF would accommodate certain portions of SBCT training. Under the proposed action, each alternative site was modeled using VISCREEN and SCREEN3 to reevaluate the ambient air quality impacts (fugitive dust emissions) associated with training within DTA. All proposed alternative sites were evaluated separately to clearly establish fugitive dust impacts specific to each location.

4.3.1.1.2 Impacts Common to All Alternatives

There are many common air quality issues that must be examined when determining impacts to air quality from Army activities. These issues include:

- Examination of emissions from the operation of stationary generators and heaters or other fuel burning sources. Of particular interest is the installation of new emission sources or a modification to an existing source's operation. If a proposed action requires an increase in operation of an existing emission source or if a new emission source is required, air quality permitting may be necessary prior to installation or modification.
- Examination of emissions from the operation of mobile sources.
- Fugitive dust from construction and training activities.

During the construction phase of the proposed action, there would be short-term, direct impacts generated from the temporary operation of heavy-duty construction equipment, heaters, and increased vehicular traffic attributed to travel by construction personnel. The operation of construction equipment would produce pollutants from engine operation and some fugitive dust when equipment travels on unimproved ground.

Currently, the facility design for the BAX and CACTF does not include back-up generators. However, it is anticipated that permanent, back-up power would be necessary at some point. Emissions associated with the operation of back-up generators within DTA East were estimated for those parameters listed as National Ambient Air Quality Standards (NAAQS) and are described in Table 4.3.1.b. There would also be various small fuel storage tanks associated with the generators. It was assumed for this analysis that two 50-kilowatt (kW) generators would be required for back-up power. Although the generators would provide back-up power to the facilities in the event of a power failure, emissions were calculated on a potential-to-emit basis, assuming unrestricted operation, in order to evaluate permitting requirements. As the design of the proposed ranges progresses and the size of each generator are determined, a PSD review would be necessary to validate the analysis assumptions. The estimated emissions from construction activities are provided in Table 4.3.1.c. Heat would be provided by electric heaters.

Table 4.3.1.b Summary of Emissions from Existing and New[1] Sources (tons/yr).

Emission Source Description	NO_x	SO_x	CO	PM_{10}	VOC
Existing Source – UAV Generator 160 kW	29.1	1.9	6.3	2.4	2.1
New Source – Emergency Back-Up Generator 50 kW	9.1	0.6	2.0	0.6	0.7
New Source – Emergency Back-Up Generator 50 kW	9.1	0.6	2.0	0.6	0.7
Total Emissions	**47.3**	**3.1**	**10.3**	**3.6**	**3.5**
Operating Permit Major Source Thresholds	100	100	100	100	100
NSR/PSDMajor Source Thresholds	250	250	250	250	250

[1] Emissions associated with these new stationary sources are the same for each alternative.

Table 4.3.1.c Summary of Construction Emissions Associated with the BAX and CACTF (tons/yr).

Facility Description	NO_x	SO_x	CO	PM_{10}	VOC
BAX	17.0	1.7	7.3	1.1	0.9
CACTF	26.2	7.2	11.3	4.3	1.3
Total Emissions	43.2	8.9	18.6	5.4	2.2

Units participating in training events would require the use of portable generators within the surrounding training area. Typically, a battalion would have 60 five-kW generators on-site. Under the "non-road engine rule," these types of sources could be considered stationary sources if they remain on-site seasonally for more than two years. The portable generators that are expected to operate within DTA East are maintained and controlled at FWA, which is considered the unit's home station. These generators would be added to FWA's air emission source inventory and applicability of the "non-road engine rule" should be evaluated at that time. It may be necessary to request revisions to the facility's Air Quality Operating Permit. Emissions for these units were calculated on a potential-to-emit basis (Table 4.3.1.d).

Table 4.3.1.d Summary of Emissions from Portable Sources (tons/yr).

Emission Source Description	NO_x	SO_x	CO	PM_{10}	VOC
Portable Sources – Bivouac Generators60, five kW	54.6	3.6	11.8	3.9	4.4

The addition of new stationary air emission sources requires a PSD applicability review to determine if the installation would trigger construction permitting requirements. Currently, the areas being examined under the proposed action are managed, for air quality purposes, separately from FWA and are not classified as a Major Source requiring an Air Quality Operating Permit. The generator proposed for the UAV facility (existing source) and the emission sources proposed under the proposed action have been examined to determine if their operation would cause the proposed facility to become a major source of emissions requiring an Operating Permit. The cumulative potential emissions associated with transformation actions and the proposed construction and use of the BAX and CACTF at DTA East would not result in the facility becoming classified as a Major Source for the Operating Permit Program. Also, the facility would not be designated as a NSR/PSD Major Facility (Table 4.3.1.b). Therefore, construction permitting would not be required as a result of these emissions increases.

The fielding of the new Stryker vehicle is the primary training-related, ambient air quality impact associated with transformation of USARAK. Training would include mock deployments, partial deployments, and actual troop deployments associated with the SBCT. Maneuver training temporarily impacts air quality by adding mobile source emissions from vehicles (including the Stryker) and through the generation of fugitive dust from vehicles. Any future paving of unpaved areas would create permanent long-term reductions in fugitive dust generation, thus ultimately improving air quality. The individual impacts associated with a single vehicle would

be compounded by the use of multiple vehicles participating in large-scale exercises. Ground and aerial support equipment used during training events at the BAX and CACTF are fuel-burning equipment that produces air pollutants. These impacts can be described as recurrent and short in duration. Pollutants are expected to dissipate relatively quickly, depending on meteorological conditions.

Impacts associated with the proposed action must be examined for visibility implications. The Regional Haze Rule regulates impacts to visibility, and prohibits impacts to Class I areas. Although DTA is within a Class II area, it is near a Class I area; thus, visibility impacts must be examined as part of this analysis. National parks and wildlife refuges are designated Class I areas, and receive the highest level of Clean Air Act (CAA) protection. Denali National Park is the closest Class I area to DTA. Visibility impacts that were examined as part of Army transformation are considered baseline.

The Regional Haze Rule promulgated in 40 CFR 51 establishes a goal of "no degradation of best visibility days." Section 169A of the CAA identifies provisions for improving visibility through the control of existing and future emissions from man-made sources. These man-made sources include stationary, mobile and area emission sources. States are required to generate periodic progress reports. If a state fails to improve visibility or if visibility becomes degraded, the state must implement stricter controls on emission sources as compensation for the compromised visibility. According to Kemme et al., military activities are not excluded from compliance with the Regional Haze Rule (Kemme et al. 2001).

If impacts occur, mitigation measures must be implemented to ensure compatibility with the Alaska State Implementation Plan, which incorporates the Regional Haze Rule. Additional impacts to visibility must also be examined for the proposed action, and mitigations would be required if additional visibility impacts on the Class I area occur as a result of this action.

Air pollutant impacts were evaluated using EPA's SCREEN3 and VISCREEN models. SCREEN3 was used to predict pollutant concentrations associated with training activities whereas the VISCREEN model was used to model visibility impacts associated with proposed training. The data used to run the models are described in the appendix.

A "Level 1" VISCREEN analysis was initially conducted, and this analysis indicated that visibility impacts were predicted for all three proposed sites. Therefore, it was necessary to conduct a "Level 2" analysis to identify where threshold criteria have been exceeded. These thresholds reflect the conditions in which a dust plume becomes visible inside or outside of the closest Class I area (which is Denali National Park). The particulate matter (PM_{10}) and NO_x emissions data reflect the total emission rates from fugitive emissions generated by Stryker vehicles, emissions from operation of Stryker engines, and the three new stationary sources identified for DTA (two of the three sources are associated with the BAX and CACTF and the third source is associated with the UAV facility). Portable generator emissions were included as well. A complete analysis summary is provided in the appendix.

Currently, the National Park Service monitors visibility by collecting data at Denali National Park. These sampling stations provide information on the quality of the visible range for Denali National Park, as well as pollutant concentrations for specific constituents such as PM. These stations are designed to detect impacts associated with growth occurring within the region. Mitigation measures have been proposed to address visibility impacts that are predicted to occur

as a result of the proposed action. These mitigations are proposed to be proactive measures to ensure that military training is not restricted in the future.

Production and use of fog oil smoke and other obscurants at the BAX and CACTF can affect air quality. These effects include: (1) the obscurant quality of the smoke which creates immediate, short-duration impacts to air quality by degrading visibility, (2) particulate matter and hydrocarbons released from fog oil smoke generation, and (3) exhaust from the generator which may contribute some particulate matter and hydrocarbon emissions from the fog oil smoke cloud (USARAK 2000c).

VISCREEN predicts that prescribed burning impacts could occur on best visibility days as a result of the proposed activities. These impacts are minor to Denali National Park since prescribed burning within DTA East is not expected to be an annual event. Forest fires can also lead to reduced air quality conditions due to smoke. Increased smoke near populated areas can create annoyance and potentially impact individuals' health.

4.3.1.1.3 Impacts Attributed to Alternative 1 (No Action)

Potential impacts under the No Action Alternative include the impacts associated with Army transformation activities scheduled to occur at USARAK. The ROD on the transformation of USARAK was signed on May 27, 2004. Full transformation of USARAK was selected as the preferred alternative. These impacts are considered to be baseline for the proposed action described in this document. The overall impact of transformation on air quality at DTA was determined to be minor (USARAK 2004a).

Only one construction project associated with ongoing Army transformation occurred within DTA East. The UAV Maintenance Facility is located within Training Area (TA) 57 and has a 300 kW generator. Activities associated with the construction of this facility would have temporary impacts to air quality. Construction of this facility was completed in 2005 (USARAK 2004a).

Fielding of new mobile sources associated with transformation would have negligible impacts on DTA ambient air quality. The impacts to air quality related to fuel combustion from these vehicles would be negligible, but the generation of fugitive dust would be more consequential. An analysis of mobile source impacts from the Stryker vehicles was conducted as part of Army transformation to assess impacts on the carbon monoxide (CO) "non-attainment" area at FWA. A more detailed description of these impacts can be found in *Transformation of U.S. Army Alaska Final Environmental Impact Statement, Vols. 1 and 2* (USARAK 2004a). DTA can be further classified as a Class II area under the CAA.

The impact of fugitive dust generated by maneuver activities related to transformation was assessed for comparison with the 24-hour and annual PM_{10} NAAQS. No NAAQS were exceeded as a result of maneuver activities (USARAK 2004a).

Visibility impacts to Denali National Park (the closest Class I area) as a result of transformation actions were assessed. Preliminary data suggests that low visibility days (days with fog and cloud cover) would not be further degraded by dust emissions at DTA. For high visibility (clear) days, visibility would not be impaired inside the Class I area itself, but visibility may be impaired (due to increased training and maneuver activities) for observers looking into the park (from outside the Class I area). However, direct visibility of Denali National Park is not attainable from DTA

East. Additional data collection and visibility monitoring are proposed for DTA (USARAK 2004a).

The overall air quality impact of transformation suggested that air quality monitoring is needed to verify and/or negate any impacts to Denali National Park. The *Transformation of U.S. Army Alaska Final Environmental Impact Statement* proposed the following air quality actions:

- Identify, inventory, and monitor air pollutant emissions and ambient air quality:
  - Conduct emission inventories at regular intervals.
  - Monitor opacity using smoke/no smoke method upon start up of stationary sources.
  - Monitor opacity of area sources such as fugitive dust using Method RM 22 or implement a dust control plan.
  - Retain records to ensure that stationary sources are operated to optimize the combustion of fuel, therefore minimizing emissions.
- Ensure that stationary, mobile, and area emission sources are operated within permitted limits.
- Ensure that design and operation of military equipment are in accordance with regulations.

Environmental management system components include the reduction of environmental risks and pollution, sustained compliance, and enhanced mission readiness. These components focus on the implementation of programs to mitigate all transformation impacts. Such improved environmental management of USARAK lands would include air resources (USARAK 2004a).

4.3.1.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

The operation of heavy equipment during range construction within the Eddy Drop Zone study area, would release a minor amount of emissions into the air, but appropriate emission control devices (on vehicles) would minimize such air quality impacts during construction. Construction emissions are identified in Table 4.3.1.c.

Dust generation resulting from construction would be temporary and localized, and would not result in any long-term impact to ambient air quality. Mitigation measures would be implemented to ensure that dust would not migrate beyond any USARAK property boundary. The same mitigation measures implemented during construction would be implemented during military training activities.

Increased training at the BAX and CACTF would have short-duration impacts. Vehicles are expected to release fugitive emissions into the air, and the duration these pollutants remain airborne is dependent on the meteorological conditions during training. In most cases, these increases in airborne pollutants would be of short duration. However, since training is reoccurring, the impact is considered long-term. The primary short-duration, long-term impact of training is the creation of fugitive dust emissions from vehicle and aircraft operation.

VISCREEN modeling indicates that fugitive dust emissions could impact visibility locally and at Denali National Park. Impacts are not expected to occur to an observer inside Denali National Park looking outside, but rather the modeling indicates that visibility for observers outside of the National Park looking in would be impacted. However, direct visibility of Denali National Park from DTA East is not possible. These impacts are only predicted to occur on best visibility days, depending on prevailing wind directions. Denali National Park is located southwest of the

Eddy Drop Zone study area and these impacts would probably be observed on days where the prevailing wind direction is westerly. From April to August, the prevailing wind directions in DTA East are from the west, south, and southwest. Military training at this location would have the least impact to the Class I area. Table 4.3.1.e identifies the predicated emissions impacts associated with training activities within the Eddy Drop Zone study area.

Table 4.3.1.e Summary of Emissions Associated with Training Activities at the BAX and CACTF within the Eddy Drop Zone Study Area (tons/yr).

Activity Description	NO_x	CO	VOC	Fugitive Dust	PM_{10}	$PM_{2.5}$
Mounted Training	2.0	0.8	0.3	449.8	*	*
Fog Oil Training	*	*	*	*	2.4	*
Prescribed Burning/ Range Maintenance	*	*	*	*	283.3	258.5

* No emissions are produced from this activity.

Emissions from mounted training exercises were modeled as an area source using the SCREEN3 model. These emission rates were added to the emissions associated with the stationary sources proposed for the facility. The model results for the Eddy Drop Zone study area indicated that pollutant concentrations were below the NAAQS (Table 4.3.1.f); therefore, more complex modeling was not conducted. The NAAQS comparison is limited to mounted training and fog oil training. Emission factors cited in Kemme et al. (2001) were used to estimate emissions from fog oil training and prescribed burning. The latest fog oil permit issued to USARAK indicates that an annual consumption of 660 gallons of fog oil is permitted. This fog oil consumption rate was used to estimate fog oil emissions. An average of the amount of acres burned over two years at DTA was used for calculations and estimated to be 2,500 acres. Prescribed burning is not evaluated against the NAAQS since this activity would occur over a larger area and is not expected to occur annually.

Table 4.3.1.f Summary of Modeled Concentrations Associated with Training Activities within the Eddy Drop Zone Study Area ($\mu g/m^3$).

Area Source	NO_x	(PM_{10})		CO	
	Modeled Concentration	Modeled Concentration		Modeled Concentration	
	Annual	Annual	24 Hour	1 hour	8 hour
Mounted Training & Fog Oil Training	6.2	27.7	138.6	17.1	12.0
NAAQS	100.0	50.0	150.0	10,000.0	40,000.0

Specific data relating to the distributions and concentrations of PM, CO, and (volatile organic compounds (VOCs) from the fog oil smoke generator used on USARAK lands are unavailable. However, appropriate controls would be addressed in site utilization and training plans to ensure smoke associated with training activities does not drift beyond installation boundaries, impacting adjacent landowners or recreational users (USARAK 2000c). Those controls include monitoring

meteorological conditions (wind speed, temperature, and precipitation) prior to use to eliminate the possible dispersion of fog oil smoke plumes beyond installation boundaries and prohibiting the production of fog oil smoke within 1,000 meters of installation boundaries (USARAK 2000c). These prohibitions are reiterated in the conditional fog oil permit renewed annually by the ADEC.

Current and proposed military activities can contribute to the formation of ice fog during the winter months when temperatures drop below -30°F. The intensity of ice fog formation is correlated with increased use of motor vehicles and other combustion activities. Ice fog formation can lead to reduced visibility for vehicle and aircraft operations.

Unnecessary vehicle idling during cold temperatures is restricted on USARAK lands. This restriction would remain in effect as part of the proposed action. Vehicles are also required to use head bolt electrical outlets to reduce engine "cold starts," which have been linked to increases in both CO and unburned fuel emissions. This would also reduce the likelihood of ice fog formation.

4.3.1.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

Expected impacts to air quality as a result of the proposed action are similar to those discussed under Alternative 2. The overall impact to air quality as a result of the construction and use of the BAX and CACTF at the Donnelly Drop Zone study area is moderate.

Table 4.3.1.c depicts the emissions associated with the construction of the BAX and CACTF at the Donnelly Drop Zone study area. Table 4.3.1.g provides a summary of emissions associated with training activities. VISCREEN modeling indicates that fugitive dust emissions could impact visibility locally and at Denali National Park. These impacts are only predicted to occur on best visibility days, depending on prevailing wind directions. However, direct visibility of Denali National Park is not possible from DTA East. Donnelly Drop Zone, as compared to the other two alternatives, has more visibility impacts to Denali National Park than Eddy Drop Zone, but less than North Texas Range. However, it is not appreciably better than North Texas Range.

Table 4.3.1.g Summary of Emissions Associated with Training Activities at the BAX and CACTF within the Donnelly Drop Zone Study Area (tons/yr).

Activity Description	NO_x	CO	VOC	Fugitive Dust	PM_{10}	$PM_{2.5}$
Mounted Training	2.0	0.8	0.3	449.8	*	*
Fog Oil Training	*	*	*	*	2.4	*
Prescribed Burning/ Range Maintenance	*	*	*	*	283.3	258.5

* No emissions are produced from this activity.

Table 4.3.1.h provides the predicted concentrations for various pollutants expected to occur as a result of increased training. The analysis demonstrates that the NAAQS would not be violated if the BAX and CACTF are sighted at the Donnelly Drop Zone study area. Emission factors cited in Kemme et al. (2001) were used to estimate emissions from fog oil training and prescribed burning as described for Alternative 2.

Table 4.3.1.h Summary of Modeled Concentrations Associated with Training Activities at the BAX and CACTF within the Donnelly Drop Zone Study Area (μg/m^3).

Area Source	NO_x	(PM_{10})		CO	
	Modeled Concentration	Modeled Concentration		Modeled Concentration	
	Annual	Annual	24 Hour	1 hour	8 hour
Mounted Training & Fog Oil Training	5.9	26.1	130.4	16.1	11.3
NAAQS	100.0	50.0	150.0	10,000.0	40,000.0

4.3.1.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

Expected impacts to air quality, as a result of the proposed action, are similar to those discussed under Alternative 2. The overall impact to air quality as a result of the construction and use of the BAX and CACTF at North Texas Range study area is moderate.

Table 4.3.1.c depicts the emissions associated with the construction of the BAX and CACTF at the North Texas Range study area. Table 4.3.1.i provides a summary of emissions associated with training at the North Texas Range. VISCREEN modeling indicates that fugitive dust emissions could impact visibility locally and at Denali National Park. However, direct visibility of Denali National Park is not possible from DTA East. When the VISCREEN summary for the North Texas Range study area is compared to the other two alternatives, it has the most predicted impacts and is considered the least desirable location for sighting the range.

Table 4.3.1.i Summary of Emissions Associated with Training Activities at the BAX and CACTF within the North Texas Range Study Area (tons/yr).

Activity Description	NO_x	CO	VOC	Fugitive Dust	PM_{10}	$PM_{2.5}$
Mounted Training	2.0	0.8	0.3	449.8	*	*
Fog Oil Training	*	*	*	*	2.4	*
Prescribed Burning/ Range Maintenance	*	*	*	*	283.3	258.5

* No emissions are produced from this activity.

Table 4.3.1.j provides the predicted concentrations for various pollutants expected to occur as a result of the increased training. Results of the SCREEN3 modeling provided in Table 4.3.1.j indicate the 24-hour NAAQS would be violated as a result of training if the BAX and CACTF were built within the North Texas Range study area. A more complex model, such as the ISCST3, could be used to refine the analysis and determine more accurately if the 24-hour PM_{10} NAAQS would be violated.

Emission factors cited in Kemme et al. were used to estimate emissions from fog oil training and prescribed burning as described for Alternative 2.

Table 4.3.1.j Summary of Modeled Concentrations Associated with Training Activities at the BAX and CACTF within the North Texas Range Study Area (µg/m^3).

Area Source	NO_x	(PM_{10})		CO	
	Modeled Concentration	Modeled Concentration		Modeled Concentration	
	Annual	Annual	24 Hour	1 hour	8 hour
Mounted Training & Fog Oil Training	7.3	32.5	162.5	20.0	14.0
NAAQS	100.0	50.0	150.0	10,000.0	40,000.0

4.3.1.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

Expected impacts to air quality as a result of the proposed action are similar to those discussed under Alternatives 2 and 4. The overall impact to air quality as a result of the construction and use of the BAX at North Texas Range and the CACTF at Eddy Drop Zone is moderate. Emissions associated with training activities would be similar to those discussed under Alternatives 2 and 4.

4.3.1.2 Mitigation

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts to air quality. The appendix states how the offered mitigation would serve to eliminate or lessen the foreseen impact and offers an assessment of the potential success of the mitigation. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

4.3.1.2.1 Existing Mitigation

There are no mitigation measures currently in place addressing air quality.

4.3.1.2.2 Proposed Mitigation

The following mitigation measures are essential in addressing impacts associated with the proposed action.

- Collect additional data to determine short-term and long-term impacts of fugitive dust generation through refined modeling analysis. Investigate the need for dust control plans to minimize fugitive dust generation. Further mitigation measures would be developed and implemented if impacts are identified.
- Establish a PM sampling network and initiate sampling to determine the contribution the proposed action would provide to visibility over time. The sampling protocol should include a method for distinguishing between wildland and prescribed fire impacts and fugitive dust from training.
- Establish and implement a dust control plan to reduce visibility impacts from fugitive dust. The plan may include biological or mechanical methods for dust control.
- Re-evaluate need for construction and/or operating air quality permits based on final site selection and design prior to start of construction.

4.3.2 Groundwater

This section analyzes and compares the impacts to groundwater associated with each alternative. Baseline data for this comparison are presented in Section 3.3.2.

Groundwater quality varies greatly based on location but is predominantly very good, as no areas with degraded groundwater are currently undergoing remediation at DTA.

4.3.2.1 Comparison of Alternatives

4.3.2.1.1 Description of Methodology

Due to a lack of predictive models and available data, qualitative analyses are used. Qualitative analyses use historic and scientific data to predict positive or negative change to groundwater. The following categories are used to qualitatively assess impacts to groundwater on USARAK lands:

- None – No measurable adverse impacts are expected to occur.
- Minor – Measurable adverse impacts are expected to occur but would be limited and should have no secondary effects.
- Moderate – Adverse impacts are expected to occur, would be noticeable and would have a measurable effect on secondary usage of groundwater.
- Severe – Adverse impacts are expected to occur, would be obvious, and would have definite and lasting consequences to secondary or tertiary aspects of groundwater use.
- Beneficial – Impacts are expected to improve groundwater resources.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant in this analysis. The next category (severe) is considered significant. Mitigation measures have been developed to offset adverse impacts. Existing mitigation for impacts to groundwater is presented in Section 4.3.2.2, *Mitigation*.

Table 4.3.2.a presents a summary of environmental consequences for each alternative.

Table 4.3.2.a Summary of Environmental Consequences to Groundwater.

Alternatives/ Footprints	Resource Issues		
	Groundwater Flow	**Groundwater Quality**	**Alteration of Groundwater System Due to Permafrost Disruption**
Alternative 1: No Action			
Impact within DTA East (104,601 acres)	Soil compaction resulting from vehicle and pedestrian use could lead to greater overland flow and reduced groundwater percolation and flow	Possible alteration of groundwater chemistry due to munitions constituents leaching into groundwater	Impacts to vegetation could affect underlying permafrost by changing dynamics between groundwater and surface water or between different groundwater tables
Alternative 2: Eddy Drop Zone			
Construction Footprint *Impact*	All season maneuver could create minor soil compaction, increase overland surface flow, and reduced recharge *Minor*	Institutional controls, no new waste generated; minimize release risk *Minor*	Potential impact to local perched water levels in ponds, drying up of some bogs; greater extent of permafrost, minor impact *Minor*

Alternatives/ Footprints	Resource Issues		
	Groundwater Flow	**Groundwater Quality**	**Alteration of Groundwater System Due to Permafrost Disruption**
Maneuver Area *Impact*	All season maneuver could create minor soil compaction, increase overland surface flow, and reduced recharge *Minor*	Institutional controls, no new waste generated; minimize release risk *Minor*	Potential impact to local perched water levels in ponds, drying up of some bogs; lower extent of permafrost, very minor impact *Minor*
Surface Danger Zone *Impact*	All season maneuver could create minor soil compaction, increase overland surface flow, and reduced recharge *Minor*	Institutional controls, no new waste generated; minimize release risk *Minor*	Potential impact to local perched water levels in ponds, drying up of some bogs; lower extent of permafrost, very minor impact *Minor*
Alternative 3: Donnelly Drop Zone			
Construction Footprint *Impact*	All season maneuver could create minor soil compaction, increase overland surface flow, and reduced recharge *Minor*	Institutional controls, no new waste generated; minimize release risk *Minor*	Potential impact to local perched water levels in ponds, drying up of some bogs; lower extent of permafrost, very minor impact *Minor*
Maneuver Area *Impact*	All season maneuver could create minor soil compaction, increase overland surface flow, and reduced recharge *Minor*	Institutional controls, no new waste generated; minimize release risk *Minor*	Potential impact to local perched water levels in ponds, drying up of some bogs; greater extent of permafrost, minor impact *Minor*
Surface Danger Zone *Impact*	All season maneuver could create minor soil compaction, increase overland surface flow, and reduced recharge *Minor*	Institutional controls, no new waste generated; minimize release risk *Minor*	Potential impact to local perched water levels in ponds, drying up of some bogs; greater extent of permafrost in southern portion, minor impact *Minor*
Alternative 4: North Texas Range			
Construction Footprint *Impact*	All season maneuver could create minor soil compaction, increase overland surface flow, and reduced recharge *Minor*	Institutional controls, no new waste generated; minimize release risk *Minor*	Potential impact to local perched water levels in ponds, drying up of some bogs; lower extent of permafrost, very minor impact *Minor*
Maneuver Area *Impact*	All season maneuver could create minor soil compaction, increase overland surface flow, and reduced recharge *Minor*	Institutional controls, no new waste generated; minimize release risk *Minor*	Potential impact to local perched water levels in ponds, drying up of some bogs; greater extent of permafrost, minor impact *Minor*
Surface Danger Zone *Impact*	All season maneuver could create minor soil compaction, increase overland surface flow, and reduced recharge *Minor*	Institutional controls, no new waste generated; minimize release risk *Minor*	Potential impact to local perched water levels in ponds, drying up of some bogs; greater extent of permafrost, minor impact *Minor*
Alternative 5: North Texas Range/Eddy Drop Zone Combination			
Construction Footprint (NTR BAX) *Impact*	All season maneuver could create minor soil compaction, increase overland surface flow, and reduced recharge *Minor*	Institutional controls, no new waste generated; minimize release risk *Minor*	Potential impact to local perched water levels in ponds, drying up of some bogs; lower extent of permafrost, very minor impact *Minor*
Construction Footprint (EDZ CACTF) *Impact*	All season maneuver could create minor soil compaction, increase overland surface flow, and reduced recharge *Minor*	Institutional controls, no new waste generated; minimize release risk *Minor*	Potential impact to local perched water levels in ponds, drying up of some bogs; greater extent of permafrost, minor impact *Minor*

Alternatives/ Footprints	Resource Issues		
	Groundwater Flow	**Groundwater Quality**	**Alteration of Groundwater System Due to Permafrost Disruption**
Maneuver Area (NTR BAX) *Impact*	All season maneuver could create minor soil compaction, increase overland surface flow, and reduced recharge *Minor*	Institutional controls, no new waste generated; minimize release risk *Minor*	Potential impact to local perched water levels in ponds, drying up of some bogs; greater extent of permafrost, minor impact *Minor*
Maneuver Area (EDZ CACTF) *Impact*	All season maneuver could create minor soil compaction, increase overland surface flow, and reduced recharge *Minor*	Institutional controls, no new waste generated; minimize release risk *Minor*	Potential impact to local perched water levels in ponds, drying up of some bogs; lower extent of permafrost, very minor impact *Minor*
Surface Danger Zone (NTR BAX) *Impact*	All season maneuver could create minor soil compaction, increase overland surface flow, and reduced recharge *Minor*	Institutional controls, no new waste generated; minimize release risk *Minor*	Potential impact to local perched water levels in ponds, drying up of some bogs; greater extent of permafrost, minor impact *Minor*
Surface Danger Zone (EDZ CACTF) *Impact*	All season maneuver could create minor soil compaction, increase overland surface flow, and reduced recharge *Minor*	Institutional controls, no new waste generated; minimize release risk *Minor*	Potential impact to local perched water levels in ponds, drying up of some bogs; lower extent of permafrost, very minor impact *Minor*

4.3.2.1.2 Impacts Common to All Alternatives

As the primary steward of its properties, USARAK is responsible for the quality of its groundwater resources. Groundwater resources can be impacted by a variety of activities, with the following general results:

- Groundwater flow can be increased (or decreased), either by withdrawing water through wells or by diverting flow to (or from) other areas.
- Groundwater quality can be affected by the addition of non-water chemicals, though groundwater quality is generally harder to alter, as these chemicals must usually filter through soil layers to reach the groundwater table (or aquifer). Groundwater often serves as a drinking water source for some areas near USARAK lands.
- Permafrost alterations can alter groundwater; connecting surface water resources to groundwater, or connecting high water tables with lower aquifers.

Construction of the BAX and CACTF may affect groundwater resources. Construction that does not occur on previously disturbed or on paved areas would increase the amount of direct runoff to surface waters, increasing the surface flow and possibly diverting flow from local groundwater. Impacts from construction are considered minor to none. The potential to construct subsurface improvements (or subsurface bunkers) exists at the BAX and CACTF. However, these structures would not impact subsurface groundwater flow rates as the location of groundwater flows are considerably deeper than the relatively shallow construction of the bunkers.

Ongoing use of the BAX and CACTF has the potential to degrade groundwater quality, primarily through inadvertent release of chemicals, which could leach into groundwater. Existing USARAK institutional controls, such as standard use of drip pans and portable containment units, would limit the probability and extent of spills and groundwater pollution. Standard spill prevention measures would be taken during construction and operation of the ranges (including the creation of a SPCC plan). All USARAK units would be equipped with (and have available) appropriate spill response materials for types and quantities of hazardous materials they may transport to

support military operations, as required by statutory and Army requirements. Any spills would be promptly cleaned up. All spills/releases must be reported to the fire department and to the Spill Prevention and Response section of the ADEC, which would then establish appropriate mitigative measures. Such impacts are therefore considered to be minor.

Groundwater wells would be drilled within the study area to supply local drinking water. Drinking water would be sampled as part of compliance management actions (in association with federal and state drinking water standards) to ensure safe drinking water for range personnel and Soldiers. The legislative withdraw of DTA for Army training use (Public Law 106-65) specifically excludes any new reservation of water rights. Therefore, the federal government possesses only that what was originally acquired as a consequence of the original withdrawal from the Bureau of Land Management (BLM). Any reservation of water rights for the purpose of the original BLM withdrawal would not include groundwater. USARAK officials would seek an allocation from the State of Alaska prior to extraction.

The use of munitions at the BAX and CACTF would create low levels of propellant residues at firing points. As no high explosive munitions would be used at any of the proposed training facilities, explosive residues would not create a concern within the ranges. Munitions residue would also not be expected within the surface danger zone of either range, as only inert rounds would be used. Trace amounts (parts per million levels) of propellant components such as 2,4-DNT and NG would be deposited at weapons firing points within the proposed training facilities. The compound NG readily degrades and is not persistent. The compound 2,4-DNT degrades much more slowly but is not very mobile. Sampling at firing points within DTA has detected low levels (parts per million) of 2,4-DNT on the surface, but not at depth in the soils and not in the groundwater or surface water (Walsh et al. 2004). The components are either immobile or not persistent when deposited in the environmental conditions found at DTA (low precipitation and frozen conditions most of the year). Impacts to groundwater are expected to be minor.

The principal groundwater aquifer at DTA East and the Delta Junction area lies within the permeable sands and gravels of a broad coalescing alluvial fan or outwash deposits that extend from the Alaska Range north to the Tanana River.

Impacts to other resources, such as soils and surface water, could affect groundwater.

4.3.2.1.3 Impacts Attributed to Alternative 1 (No Action)

Potential impacts under the No Action Alternative must incorporate Army transformation activities at USARAK. The ROD on the transformation of USARAK was signed on May 27, 2004. Full transformation of USARAK was selected as the preferred alternative. The overall impact of transformation on groundwater resources at DTA was determined to be minor (USARAK 2004a).

Ongoing DTA activities can potentially degrade groundwater quality, primarily through inadvertent release of chemicals, which could leach to groundwater. A higher frequency of petrochemical spills could occur with an increase in troops and vehicles to support Army transformation. Existing USARAK institutional controls (such as common use of drip pans and portable containment units) and SPCC and spill contingency plans would minimize the release risk, as well as any actual environmental damage associated with any major petrochemical

release. Such impacts are thus considered minor, due to low risk and existing institutional controls (USARAK 2004a).

The conduct of all-seasons maneuver training with the Stryker is expected to lead to increased impacts. Soil compaction from increased use of existing trails and the creation of new trails could lead to greater overland flow, and may reduce groundwater percolation. Maneuver training could potentially impact groundwater resources at DTA. New trails would impact vegetation, which could affect any underlying permafrost. This could additionally affect groundwater resources, changing the interaction dynamics between groundwater and surface water, or between different groundwater tables. Impacts would be considered minor (USARAK 2004a).

Management actions affecting groundwater include full implementation of a Training Area Recovery Plan and an environmental management program, as well as soil and water quality monitoring. Detailed descriptions of these plans may be found in the *Final Environmental Impact Statement for Transformation of U.S. Army Alaska, Vol. 2,* Appendix H. These would result in improved environmental management of USARAK lands.

4.3.2.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

The overall impact of construction and use of the BAX and CACTF on groundwater at Eddy Drop Zone study area is considered minor. USARAK would continue to use DTA as an all-seasons maneuver area. This would lead to soil compaction, increased overland surface flow, and may reduce percolation and groundwater recharge.

The eastern portion of the Eddy Drop Zone study area has a groundwater potential of 1,000 to 3,000 gallons per minute, and the remainder of the study area has a relatively low groundwater potential of less than 1,000 gallons per minute (USARAK 2002b).

The depth to groundwater beneath the surface of this outwash fan decreases down slope from nearly 400 feet near the mountains, to 180 feet in the vicinity of Fort Greely and Eddy Drop Zone, to 80 feet at Delta Junction, and to 10 feet at Big Delta at the Tanana River. Annual fluctuations of the water-table depth range from 50 to 60 feet in the Fort Greely area to two to three feet at Big Delta. The thick sand and gravel alluvium result in high transmissivity for the aquifer. Well yields in the DTA are as high as 1,500 gallons per minute (Wilcox 1980).

Groundwater is recharged in late spring and early summer when ground thawing permits penetration of meltwater. Jarvis Creek and the Delta River are losing streams in their lower reaches, with the groundwater table lower than the streambeds. A considerable portion of their flow infiltrates from the streambeds to the groundwater table.

The presence of discontinuous permafrost does not prevent groundwater recharge over significant areas. Locally shallow permafrost can create local perched groundwater aquifers and can create areas of poor drainage, bogs, and small ponds, especially in glacial moraine areas.

Within the eastern portion of the Eddy Drop Zone study area, a perched groundwater system exists due to locally shallow permafrost. Disturbance of the ground surface in this area could result in thawing and lowering of the permafrost table and affect local perched groundwater aquifers, lowering local perched water levels in ponds and drying up some bogs. However, disturbance and thawing of permafrost would not affect the regional groundwater system. This

effect is considerably less at the Eddy Drop Zone study area due the lesser extent of permafrost found there.

4.3.2.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

Impacts to groundwater as a result of the proposed action are likely similar to those discussed under Alternative 2. The overall impact of construction and use of the BAX and CACTF on groundwater at Donnelly Drop Zone study area is considered minor.

The portion of the Donnelly Drop Zone study area west of Jarvis Creek has a groundwater potential of 1,000-3,000 gallons per minute, and the remainder of Donnelly Drop Zone study area has a relatively low groundwater potential of less than 1,000 gallons per minute (USARAK 2002b).

The presence of discontinuous permafrost does not prevent groundwater recharge over significant areas. Locally shallow permafrost can create local perched groundwater aquifers and can create areas of poor drainage, bogs, and small ponds, especially in glacial moraine areas. These areas are more common within the Donnelly Drop Zone study area. Disturbance of the ground surface in permafrost areas can result in thawing and lowering of the permafrost table and can affect local perched groundwater aquifers, lowering local perched water levels in ponds and drying up some bogs. However, disturbance and thawing of permafrost would not affect the regional groundwater system.

4.3.2.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

Impacts to groundwater as a result of the proposed action are likely similar to those discussed under Alternative 2. The overall impact of construction and use of the BAX and CACTF on groundwater at North Texas Range study area is considered minor.

The North Texas Range study area has a relatively low groundwater potential of less than 1,000 gallons per minute (USARAK 2002b).

The presence of discontinuous permafrost does not prevent groundwater recharge over significant areas. Locally shallow permafrost can create local perched groundwater aquifers and can create areas of poor drainage, bogs, and small ponds, especially in glacial moraine areas. These areas are more common within the North Texas Range study area. Disturbance of the ground surface in permafrost areas can result in thawing and lowering of the permafrost table and can affect local perched groundwater aquifers, lowering local perched water levels in ponds and drying up some bogs. However, disturbance and thawing of permafrost would not affect the regional groundwater system.

4.3.2.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

Impacts to groundwater as a result of the proposed action are likely similar to those discussed under Alternative 2 and Alternative 4. The overall impact of construction and use of the BAX at North Texas Range and the CACTF at Eddy Drop Zone on groundwater is considered minor.

4.3.2.2 Mitigation

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts to groundwater. The appendix states how the offered mitigation would serve to eliminate or lessen the foreseen impact and offers an assessment of the potential success of the mitigation. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

4.3.2.2.1 Existing Mitigation

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts.

- Continued monitoring of groundwater resources currently within the USARAK monitoring program. This would provide an updated baseline for analysis of groundwater changes or impacts.
- Continued implementation of INRMPs, including institutional controls and training programs for troops, to reduce or eliminate the risk of inadvertent petrochemical releases that could affect groundwater (USARAK 2002b,c). The INRMPs contain specific actions to maintain and improve groundwater resources.
- Expanded monitoring to include groundwater resources on USARAK properties that are not currently being monitored. Priority monitoring should be conducted on those groundwater resources for which no current or historic data exists to expand the qualitative and quantitative baselines for groundwater.

4.3.2.2.2 Proposed Mitigation

No additional mitigation measures are needed. Current resource management practices and mitigation measures are sufficient to mitigate any additional impact to groundwater resources resulting from the construction and operation of the BAX and CACTF within DTA East. USARAK would comply with all State of Alaska requirements for an appropriation of groundwater prior to installing water system wells.

4.3.3 Wetlands

This section analyzes and compares wetland impacts associated with each alternative. Baseline data for this comparison are presented in Section 3.3.3.

Wetlands, important ecological resources, comprise significant portions of USARAK lands. Approximately 68 percent of DTA is classified as wetland (Lichvar 2000). As a consequence, construction of the BAX or CACTF at any of the alternative sites under consideration would impact some amount of wetlands. Use and management of wetlands are regulated by Section 404 of the Clean Water Act; Executive Order 11990, *Protection of Wetlands*; the Sikes Act, which requires the development and implementation of INRMPs; and the Military Lands Withdrawal Act (Public Law 106-65). USARAK would continue to avoid and/or minimize impacts to wetlands under these laws to the maximum extent practicable.

4.3.3.1 Comparison of Alternatives

4.3.3.1.1 Description of Methodology

USARAK has classified wetlands as either "higher function" or "other" for management purposes, a distinction not mandated by federal or state policies. Higher function wetlands include riverine areas, permanent emergent areas, semi-permanent emergent areas, riparian areas, and other sensitive wildlife habitats that lie within any wetland areas. The "other" category includes all other wetland types. The importance of various functions may vary by alternative location. The following definitions will be used to qualitatively categorize potential impacts to both USARAK wetland classifications:

- None – No measurable impacts are expected to occur.
- Minor – Small but measurable adverse impacts are expected. Adverse impacts would occur on less than 5 percent of either "higher function" or "other" wetlands within the range maneuver area.
- Moderate – Noticeable adverse impacts that would have a measurable effect on wetlands. Adverse impacts would occur on between 5 and 10 percent of "higher function" or "other" wetlands within the range maneuver area.
- Severe – Adverse impacts would be obvious. Adverse impacts would occur on greater than 10 percent of "higher function" or "other" wetlands within the range maneuver area.
- Beneficial – Impacts would benefit wetlands.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant in this analysis. The next category (severe) is considered significant. Mitigation measures have been developed to offset adverse impacts. Existing mitigation for impacts to wetlands is presented in Section 4.3.3.2, *Mitigation*.

Table 4.3.3.a presents a summary of quantitative impacts to wetland parameters for each alternative. Table 4.3.3.b summarizes the amount of wetland fill required for construction and operation of the BAX and CACTF. A summary of environmental consequences for each alternative and for DTA East as a whole is presented in Table 4.3.3.c.

Table 4.3.3.a Quantitative Summary of Impacts to Wetlands.

Alternatives/Footprint[1]	Area (acres)	Impacts to Higher Function Wetlands within Range (acres)	Impacts to Other Wetlands within Range (acres)
Eddy Drop Zone – BAX			
Construction Footprint (fill)	254	17	4
Maneuver Area (fill to meet throughput and maneuverability requirements)	2,872	0	0
Maneuver Area (potential disturbance)	2,872	241	147
Eddy Drop Zone – CACTF			
Construction Footprint (fill)	96	0	3
Maneuver Area (potential disturbance)	1,184	0	96
Donnelly Drop Zone – BAX			
Construction Footprint (fill)	508	75	293
Maneuver Area (fill to meet throughput and maneuverability requirements)	3,413	0	198
Maneuver Area (potential disturbance)	3,413	648	1,827

Alternatives/Footprint[1]	Area (acres)	Impacts to Higher Function Wetlands within Range (acres)	Impacts to Other Wetlands within Range (acres)
Donnelly Drop Zone – CACTF			
Construction Footprint (fill)	44	0	21
Maneuver Area (potential disturbance)	694	6	280
North Texas Range – BAX			
Construction Footprint (fill)	553	16	132
Maneuver Area (fill to meet throughput and maneuverability requirements)	2,548	2	107
Maneuver Area (potential disturbance)	2,548	113	810
North Texas Range – CACTF			
Construction Footprint (fill)	105	0	24
Maneuver Area (potential disturbance)	771	44	303
Combined North Texas Range and Eddy Drop Zone			
Construction Footprint – NTR BAX (fill)	727	4	211
Construction Footprint – EDZ CACTF (fill)	96	0	3
Maneuver Area – NTR BAX (fill to meet throughput and maneuverability requirements)	4,081	2	99
Maneuver Area – NTR BAX (potential disturbance)	4,081	227	1,019
Maneuver Area – EDZ CACTF (potential disturbance)	1,184	0	96

[1] Acres of wetlands impacted within the surface danger zone are not listed because there are no impacts to wetlands (fill or disturbance) expected to occur within the surface danger zone.

Table 4.3.3.b Total Fill in Wetlands for BAX and CACTF By Alternative.

Alternative/Footprint	Fill (acres)[1]
Eddy Drop Zone – BAX and CACTF	26
Donnelly Drop Zone – BAX and CACTF	587
North Texas Range – BAX and CACTF	281
Combined North Texas Range BAX and Eddy Drop Zone CACTF	319

[1] Fill is defined as the area of wetlands to be filled for construction of both the BAX and CACTF range facilities, and potential fill at the BAX to meet minimum throughput and maneuverability requirements.

Table 4.3.3.c Summary of Environmental Consequences to Wetlands.

Alternative/Footprint	Higher Function Wetlands	Other Wetlands
Alternative 1: No Action		
Impact within DTA East (104,601 acres)	Annual wetland damage is approximately two acres per year; this minor damage is typically restored	
Alternative 2: Eddy Drop Zone BAX		
Construction Footprint (fill)	241 acres of higher function wetlands within the maneuver area. 17 acres of higher function wetlands would be filled for construction (approximately 7% of higher function wetlands within the maneuver area). *Moderate*	147 acres of other wetlands within the maneuver area. 4 acres of other wetlands would be filled for construction (approximately 3% of other wetlands within the maneuver area). *Minor*
DTA East (construction fill)	0.3% of higher function wetlands on DTA East filled for construction	0.02% of other wetlands on DTA East filled for construction
Maneuver Area (potential fill to meet minimum throughput and maneuverability requirements)	No higher function wetlands are required to be filled to meet requirements. *None*	No other wetlands are required to be filled to meet requirements. *None*
Maneuver Area (potential disturbance)[1]	224 acres of higher function wetlands within the maneuver area remain for potential disturbance by maneuvers	143 acres of other wetlands within the maneuver area remain for potential disturbance by maneuvers
DTA East (maneuver fill)	No higher function wetlands on DTA East filled for maneuver	No other wetlands on DTA East filled for maneuver
Surface Danger Zone	Area less likely to be used for vehicle maneuvers *Minor*	Area less likely to be used for vehicle maneuvers *Minor*
Alternative 2: Eddy Drop Zone CACTF		
Construction Footprint (fill)	No higher function wetlands would be filled during construction of the CACTF. *None*	96 acres of other wetlands within the maneuver area. 3 acres of other wetlands would be filled for construction (3% of other wetlands within the maneuver area) *Minor*
DTA East (construction fill)	No higher function wetlands on DTA East filled for construction	0.02% of other wetlands on DTA East filled for construction
Maneuver Area (potential disturbance)	Minimal off-road disturbance as travel would primarily be on established roads and trails within the range complex *Minor*	Minimal off-road disturbance as travel would primarily be on established roads and trails within the range complex *Minor*
Surface Danger Zone	Area less likely to be used for vehicle maneuvers *Minor*	Area less likely to be used for vehicle maneuvers *Minor*

Alternative/Footprint	Higher Function Wetlands	Other Wetlands
Alternative 3: Donnelly Drop Zone BAX		
Construction Footprint (fill)	648 acres of higher function wetlands within the maneuver area. 75 acres of higher function wetlands would be filled for construction (approximately 12% of higher function wetlands within the maneuver area) *Severe*	1,827 acres of other wetlands within the maneuver area. 293 acres of other wetlands would be filled for construction (approximately 16% of other wetlands within the maneuver area). *Severe*
DTA East (construction fill)	1% of higher function wetlands on DTA East filled for construction	2% of other wetlands on DTA East filled for construction
Maneuver Area (potential fill to meet minimum throughput and maneuverability requirements)	No higher function wetlands are required to be filled to meet requirements. *None*	198 acres of other wetlands are required to be filled to meet requirements (approximately 11% of other wetlands within the maneuver area). *Severe*
Maneuver Area (potential disturbance)[1]	573 acres of higher function wetlands within the maneuver area remain for potential disturbance by maneuvers	1,336 acres of other wetlands within the maneuver area remain for potential disturbance by maneuvers
DTA East (maneuver fill)	No higher function wetlands on DTA East filled for maneuver	1% of other wetlands on DTA East filled for maneuver
Surface Danger Zone	Area less likely to be used for vehicle maneuvers *Minor*	Area less likely to be used for vehicle maneuvers *Minor*
Alternative 3: Donnelly Drop Zone CACTF		
Construction Footprint (fill)	No higher function wetlands would be filled during construction of the CACTF. *None*	280 acres of other wetlands within the maneuver area. 21 acres of other wetlands would be filled for construction (approximately 8% of other wetlands within the maneuver area). *Moderate*
DTA East (construction fill)	No higher function wetlands on DTA East filled for construction	0.1% of other wetlands on DTA East filled for construction
Maneuver Area (potential disturbance)	Minimal off-road disturbance as travel would primarily be on established roads and trails within the range complex *Minor*	Minimal off-road disturbance as travel would primarily be on established roads and trails within the range complex *Minor*
Surface Danger Zone	Area less likely to be used for vehicle maneuvers *Minor*	Area less likely to be used for vehicle maneuvers *Minor*

Alternative/Footprint	Higher Function Wetlands	Other Wetlands
Alternative 4: North Texas Range BAX		
Construction Footprint (fill)	113 acres of higher function wetlands within the maneuver area. 16 acres of higher function wetlands would be filled for construction (approximately 14% of higher function wetlands within the maneuver area). *Severe*	810 acres of other wetlands within the maneuver area. 132 acres of other wetlands would be filled for construction (approximately 16% of other wetlands within the maneuver area). *Severe*
DTA East (construction fill)	0.3% of higher function wetlands on DTA East filled for construction	0.8% of other wetlands on DTA East filled for construction
Maneuver Area (potential fill to meet minimum throughput and maneuverability requirements)	2 acres of higher function wetlands are required to be filled to meet requirements (2% of higher function wetlands within the maneuver area). *Minor*	107 acres of other wetlands are required to be filled to meet requirements (approximately 13% of other wetlands within the maneuver area). *Severe*
Maneuver Area (potential disturbance)[1]	105 acres of higher function wetlands within the maneuver area remain for potential disturbance by maneuvers	571 acres of other wetlands within the maneuver area remain for potential disturbance by maneuvers
DTA East (maneuver fill)	0.03% higher function wetlands on DTA East filled for maneuver	0.7% of other wetlands on DTA East filled for maneuver
Surface Danger Zone	Area off limits to vehicle use *None*	Area off limits to vehicle use *None*
Alternative 4: North Texas Range CACTF		
Construction Footprint (fill)	No higher function wetlands would be filled during construction of the CACTF. *None*	303 acres of other wetlands within the maneuver area. 24 acres of other wetlands would be filled for construction (approximately 8% of other wetlands within the maneuver area). *Moderate*
DTA East (construction fill)	No higher function wetlands on DTA East filled for construction	0.1% of other wetlands on DTA East filled for construction
Maneuver Area (potential disturbance)	Minimal off-road disturbance as travel would primarily be on established roads and trails within the range complex *Minor*	Minimal off-road disturbance as travel would primarily be on established roads and trails within the range complex *Minor*
Surface Danger Zone	Area less likely to be used for vehicle maneuvers *Minor*	Area less likely to be used for vehicle maneuvers *Minor*

Alternative/Footprint	Higher Function Wetlands	Other Wetlands
Alternative 5: North Texas Range/Eddy Drop Zone Combination		
Construction Footprint – NTR BAX (fill)	227 acres of higher function wetlands within the maneuver area. 4 acres of higher function wetlands would be filled for construction (2% of higher function wetlands within the maneuver area). *Minor*	1,019 acres of other wetlands within the maneuver area. 211 acres of other wetlands would be filled for construction (approximately 21% of other wetlands within the maneuver area). *Severe*
DTA East – NTR BAX (construction fill)	0.06% of higher function wetlands on DTA East filled for construction	1.3% of other wetlands on DTA East filled for construction
Maneuver Area – NTR BAX (potential fill to meet minimum throughput and maneuverability requirements)	2 acres of higher function wetlands are required to be filled to meet requirements (less than 1% of higher function wetlands within the maneuver area). *Minor*	99 acres of other wetlands are required to be filled to meet requirements (approximately 10% of other wetlands within the maneuver area). *Moderate*
Maneuver Area – NTR BAX (potential disturbance)[1]	221 acres of higher function wetlands within the maneuver area remain for potential disturbance by maneuvers	709 acres of other wetlands within the maneuver area remain for potential disturbance by maneuvers
DTA East – NTR BAX (maneuver fill)	0.03% higher function wetlands on DTA East filled for maneuver	0.6% of other wetlands on DTA East filled for maneuver
Surface Danger Zone – NTR BAX	Area off limits to vehicle use *None*	Area off limits to vehicle use *None*
Construction Footprint – EDZ CACTF (fill)	No higher function wetlands would be filled during construction of the CACTF. *None*	96 acres of other wetlands within the maneuver area. 3 acres of other wetlands would be filled for construction (3% of other wetlands within the maneuver area) *Minor*
DTA East – EDZ CACTF (construction fill)	No higher function wetlands on DTA East filled for construction	0.02% of other wetlands on DTA East filled for construction
Maneuver Area – EDZ CACTF (potential disturbance)	Minimal off-road disturbance as travel would primarily be on established roads and trails within the range complex *Minor*	Minimal off-road disturbance as travel would primarily be on established roads and trails within the range complex *Minor*
Surface Danger Zone – EDZ CACTF	Area less likely to be used for vehicle maneuvers *Minor*	Area less likely to be used for vehicle maneuvers *Minor*

[1] This impact estimate assumes the even distribution of vehicular maneuver across the range maneuver area. Realistically, impacts would likely be localized near targets, roads, and trails and away from higher function wetlands and open water bodies. The exact locations of maneuver impact cannot be predicted. As a result, a worst case scenario predicting wetland disturbance throughout the entire maneuver area was used in this analysis. In combination with existing and proposed mitigation measures, including wetland avoidance, disturbance to wetlands by vehicles within the maneuver area would be expected to be lower than listed in this table.

4.3.3.1.2 Impacts Common to All Alternatives

Actual impacts from range construction would be restricted to only a small portion of the individual range(s) areas. Clearing of vegetation with heavy equipment would result in wetland degradation. Wetlands would also be lost as a result of fill for construction of roads, buildings, utility lines or other structures. Wetlands would be considered in the final engineering plans and layout of all range components. Wetland surveys are utilized during each design phase to assure that wetlands would be avoided, when practicable. Wetlands in Alaska are often associated with permafrost-rich soils. These areas would be identified during geotechnical surveys prior to construction. Silt fences and other construction techniques would be used to prevent siltation during construction. Construction would remove the least amount of vegetation possible.

Military vehicles used at the BAX would travel primarily off road and vehicle travel at the CACTF would primarily be on established roads and trails within the range complex. Impacts as a result of vehicular maneuver within the BAX would likely be localized near targets, roads, and trails, and would not directly or indirectly impact all acres within the maneuver areas. The exact locations of vehicular maneuver impact within the maneuver area cannot be predicted as maneuver can be performed anywhere not designated as off-limits. As a result, a worst case scenario predicting wetland disturbance throughout the entire maneuver area except higher function wetlands and open water areas was used in this analysis. However, during actual use of the range, USARAK's environmental limitations overlays (see Section 3.3.3.3, *Wetland Management*), which were developed as a planning tool for protecting wetlands during military maneuver activities, would be used to clarify where maneuver training is allowed. These overlays would be used to avoid adverse impacts to higher function wetlands as a result of vehicle maneuvers. In combination with existing and proposed mitigation measures, including wetland avoidance, impacts to wetlands within the maneuver area would be expected to be lower than listed in Table 4.3.3.c.

Military damage to wetlands can occur from off-road maneuvers and weapons training (typically within impact areas as a result of detonations of high explosive munitions) during summer when the wetlands are unfrozen (Radforth and Burwash 1977). Impacts to vegetation include the breaking and crushing of plants and disturbance to soils or wetland substrates. These off-road impacts are less harmful during winter when wetlands are frozen and snowpack protects vegetation. Finally, pollutants and hazardous materials associated with military operations can affect wetlands. As a consequence of the pervasiveness of wetlands within DTA, there is no practicable alternative to constructing the range complex within wetlands. No alternative location offers sufficient space outside of a wetland area.

Impacts could occur to the surrounding environment as a result of wetland disturbance and loss. Direct effects of significant wetland degradation include:

- Increased peak flow and increased water flow rates during runoff events
- Decreased flow volumes during low flow
- Lost erosion control
- Lost streambank stability
- Lost riparian habitats
- Lost fish and wildlife habitat
- Increased water temperatures during summer
- Lost organic matter in water, resulting in lower biological productivity
- Lost filtering capacity, and ready flow of sediments and pollutants through the system
- Lost permafrost and creation of thermokarst conditions

Vehicle maneuvers can directly or indirectly alter the composition of plant communities and vegetative structure. If wetlands are disturbed, small annual plants or invasive species often replace large perennial plants. Vehicle maneuvers could decrease plant cover and densities of woody vegetation, resulting in reduced wetland function and habitat quality. Foot maneuvers would cause very minor impacts to wetlands, vegetation and soils, as use of the range would be unique to each training event and footpaths would not be expected to develop.

Soils at disturbed sites also tend to become more compacted, which can affect seedling establishment, water and nutrient uptake, and root penetration. Reestablishment of plant communities may be impeded by such changes in soil properties. Soil erosion and transport may increase through reduced soil stability from the removal of vegetative cover and underlying supportive root systems. In severe cases, damaged plant communities could be replaced by lower quality plant communities.

Wetland damage in northern climates, such as Alaska, can affect the insulating layer that protects permafrost (see Section 3.2.1, *Soil Resources*). This could create thermokarst conditions, possibly leading to subsidence, and could increase sediment delivery to nearby waterways. As a result, the water quality and aquatic habitats could be degraded.

Severe adverse impacts would be expected if the Stryker or any other vehicle drove repeatedly through wetland areas of the BAX and CACTF or other portions of DTA in summer. Such events would also result in wetland degradation. Use of the Stryker on wetlands during winter would result in minor damage to wetland plants but minimal damage to the root systems and soil substrate due to frozen conditions. (Detailed discussion of maneuver training associated with Army transformation and use of the Stryker vehicle can be found in the *Final Environmental Impact Statement for Transformation of U.S. Army Alaska, Vols. 1 and 2).*

Wetlands are located within the surface danger zone of the BAX and CACTF at each alternative location. Inert (but live-fire) munitions would directly affect wetlands; however, construction or vehicle use is unlikely in these areas. Use of the range may damage and/or eliminate the tree component in areas around firing lanes, targets within the maneuver area and surface danger zone. This may convert the type of wetland from forested to scrub-shrub with a large standing, but dead, tree component. The munitions themselves would not contribute any measurable amount of fill and would not alter any wetland functions.

Use of smoke obscurants for training would be conducted within the proposed range facilities under the proposed action. This would include the use of fog oil smoke generators (both stationary and vehicular-mounted units), smoke grenades, and smoke pots. A Conditional Fog Permit granted by ADEC (that is renewed annually) allows the use of up to 6,000 gallons of fog oil and 2,000 gallons of kerosene per federal fiscal year. Production and use of SGF-2 (fog oil) smoke may have a slight adverse effect on DTA water quality. SGF-2 is a highly refined mineral oil that has been found nontoxic to humans and birds. The smoke cloud produced by the fog oil smoke generator atomizes oil into a very fine mist and, upon contact with a water body, may form a thin film or sheen on the water surface. It is known that large doses of oil pose a threat to aquatic organisms, and some aquatic biota are sensitive to oil-based products. Large quantities of oil can be persistent and may bio-accumulate. However, the deposition of oil from an SGF-2 generated smoke cloud is extremely low and would not produce the serious impacts of a substantial oil spill, given the relatively small amount applied to the environment. The measured deposition rate from SGF-2 generated smoke clouds averages less than 10 mg/m^2. This is equivalent to about one ounce of oil deposited on an acre of ground per fogging event (USARAK 2000c).

4.3.3.1.3 Impacts Attributed to Alternative 1 (No Action)

Potential impacts under the No Action Alternative must incorporate Army transformation activities at USARAK. The ROD on the transformation of USARAK was signed on May 27, 2004. Full transformation of USARAK was selected as the preferred alternative. The overall impact of transformation on wetlands at DTA was determined to be moderate (USARAK 2004a).

Between 2000 and 2005, wetland damage due to military training was approximately 11 acres, of which a majority was restored. Damage may increase from this amount due to Stryker vehicle use. Affected areas would be monitored and rehabilitated. USARAK wetlands management policies ensure that direct adverse effects to wetlands would be avoided or minimized.

Total munitions requirements would increase by approximately 50 percent at DTA at the completion of transformation (USARAK 2004a). Any increased wetland damage as a result of high explosive munitions would be restricted to existing impact areas (USARAK 2004a).

Existing management programs regarding range management, INRMP implementation, environmental management, and sustainable range management would be fully funded and implemented as a result of transformation. Implementation of these programs includes soil and water quality monitoring, a Training Area Recovery Plan, and ecosystem management. This would result in improved wetlands management on USARAK lands (USARAK 2004a).

Specific measures to minimize wetland impacts include:

- Implementation of additional wetlands mitigations on a case-by-case basis. This would ensure compliance with wetland regulations and conservation of wetland resources.
- Development and maintenance of a wetlands database for each USARAK post that includes the spatial distribution of wetland types and historic damage levels. This would provide information to better monitor and conserve wetland resources.
- Completion of wetlands surveys, including wetland types and locations, to ensure avoidance of sensitive areas during military operations, to conserve wetlands.
- Assessment of recreational vehicle impacts on wetlands. This study would provide information to improve future conservation efforts.

4.3.3.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

Wetlands would be impacted by construction and use of the BAX and CACTF at Eddy Drop Zone study area, as it would be impossible to locate the proposed ranges to completely avoid wetlands and still meet established range design, siting, and minimum throughput and maneuverability requirements (see Chapters 1 and 2 for a description of criteria).

Appendix, Figure 3.q indicates wetlands that could be affected by the construction of the BAX and CACTF within the Eddy Drop Zone study area. Construction projects under the proposed action include structures, targetry, buried utilities and roads at the BAX and structures, buried utilities and roads at the CACTF. Approximately 17 acres of higher function wetlands and 7 acres of other wetlands lie within the construction footprints of the BAX and CACTF and would be filled under the proposed action. The combined fill of higher function and other wetlands required for construction at the BAX and CACTF represents 5 percent of all wetlands within the range maneuver area (24 out of 484 acres).

The majority of Eddy Drop Zone contains uplands that are able to support year-round training with military vehicles. Due to the distribution of uplands within the site, the BAX maneuver area can support 10,001 Stryker vehicle passes per year during the summer months without severe damage from rutting and erosion. This exceeds the 1,012 vehicle passes per year during summer months (minimum throughput) required for the BAX. No filling of wetlands would be required to achieve the minimum throughput and maneuverability requirements. Some wetland areas would still be disturbed by maneuvers but these areas would be repairable through the ITAM program (See the mitigation matrix in the appendix for a description of management techniques).

Approximately 241 acres of higher function wetlands and 147 acres of other wetlands within the BAX maneuver area (Table 4.3.3.b) could be disturbed from vehicular maneuver under this alternative. In combination with existing and proposed mitigation measures, including wetland avoidance, disturbance to wetlands by vehicles within the maneuver area would likely be less than 241 acres of higher function wetlands and 147 acres of other wetlands.

Wetlands are also located within the surface danger zone of the BAX and CACTF at Eddy Drop Zone. Inert (but live-fire) munitions would directly affect wetlands; however, construction or vehicle use is unlikely in these areas. Overall, impacts in the surface danger zone would be minor.

4.3.3.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

Wetlands would be impacted by construction and use of the BAX and CACTF at Donnelly Drop Zone study area, as it would be impossible to locate the proposed ranges to completely avoid wetlands and still meet established range design, siting, and minimum throughput and maneuverability requirements. Wetlands are the most numerous at this proposed location.

Appendix, Figure 3.r indicates wetlands that could be affected by the construction of the BAX and CACTF within the Donnelly Drop Zone study area. Approximately 75 acres of higher function wetland and 314 acres of other wetlands lie within the construction footprints of the BAX and CACTF and would be filled under the proposed action unless features could be sited to avoid wetlands during the final design process. The combined fill of higher function and other wetlands required for construction at the BAX and CACTF represents 21 percent of all wetlands within the range maneuver area (587 out of 2,761 acres).

Much of Donnelly Drop Zone contains wetlands that are unable to support year-round training with military vehicles. Due to the distribution of wetlands within the site, the BAX maneuver area can only support 988 Stryker vehicle passes per year during the summer months without severe damage from rutting and erosion. This does not meet the 1,012 vehicle passes per year during summer months (minimum throughput) required for the BAX. Filling of wetlands would be required to accommodate the minimum throughput and maneuverability requirements. Approximately 198 acres of wetlands would require filling (none of which would be higher function wetlands), mostly to provide sufficient trafficable terrain in order to meet maneuverability requirements. While fill would minimize rutting and erosion in wet soils, it would greatly alter the local vegetation and negatively impact natural soil structure, drainage patterns and wetland function. The impact to wetlands would be severe.

Approximately 648 acres of higher function wetlands and 1,827 acres of other wetlands within the BAX maneuver area (Table 4.3.3.b) could be disturbed from vehicular maneuver under this alternative. In combination with existing and proposed mitigation measures, including wetland

avoidance, disturbance to wetlands by vehicles within the maneuver area would likely be less than 648 acres of higher function wetlands and 1,827 acres of other wetlands.

Wetlands are located within the surface danger zone of the BAX and CACTF at Donnelly Drop Zone. Inert (but live-fire) munitions would directly affect wetlands; however, construction or vehicle use is unlikely in these areas. Overall impacts in the surface danger zone would be minor.

4.3.3.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

Wetlands would be impacted by construction and use of the BAX and CACTF at North Texas Range study area, as it would be impossible to locate the proposed ranges to completely avoid wetlands and still meet established range design, siting, and minimum throughput and maneuverability requirements.

Appendix, Figure 3.s indicates wetlands that could be affected by the construction of the BAX and CACTF within the North Texas Range study area. Approximately 16 acres of higher function wetland and 156 acres of other wetlands lie within the construction footprints of the BAX and CACTF and would be filled under the proposed action unless features could be sited to avoid wetlands during the final design process. The combined fill of higher function and other wetlands required for construction at the BAX and CACTF represents 22 percent of all wetlands within the range maneuver area (281 out of 1,270 acres).

Much of North Texas Range contains wetlands that are unable to support year-round training with military vehicles. Due to the distribution of wetlands within the site, the BAX maneuver area can only support 517 Stryker vehicle passes per year during the summer months without severe damage from rutting and erosion. This does not meet the 1,012 vehicle passes per year during summer months (minimum throughput) required for the BAX. Filling of wetlands would be required to accommodate the minimum throughput and maneuverability requirements. Approximately 109 acres of wetlands would require filling (of which approximately 2 acres would be higher function wetlands), mostly to provide sufficient trafficable terrain in order to meet maneuverability requirements. While fill would minimize rutting and erosion in wet soils, it would greatly alter the local vegetation and negatively impact natural soil structure, drainage patterns and wetland function. The impact to wetlands would be severe.

Approximately 113 acres of higher function wetlands and 810 acres of other wetlands within the BAX maneuver area (Table 4.3.3.b) could be disturbed from vehicular maneuver under this alternative. In combination with existing and proposed mitigation measures, including wetland avoidance, disturbance to wetlands by vehicles within the maneuver area would likely be less than 113 acres of higher function wetlands and 810 acres of other wetlands.

Wetlands are located within the surface danger zone of the BAX and CACTF at North Texas Range. Inert (but live-fire) munitions would directly affect wetlands; however, construction or vehicle use is prohibited in these areas as it is an existing impact area. Overall impacts within the surface danger zone would be minor.

4.3.3.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

Wetlands would be impacted by construction and use of the BAX and CACTF at North Texas Range and Eddy Drop Zone, as it would be impossible to locate the proposed ranges

to completely avoid wetlands and still meet established range design, siting, and minimum throughput and maneuverability requirements.

Appendix, Figure 3.t indicates wetlands could be affected by the construction of the BAX within the North Texas Range and the CACTF at Eddy Drop Zone. Approximately 4 acres of higher function wetlands and 211 acres of other wetlands lie within the construction footprint of the BAX at North Texas Range and would be filled under the proposed action unless features could be sited to avoid wetlands during the final design process. No higher function wetlands and 3 acres of other wetlands within the CACTF construction footprint at Eddy Drop Zone would be filled under this alternative. The combined fill of higher function and other wetlands required for construction at the BAX and CACTF represents 24 percent of all wetlands within the range maneuver area (319 out of 1,342 acres).

Much of North Texas Range contains wetlands that are unable to support year-round training with military vehicles. Due to the distribution of wetlands within the site, the BAX maneuver area can only support 648 Stryker vehicle passes per year during the summer months without severe damage from rutting and erosion. This does not meet the 1,012 vehicle passes per year during summer months (minimum throughput) required for the BAX. Filling of wetlands would be required to accommodate the minimum throughput and maneuverability requirements. Approximately 100 acres of wetlands would require filling (of which approximately 2 acres would be higher function wetlands), mostly to provide sufficient trafficable terrain in order to meet maneuverability requirements. While fill would minimize rutting and erosion in wet soils, it would greatly alter the local vegetation and negatively impact natural soil structure, drainage patterns and wetland function. The impact to wetlands would be severe.

Approximately 227 acres of higher function wetlands and 1,019 acres of other wetlands within the BAX maneuver area (Table 4.3.3.b) could be disturbed from vehicular maneuver under this alternative. In combination with existing and proposed mitigation measures, including wetland avoidance, disturbance to wetlands by vehicles within the maneuver area would likely be less than 227 acres of higher function wetlands and 1,019 acres of other wetlands.

Wetlands are located within the surface danger zones of the BAX and CACTF at North Texas Range and Eddy Drop Zone. Inert (but live-fire) munitions would directly affect wetlands; however, construction or vehicle use is prohibited in these areas as they are in an existing impact area (North Texas Range). Overall impacts within the surface danger zones would be minor.

4.3.3.2 Mitigation

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to minimize adverse impacts to wetlands. The appendix states how the offered mitigation would serve to eliminate or lessen foreseen adverse impacts and offers an assessment of the potential success of the mitigation to lessen the potential impacts. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

Before the Army could proceed on either of the three sites, pursuant to Executive Order 11990 – *Protection of Wetlands*, a determination must be made that there is no practicable alternative to constructing the project within wetlands and that adverse impacts of doing so would be minimized (see Finding of No Practicable Alternative in the appendix). USARAK would continue to avoid and/or minimize impacts to wetlands to the maximum extent possible.

Prior to the potential construction of the range facilities, USARAK would submit an individual Clean Water Act (CWA), Section 404 permit application, detailing exact amounts of wetlands to be filled and acres affected and would comply with all permitting conditions, potentially further mitigating impacts to wetlands.

4.3.3.2.1 Existing Mitigation

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts.

- Continued classification of wetlands as "higher function" or "other wetlands" for management purposes, and continued use of the environmental limitations overlays for planning military training activities and managing wetlands.
- Continued production of planning-level surveys, wetlands management and re-vegetation plans.
- Continued implementation of INRMPs, with specific actions for management of wetlands.
- Compliance with training exercise regulations, as stipulated by USARAK Range Regulation 350-2.
- Application of the ITAM program to inventory and monitor, repair, maintain, and enhance training lands.
- Continued damage control measures.

4.3.3.2.2 Proposed Mitigation

The following mitigation measures are essential in addressing impacts associated with the proposed action.

- Site facilities, targetry, access and firing roads/trails to avoid construction within wetlands, as much as practicable. Construction would remove the least amount of vegetation possible to avoid melting permafrost.
- Use silt fences and other construction techniques to prevent siltation during construction. Overburden would not be stored in wetland areas.
- Complete detailed wetland delineations as designs of the proposed BAX and CACTF facility are finalized and the exact locations of targets, trails, buildings and other construction elements are better known for utilization in siting of facilities, where necessary.

4.3.4 Vegetation

This section analyzes and compares the impacts to vegetation associated with each alternative. Baseline data for this comparison are presented in Section 3.3.4.

Alaska's training lands lie within the Subarctic ecoregion, and this area exhibits moderate to low resiliency to disturbance (Doe et al. 1999).

The variables analyzed in this section include vegetation cover/ecological land classification, rare plant impacts, forest resources, and invasive species management. Vegetation cover for this analysis is defined as natural aerial cover of vegetation (as opposed to bare ground), and the ecological land classification system is used for quantitative analyses of impacts to vegetative

cover. The presence of rare species is described for each study area, and the invasive species management and monitoring are also discussed.

4.3.4.1 Comparison of Alternatives

4.3.4.1.1 Description of Methodology

The following definitions will be used to categorize potential impacts to vegetation cover, forest resources, rare plants, and invasive species:

- None – No measurable adverse impacts are expected to occur.
- Minor – Adverse impacts would occur on less than 10 percent of vegetation within DTA East. Temporary damage (less than one year to recover) would occur in the maneuver area.
- Moderate – Adverse impacts would be between 11 to 25 percent of vegetation within DTA East. Short-term (two to five years to recover) damage would occur in the maneuver area.
- Severe – Adverse impacts to vegetation would occur on more than 25 percent of DTA East. Long-term (five or more years to recover) damage would occur in the maneuver area.
- Beneficial – Impacts would benefit vegetative resources.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant in this analysis. The next category (severe) is considered significant. Mitigation measures have been developed to offset adverse impacts. Existing and proposed mitigation for impacts to vegetation is presented in Section 4.3.4.2, *Mitigation*.

A summary of impacts is presented in Table 4.3.4.a. The overall impacts to vegetation would be relatively similar, regardless of study area. The most noticeable difference would be within the construction footprints where vegetation would be, in large part, eliminated. Additional changes would be expected in vegetative structure near the target areas and firing lanes within the maneuver area and surface danger zone at the Eddy Drop Zone study area (Alternative 2) and the North Texas Range study area (Alternative 4) and the combination North Texas Range BAX/ Eddy Drop Zone CACTF study areas (Alternative 5). These sites have a high proportion of forest within the surface danger zones, and the vertical structure and composition in some areas would be affected from weapons training. Eventually these areas would be in an early seral state because the trees within firing lanes would die. However, alteration of forest vegetation within the surface danger zone would not be extensive.

Table 4.3.4.a Summary of Environmental Consequences to Vegetation.

Alternatives/ Footprints	Resource Issues			
	Vegetative Cover	**Rare Plants**	**Invasive Plant Species**	**Forest Resources**
Alternative 1: No Action				
Impact within DTA East (104,601 acres)	Localized impacts from training and land use activities, but impacts are sustainable	There have not been large-scale impacts to rare plant communities, and relatively few new impacts expected	DTA is relatively free of widespread invasive plant infestations	Frequency of fires affects forest resources
Alternative 2: Eddy Drop Zone				
Construction Footprint *Impact*	350 acre footprint (0.3% of DTA East) *Minor*	Construction footprint is small *Minor*	Invasive species are easily managed within footprint *Minor*	Timber not viable for commercial sale *Minor*
Maneuver Area Acres affected % of DTA East *Impact*	4,056 acre area (3.9 percent of DTA East); maneuver impacts would be dispersed, temporary, and mitigated through environmental programs such as ITAM or TARP. *Minor*	Maneuver impacts would be dispersed and vulnerable habitats would be avoided. *Minor*	Disturbance would be widespread within maneuver area *Minor*	Timber not viable for commercial sale *Minor*
Surface Danger Zone *Impact*	Disturbance to vegetation limited to direct line of sight; composition and structure would change, but cover not negatively affected *Minor*	Rare plants would be relatively unaffected *None*	Minimal surface damage; native plants would dominate *Minor*	Timber not viable for commercial sale *Minor*
Alternative 3: Donnelly Drop Zone				
Construction Footprint *Impact*	552 acre footprint (0.5 percent of DTA East) *Minor*	Construction footprint is small *Minor*	Invasive species are easily managed within footprint *Minor*	Timber not viable for commercial sale *Minor*
Maneuver Area *Impact*	4,107 acre maneuver area (3.9 percent of DTA East); maneuver impacts would be dispersed, temporary, and mitigated through environmental programs such as ITAM or TARP. *Minor*	Maneuver impacts would be dispersed and vulnerable habitats would be avoided. *Minor*	Disturbance potential widespread within maneuver area *Minor*	Timber not viable for commercial sale *Minor*
Surface Danger Zone *Impact*	Disturbance to vegetation limited to direct line of sight; composition and structure would change, but cover not negatively affected *Minor*	Rare plants would be relatively unaffected *None*	Minimal surface damage; native plants would dominate *Minor*	Timber not viable for commercial sale *Minor*
Alternative 4: North Texas Range				
Construction Footprint *Impact*	657 acre footprint (0.7 percent of DTA East) *Minor*	Construction footprint is small *Minor*	Invasive species are easily managed within footprint *Minor*	Timber not viable for commercial sale *Minor*

Alternatives/ Footprints	Resource Issues			
	Vegetative Cover	**Rare Plants**	**Invasive Plant Species**	**Forest Resources**
Maneuver Area	3,319 acre area (3.3 percent of DTA East); maneuver impacts would be dispersed, temporary, and mitigated through environmental programs such as ITAM or TARP.	Maneuver impacts would be dispersed and vulnerable habitats would be avoided.	Disturbance potential widespread within maneuver area	Timber not viable for commercial sale
Impact	*Minor*	*Minor*	*Minor*	*Minor*
Surface Danger Zone	Relatively small areas of forest cover	Rare plants would be relatively unaffected	Minimal surface damage; native plants would dominate	Timber not viable for commercial sale
Impact	*Minor*	*None*	*Minor*	*Minor*
Alternative 5: North Texas Range/Eddy Drop Zone Combination				
Construction Footprint	823 acre footprint (0.8 percent of DTA East)	Construction footprint is small	Invasive species are easily managed within footprint	Timber not viable for commercial sale
Impact	*Minor*	*Minor*	*Minor*	*Minor*
Maneuver Area	5,235 acre area (5.2 percent of DTA East); maneuver impacts would be dispersed, temporary, and mitigated through environmental programs such as ITAM or TARP.	Maneuver impacts would be dispersed and vulnerable habitats would be avoided.	Disturbance potential widespread within area	Timber not viable for commercial sale
Impact	*Minor*	*Minor*	*Minor*	*Minor*
Surface Danger Zone	Relatively small areas of forest cover	Rare plants would be relatively unaffected	Minimal surface damage; native plants would dominate	Timber not viable for commercial sale
Impact	*Minor*	*None*	*Minor*	*Minor*

A quantitative summary of direct impacts to vegetative cover from the construction and use of the BAX/CACTF is presented in Table 4.3.4.b

Table 4.3.4.b Quantitative Summary of Impacts to Vegetation.

Type	Acres of Vegetation Affected			
	Eddy Drop Zone (Alternative 2)	**Donnelly Drop Zone (Alternative 3)**	**North Texas Range (Alternative 4)**	**North Texas Range/ Eddy Drop Zone Combination (Alternative 5)**
Total Area				
Construction	350	552	657	823
Maneuver	4,056	4,107	3,319	5,235
Barrens				
Construction	3	2	0	1
Maneuver	14	44	0	14
Broadleaf Forest				
Construction	144	8	23	105
Maneuver	1,768	93	82	764
Dwarf Scrub				
Construction	0	0	0	4
Maneuver	4	7	0	48
Low Scrub				
Construction	49	253	476	516
Maneuver	334	2,112	2,556	2,527

Type	Acres of Vegetation Affected			
	Eddy Drop Zone (Alternative 2)	**Donnelly Drop Zone (Alternative 3)**	**North Texas Range (Alternative 4)**	**North Texas Range/ Eddy Drop Zone Combination (Alternative 5)**
Low or Tall Scrub				
Construction	7	23	60	107
Maneuver	36	150	389	589
Mixed Forest				
Construction	19	9	0	1
Maneuver	213	77	0	12
Needleleaf Forest				
Construction	72	234	28	47
Maneuver	1,406	1,456	118	977
Human Disturbed				
Construction	50	15	65	40
Maneuver	244	102	135	242

4.3.4.1.2 Impacts Common to All Alternatives

Military damage to vegetation occurs from construction, off-road maneuvers, and weapons training. Off-road impacts are less harmful during winter when snowpack protects vegetation. Military impacts to vegetation can include breaking and crushing of plants and direct mortality. This can directly or indirectly alter plant community composition and structure, and vegetation cover. Military maneuvers can cause changes from large perennial plants to small annuals, decreases in plant cover, reduced densities of woody vegetation, and increases in invasive plant species (Severinghaus et al. 1981; Goran et al. 1983; Shaw and Diersing 1990; Thurow et al. 1995; Jones and Bagley 1997). However, the training areas at DTA are in good condition.

Vehicles can indirectly affect plant communities through soil compaction and by altering competitive relationships (Milchunas et al. 1998, 1999). Vehicle use can result in decreased plant litter, ground cover and basal cover, and increased bare ground (Shaw and Diersing 1989, 1990). Large military vehicles can alter vertical and horizontal structure of plant communities (Severinghaus et al. 1981).

Increased soil compaction can alter plant communities by affecting seedling establishment, plant water and nutrient uptake, and root penetration, and by causing invasions of more tolerant plant species. Reestablishment of plant communities and structure may be impeded by changes in soil properties (Shaw and Diersing 1990).

Wildland fire from military activities impacts vegetation by altering age class diversity, which maintains a diverse plant community. Fires occur on military lands and can be caused by incendiary devices (see Sections 3.2.3 and 4.2.3, *Fire Management*). The frequency of fires would increase in relation to training, which would result in changes to the vegetation structure and age classification on USARAK posts. Impacts from fires could range from beneficial to minor, moderate or severe if exposed areas were subjected to severe erosion, water accumulation, or loss of permafrost.

Management of invasive plant species is a concern on USARAK lands. The RTLA program monitors vegetation and documents invasive plant species. These species are managed using

integrated pest management techniques, whereby chemical control is minimized. In addition, pests such as the spruce bark beetle (*Dendroctonus rufipennis*) are a concern. This problem is addressed by managing for diversity in the age structure of timber stands (USARAK 2002b,c).

Construction would eliminate all vegetation in limited, well-defined locations. Subsequent range use would most likely eliminate the tree component that remains in a larger area, defined by firing lanes around targets within the range complex and the surface danger zone. Vegetative ground cover, whether grass, lichens, moss, low-growing shrubs, or taller growing willows/alders, would be mechanically maintained at the BAX and CACTF to protect soil resources and to provide training realism. Areas directly affected by construction would be re-seeded with native grass and would eventually become re-vegetated by other species, unless specifically maintained as grass by frequent mowing. Areas continually affected by range use would most likely convert from a forested area to a shrub-scrub dominated landscape. Any areas that are not recovering naturally would be re-vegetated through the ITAM-Land Rehabilitation and Maintenance (LRAM) program.

Many changes would occur in general vegetation when compared to the present conditions. However, it is desirable to maintain natural ground cover for training realism and soil stabilization, so these alterations would be minimized. USARAK's LRAM program conducts re-seeding (with native grass mixes) in disturbed areas identified during periodic land condition surveys. This existing program repairs damage from training and enhances re-vegetation following range facility construction. In addition, providing insulation (vegetative cover) as soon as possible following disturbance can prevent or slow the thawing of permafrost. In Alaska, grasses are the best option for re-vegetation, followed by some shrubs.

Fugitive dust from these construction projects could occur and result in short-term impacts to vegetation. No impacts to rare ecotypes or species of concern are expected.

The frequency and intensity of maneuver and weapons training would increase at the proposed BAX and CACTF locations. Changes in maneuver and artillery training could cause long-term adverse impacts to vegetation. Effects resulting from artillery training would be minor because live-fire operations would utilize inert munitions. Inert munitions would not create large craters usually associated with larger caliber, explosive-laden munitions. Live munitions would sometimes be used at the North Texas Range alternative, but this would not represent a change from the current use of the area (weapons firing from firing points and observation points into the existing dudded impact areas). Use of the Stryker or other military vehicles on wetlands during winter could result in minor damage to plants, but negligible damage to the root systems and soil substrate. Off-road maneuver training with the Stryker when vegetation is not dormant could result in damage to vegetation. The impacts could range from minor to moderate or severe, depending on environmental conditions and spatial extent of damage. The impacts to forest resources would be negligible. Increases in foot training during summer could result in minor impacts to vegetation, but the impacts would not be widespread.

BLM has management responsibility for vegetation rights at all proposed BAX and CACTF sites. There could be a one-time timber sale within the study areas to clear timber for range construction. Timber sales would be coordinated with BLM and adhere to USARAK and BLM requirements. A timber cruise would be conducted to determine the volume and value of affected timber prior to the start of construction. The current value of such timber, based on State of Alaska, Division of Forestry firewood timber sales, is approximately $2.00 per hundred cubic

feet of timber. BLM requires any usable timber that cannot be sold in a timber sale to be made available to the public at no cost. A USARAK and BLM firewood permit would be required.

Considering forest management priorities and lack of available markets, commercial sales of forest resources are not expected in any of the study areas in the foreseeable future, with (or without) the proposed action.

4.3.4.1.3 Impacts Attributed to Alternative 1 (No Action)

Potential impacts under the No Action Alternative must incorporate Army transformation activities at USARAK. The ROD on the transformation of USARAK was signed on May 27, 2004. Full transformation of USARAK was selected as the preferred alternative. The overall impact of transformation on vegetation at DTA was determined to be moderate (USARAK 2004a).

Maneuver and weapons training would impact vegetation as a result of transformation. More of DTA would be used for maneuver during winter when susceptible lands (e.g., wetlands) are frozen. During the remainder of the year, maneuvers would be confined to non-restricted areas with sufficient traction and less than 30 percent slope (USARAK 2004a).

Use of the Stryker vehicle on DTA training lands would increase damage to vegetation, although forest resources would not be affected. Depending on environmental conditions, damage could range from minor to moderate or severe. The impacts would be localized and could affect less than 0.1 percent of the post. Due to existing environmental regulations, direct adverse effects to vegetation would be minimized. Training areas would be monitored, and any damaged areas would be rehabilitated (USARAK 2004a).

Use of high explosive weapons in impact areas would increase as a result of transformation. Damage rates would increase from about 100 acres per year to about 150 acres. Craters accumulate windblown organic matter, and older craters appear to provide favorable conditions for future plant growth. The impacts would be sustainable (USARAK 2004a), and would be focused within impact areas.

Fires on DTA result from military training (Sections 3.2.3 and 4.2.3, *Fire Management*), and increased training could cause higher frequencies of fires. Although fires are natural and desirable ecological processes, they can have a large influence on the composition and structure of forests. The impacts to forest resources can be beneficial or adverse, depending on environmental conditions (USARAK 2004a).

Management actions regarding range management, ITAM, environmental management, and sustainable range management would be implemented at USARAK. Vegetation management would include implementation of the INRMPs, ecosystem management programs and the Training Area Recovery Plan (USARAK 2004a).

4.3.4.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

The overall impact of construction and use of the BAX and CACTF on vegetation at Eddy Drop Zone study area is considered minor. Vegetation removal would occur as a result of range construction. In addition, military damage to vegetation occurs from off-road maneuvers and

weapons training. Off-road impacts are less harmful during winter, when snowpack protects vegetation (For further discussion of impacts, see Section 4.3.4.1.2, *Impacts Common to All Alternatives*).

The affected land in the Eddy Drop Zone maneuver and construction footprints is primarily upland with mixed forest (78 percent of the construction and maneuver areas are needleleaf or mixed forest) vegetation and some low scrub vegetation. About 293 acres are currently cleared within the maneuver areas and construction footprints.

Construction projects under the proposed action include structures, targetry, and roads at the BAX, and structures and roads at the CACTF. The construction footprint at Eddy Drop Zone would encompass about 350 acres (or 0.3 percent of all vegetative cover within DTA East), all of which would be cleared of vegetation for roads, targetry, and building foundations (Table 4.3.4.a). This would be a minor impact. A portion of the approximately 4,054-acre maneuver area at Eddy Drop Zone would be partially cleared of vegetation over time from vehicles traveling off-road, regular maintenance activities, and by ammunition traveling within firing lanes around targets within the range complex. The proposed maneuver area comprises less than 4 percent of DTA East. These impacts would be dispersed and temporary, and would be mitigated through environmental programs such as ITAM and the Training Area Recovery Plan. Impacts within the maneuver area would be minor.

Monitoring and management would ensure that any areas not recovering naturally would be re-vegetated through the LRAM program. Overall, clearing would be minimized within the construction footprint and maneuver area, and as much existing vegetation would remain as possible, to provide cover, concealment and realism for subsequent training exercises. Vegetation buffers would remain areas along waterways or other specifically designated areas.

The surface danger zone within Eddy Drop Zone study area covers about 24,500 acres of land. Most of the smaller, low-lying vegetation would not be affected by firing into the surface danger zone but about 37 percent of the area is covered by forest. The trees within firing lanes would eventually be damaged and knocked over, and these areas would eventually become early succession scrub lands. Alteration of vegetative structure within the surface danger zone would not be extensive and is expected to be minor.

Previous inventories documented four sensitive plant species (those that are being tracked by the Alaska Natural Heritage Program's (AKNHP) Biological Conservation Database) within the Eddy Drop Zone study area. These include *Carex deweyana, Carex atratiformis, Viola selkirkii* and *Cryptogramma stelleri.* Surveys conducted in 2004 documented two of these species (*Carex atratiformis* and *Viola selkirkii*) as well as *Carex eburnean* within the boundaries of the study area (Mason 2005). Off-road vehicle maneuver impacts would be dispersed and vulnerable habitats would be avoided by using the environmental limitations overlays. These overlays indicate areas that are off-limits to vehicle maneuvers due to sensitive habitats or other features requiring special management actions. Overall, impacts would be minor.

Increased soil compaction due to maneuvers can alter plant communities by causing invasions of more tolerant invasive plant species. However, this would be minor as disturbance from vehicle maneuvers would be widespread throughout the area. The Eddy Drop Zone study area would continue to be monitored and managed for invasive species through the RTLA program.

A one-time timber sale in the Eddy Drop Zone study area to clear timber for range construction could occur. However, there are issues (primarily available markets) that might make this type of removal impracticable.

4.3.4.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

The overall impact of construction and use of the BAX and CACTF on vegetation at Donnelly Drop Zone study area is considered minor. Vegetation removal would occur as a result of range construction. Off-road impacts are less harmful during winter when snowpack protects vegetation. (For further discussion of impacts, see Section 4.3.4.1.2, *Impacts Common to All Alternatives*).

The affected land in the Donnelly Drop Zone study area has a high proportion of wetland with needleleaf forest (dominated by black spruce) comprising 18 percent of the vegetation. The area also includes coverage of about 18 percent broadleaf forest (paper birch and aspen). The dominant vegetation within the study area is low scrub and shrub vegetation (58 percent) including willow, alder and dwarf birch. About 109 acres is currently cleared within the study area.

The construction footprint at Donnelly Drop Zone would encompass about 552 acres (or 0.5 percent of all vegetative cover within DTA East), all of which would be cleared of vegetation for roads, targetry, and building foundations (Table 4.3.4.a). This would be a minor impact. A portion of the approximately 4,107-acre maneuver area at Donnelly Drop Zone would be partially cleared of vegetation over time from vehicles traveling off-road, regular maintenance activities, and by ammunition traveling within firing lanes around targets within the range complex. The proposed maneuver area comprises less than 4 percent of DTA East. These impacts would be dispersed and temporary, and would be mitigated through environmental programs such as ITAM and the Training Area Recovery Plan. Impacts within the maneuver area would be minor.

Monitoring and management would ensure that any areas not recovering naturally would be re-vegetated through the LRAM program. Overall, clearing would be minimized within the construction footprint and maneuver areas, and as much existing vegetation would remain as possible, to provide cover, concealment and realism for subsequent training exercises. Vegetation buffers would remain areas along waterways or other specifically designated areas.

The surface danger zone within Donnelly Drop Zone study area covers nearly 20,200 acres of land. Most low-lying vegetation (e.g., scrub or grasslands) would not be affected by firing into the surface danger zone but about 23 percent of the area is covered by forest. The trees within firing lanes would eventually be damaged and knocked over, and these areas would become early succession scrub lands. Alteration of forest vegetation within the surface danger zone would not be extensive and is expected to be minor.

Previous inventories documented only one of the AKNHP-listed species within the Donnelly Drop Zone study area (*Carex atratiformis*). During the 2004 survey it was found to be widespread and common on disturbed sites (Mason 2005). Off-road vehicle maneuver impacts would be dispersed and vulnerable habitats would be avoided by using the environmental limitations overlays. These overlays indicate areas that are off-limits to vehicle maneuvers due to sensitive habitats or other features requiring special management actions. Overall, impacts would be minor.

Increased soil compaction due to maneuvers can alter plant communities by causing invasions of more tolerant invasive plant species. However, this would be minor as disturbance from vehicle

maneuvers would be widespread throughout the area. The Donnelly Drop Zone study area would continue to be monitored and managed for invasive species through the RTLA program.

A one-time timber sale on the proposed BAX and CACTF alternative sites to clear timber for range construction could occur. However, there are issues (primarily available markets) that might make this type of removal impracticable.

4.3.4.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

The overall impact of construction and use of the BAX and CACTF on vegetation at North Texas Range study area is considered minor. Vegetation removal would occur as a result of range construction. (For further discussion of impacts, see Section 4.3.4.1.2, *Impacts Common to All Alternatives*).

The affected land in the North Texas Range study area is primarily low scrub and shrub tussock vegetation (approximately 88 percent). There is relatively little forest or other taller vegetation within the construction footprint and maneuver area when compared to the other study areas. A majority of the taller vegetation is located on the west side of the Delta River, within the surface danger zone. About 209 acres are currently cleared within the study area.

The construction footprint would encompass about 657 acres (or 0.7 percent of all vegetative cover within DTA East), all of which would be cleared of vegetation for roads, targetry, and building foundations (Table 4.3.4.a). This would be a minor impact. A portion of the approximately 3,319-acre maneuver area at North Texas Range would be partially cleared of vegetation over time from vehicles traveling off-road, regular maintenance activities, and by ammunition traveling within firing lanes around targets within the range complex. The proposed maneuver area comprises less than 4 percent of DTA East. These impacts would be dispersed and temporary, and would be mitigated through environmental programs such as ITAM and the Training Area Recovery Plan. Impacts within the maneuver area would be minor.

Monitoring and management would ensure that any areas not recovering naturally would be re-vegetated through the LRAM program. Overall, clearing would be minimized within the construction footprint and maneuver area, and as much existing vegetation would remain as possible, to provide cover, concealment and realism for subsequent training exercises. Vegetation buffers would remain areas along waterways or other specifically designated areas.

The surface danger zone within North Texas Range study area covers nearly 19,900 acres of land. Most low-lying vegetation (e.g., scrub or grasslands) would not be affected by firing into the surface danger zone, but about 69 percent of the area is covered by forest (most of the forest is white spruce west of the Delta River). The trees within firing lanes would eventually be damaged and knocked over, and these areas would become early succession scrub lands. Alteration of forest vegetation within the surface danger zone would not be extensive and is expected to be minor.

A 2004 survey of rare plants found large patches of *Carex crawfordii* mostly along pond margins. *Carex sychnocephala*, previously known at only one site on DTA, was discovered in a number of pond margins often growing with *C. crawfordii. Carex atratiformis* was found at several sites. *Dodecatheon pulchellum ssp. pauciflorum* is widespread and common in upland areas at this study area (Mason 2005). Off-road vehicle maneuver impacts would be dispersed and vulnerable

habitats (including pond margins) would be avoided by using the environmental limitations overlays. These overlays indicate areas that are off-limits to vehicle maneuvers due to sensitive habitats or other features requiring special management actions. Overall, impacts would be minor.

Increased soil compaction due to maneuvers can alter plant communities by causing invasions of more tolerant invasive plant species. However, this would be minor as disturbance from vehicle maneuvers would be widespread throughout the area. The North Texas Range study area would continue to be monitored and managed for invasive species through the RTLA program.

A one-time timber sale on the proposed BAX and CACTF alternative sites to clear timber for range construction could occur. However, there are issues (primarily available markets) that might make this type of removal impracticable.

4.3.4.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

The overall impact of construction and use of the BAX at North Texas Range and CACTF at Eddy Drop Zone is considered minor. Vegetation removal would occur as a result of range construction. (For further discussion of impacts, see Section 4.3.4.1.2, *Impacts Common to All Alternatives*).

The affected land in the combined study area is primarily low scrub and shrub tussock vegetation (approximately 63 percent). Broadleaf forest comprises about 13 percent of the study area, and needleleaf forest cover about 18 percent. Most of the forest coverage is within the Eddy Drop Zone CACTF site. About 232 acres are currently cleared within the study area.

The construction footprint would encompass about 823 acres (or 0.8 percent of all vegetative cover within DTA East), all of which would be cleared of vegetation for roads, targetry, and building foundations (Table 4.3.4.a). This would be a minor impact. A portion of the approximately 5,235- acre combined maneuver area at both North Texas Range and Eddy Drop Zone would be partially cleared of vegetation over time from vehicles traveling off-road, regular maintenance activities, and by ammunition traveling within firing lanes around targets within the range complex. The proposed maneuver area comprises less than 4 percent of DTA East. These impacts would be dispersed and temporary, and would be mitigated through environmental programs such as ITAM and the Training Area Recovery Plan. Impacts within the maneuver area would be minor.

Monitoring and management would ensure that any areas not recovering naturally would be re-vegetated through the LRAM program. Overall, clearing would be minimized within the construction footprint and maneuver area, and as much existing vegetation would remain as possible, to provide cover, concealment and realism for subsequent training exercises. Vegetation buffers would remain areas along waterways or other specifically designated areas.

A 2004 survey of rare plants large patches of *Carex crawfordii* mostly along pond margins in the North Texas Range BAX area. *Carex sychnocephala,* previously known at only one site on DTA, was discovered in a number of pond margins often growing with *C. crawfordii. Carex atratiformis* was found at several sites. *Dodecatheon pulchellum ssp. pauciflorum* is widespread and common in upland areas at this study area. *Viola selkirkii* as well as *Carex eburnean* have been found on or near the Eddy Drop Zone CACTF area. Off-road vehicle maneuver impacts would be dispersed and vulnerable habitats (including pond margins) would be avoided by using the environmental

limitations overlays. These overlays indicate areas that are off-limits to vehicle maneuvers due to sensitive habitats or other features requiring special management actions. Overall, impacts would be minor.

Increased soil compaction due to maneuvers can alter plant communities by causing invasions of more tolerant invasive plant species. However, this would be minor as disturbance from vehicle maneuvers would be widespread throughout the area. The North Texas Range study area would continue to be monitored and managed for invasive species through the RTLA program.

A one-time timber sale on the proposed BAX and CACTF alternative sites to clear timber for range construction could occur. However, there are issues (primarily available markets) that might make this type of removal impracticable.

4.3.4.2 Mitigation

The following existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts to vegetation. The appendix states how the offered mitigation would serve to eliminate or lessen foreseen adverse impacts and offers an assessment of the potential success of the mitigation to lessen the potential impacts. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

4.3.4.2.1 Existing Mitigation

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts.

- Continued inventory of forest resources to aid ecosystem management program.
- Continued use of environmental limitations overlays to protect vulnerable habitats, indicating areas where maneuver training is and is not allowed.
- Continued implementation of INRMPs, with specific actions for management of vegetation, including invasive species monitoring and management.
- Continued implementation of RTLA and LRAM programs to minimize and to rehabilitate vegetation damage, and to gather long-term monitoring data.
- Continued implementation of a recreational vehicle use policy at USARAK.
- Continue to make available usable timber that cannot be sold in a timber sale to the public at no cost.

4.3.4.2.2 Proposed Mitigation

The following mitigation measures are essential in addressing impacts associated with the proposed action.

- Maintain vegetative ground cover at the BAX and CACTF to protect soil resources and to provide training realism.
- Re-seed areas directly affected by construction with native grass.
- Re-vegetate any areas that are not recovering naturally through the LRAM program.
- Retain as much existing vegetation as possible to provide cover, concealment and realism. Retain vegetation buffers areas along waterways or other specifically designated areas.

4.3.5 Threatened or Endangered Species and Species of Concern

This section analyzes and compares the impacts to threatened or endangered species and species of concern associated with proposed alternatives. Baseline data for this comparison are presented in Section 3.3.5.

No federal or state threatened, endangered, proposed, or candidate plant or animal species are found within (or near) lands used by USARAK. Although the American peregrine falcon was de-listed as an endangered species in 1999, the USFWS requests consultation on any projects that may hinder their recovery. The installation is within their breeding range, and they have been known to nest at one location along the east bluff of the Delta River (Mason 2005). Proposed activities would have no effect on the recovery of the peregrine falcon in this area. The USFWS concluded that the Army's activities related to construction and operation of the BAX and CACTF would not likely adversely impact any federally listed species (see appendix). Several species of concern are found on USARAK lands (see Section 3.3.5).

USARAK's policies for management of endangered species are outlined in the INRMPs for each post (USARAK 2002b). Endangered species management goals and objectives include protection and conservation of endangered or threatened species found on USARAK posts, identification and delineation of species and their habitats, and compliance with Section 7 of the Endangered Species Act. USARAK currently conducts planning for the endangered species program, and would implement an inventory and monitoring program to identify the location and distribution of any rare, uncommon, or priority species; and would protect habitats of these species, if any species are found through already established monitoring programs. The endangered species program is integrated fully with other natural resources programs, especially ecosystem management. Because there are no federally listed endangered or threatened species on USARAK lands, all actions that protect, conserve, and enhance rare, uncommon, and priority species and their habitats are listed under other program areas.

4.3.5.1 Comparison of Alternatives

4.3.5.1.1 Description of Methodology

The following definitions will be used to categorize potential impacts to mammals, birds, amphibians, and fisheries. Not all criteria included in the definitions need to be met for that particular category to apply.

- None – No measurable adverse impacts are expected to occur.
- Minor – Adverse impacts would occur on less than 10 percent of preferred habitat (of a priority species) within DTA East. Temporary or localized displacement could affect individuals or less than 10 percent of the population on DTA East. Actions would result in 10 percent or less loss of population on DTA East over the long term (five years and beyond).
- Moderate – Adverse impacts would be between 11 to 25 percent of preferred habitat within DTA East. Temporary or regional displacement of the local population, resulting changes in distribution or population loss of 11 to 25 percent over the long term (five years and beyond).

- Severe – Adverse impacts would occur on more than 25 percent of preferred habitat on DTA East. Actions would result in permanent or long-term displacement of local population; or impacts would result in a 25 percent or greater loss to population on DTA East over the long term (five years and beyond).
- Beneficial – Impacts would benefit wildlife resources.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant in this analysis. The next category (severe) is considered significant. Mitigation measures have been developed to offset negative impacts. Existing mitigation of impacts to threatened or endangered species and species of concern is presented in Section 4.3.5.2, *Mitigation*.

Table 4.3.5.a presents a summary of environmental consequences to plant species of concern for each alternative.

Table 4.3.5.a Summary of Environmental Consequences to Plant Species of Concern.

Alternatives/ Footprints	Resource Issues
	Plant Species of Concern
Alternative 1: No Action	
Impact within DTA East (104,601 acres)	There have not been large-scale impacts to rare plant communities, and relatively few new impacts expected. Currently 18 AKNHP-listed rare plant species have been documented on DTA
Alternative 2: Eddy Drop Zone	
Construction Footprint *Impact*	350 acre construction footprint (0.3 percent of DTA East) is relatively small; plant species of concern found in area include: *Carex deweyana*, *Carex atratiformis*, *Viola selkirkii*, *Crytogramma stelleri* *Minor*
Maneuver Area *Impact*	4,054 acre maneuver area (3.9 percent of DTA East); maneuver impacts would be dispersed and vulnerable habitats would be avoided; plant species of concern found in area include: *Carex deweyana*, *Carex atratiformis*, *Viola selkirkii*, *Crytogramma stelleri* *Minor*
Surface Danger Zone *Impact*	Rare plants would be relatively unaffected *None*
Alternative 3: Donnelly Drop Zone	
Construction Footprint *Impact*	552 acre footprint (0.5 percent of DTA East) is relatively small; plant species of concern found in area include: *Carex atratiformis, Carex eburnea* *Minor*
Maneuver Area *Impact*	4,107 acre maneuver area (3.9 percent of DTA East); Maneuver impacts would be dispersed and vulnerable habitats would be avoided; plant species of concern found in area include: *Carex atratiformis, Carex eburnea* *Minor*
Surface Danger Zone *Impact*	Rare plants would be relatively unaffected *None*
Alternative 4: North Texas Range	
Construction Footprint *Impact*	730 acre footprint (0.7 percent of DTA East) is relatively small; plant species of concern found in the area include: *Carex crawfordii, Carex sychnocephala, Artemisia laciniata, Potamogeton obtusifolius* *Minor*
Maneuver Area *Impact*	4,123 acre maneuver area (3.9 percent of DTA East); Maneuver impacts would be dispersed and vulnerable habitats would be avoided; plant species of concern found in the area include: *Carex crawfordii, Carex sychnocephala, Artemisia laciniata, Potamogeton obtusifolius* *Minor*
Surface Danger Zone *Impact*	Rare plants would be relatively unaffected *None*

Alternatives/ Footprints	Resource Issues
	Plant Species of Concern
Alternative 5: North Texas Range/Eddy Drop Zone Combination	
Construction Footprint *Impact*	711 acre footprint (0.7 percent of DTA East) construction footprint is relatively small *Carex crawfordii, Carex sychnocephala, Artemisia laciniata, Potamogeton obtusifolius, Carex deweyana*, *Carex atratiformis*, *Viola selkirkii*, *Crytogramma stelleri* *Minor*
Maneuver Area *Impact*	4,439 acre maneuver area (4.2 percent of DTA East); Maneuver impacts would be dispersed and vulnerable habitats would be avoided. *Carex crawfordii, Carex sychnocephala ,Artemisia laciniata, Potamogeton obtusifolius, Carex deweyana*, *Carex atratiformis*, *Viola selkirkii*, *Crytogramma stelleri* *Minor*
Surface Danger Zone *Impact*	Rare plants would be relatively unaffected *None*

Table 4.3.5.b presents a quantitative summary of impacts to wildlife species of concern. A summary of environmental consequences to wildlife species of concern is presented in Table 4.3.5.c.

Table 4.3.5.b Quantitative Summary of Impacts to Wildlife Species of Concern.

Type	Acres of Preferred Habitat Affected			
	Eddy Drop Zone (Alternative 2)	**Donnelly Drop Zone (Alternative 3)**	**North Texas Range (Alternative 4)**	**North Texas Range/Eddy Drop Zone Combination (Alternative 5)**
Total Area				
Construction	350	552	657	823
Maneuver	4,056	4,107	3,319	5,235
White-winged Crossbill				
Construction	11	31	5	0
Maneuver	89	372	39	90
Townsend's Warbler				
Construction	182	96	80	51
Maneuver	1,865	797	177	319
Blackpoll Warbler				
Construction	134	333	229	214
Maneuver	1,625	2,218	1,217	1,479
American Osprey				
Construction	81	399	394	431
Maneuver	1,279	2,466	2,215	2,357
American Peregrine Falcon				
Construction	25	49	1	15
Maneuver	324	263	10	53

Table 4.3.5.c Summary of Environmental Consequences for Threatened or Endangered Species and Species of Concern – Wildlife.

Alternatives/ Footprint	**White-winged Crossbill** 17,668 acres preferred habitat	**Townsend's Warbler** 36,453 acres preferred habitat	**Blackpoll Warbler** 25,592 acres preferred habitat	**American Osprey** 15,042 acres preferred habitat	**American Peregrine Falcon** 4,593 acres preferred habitat
Alternative 1: No Action					
Impact within DTA East (104,601 acres)	Habitat loss from fires and forest clearing	Habitat loss from fires and forest clearing	Habitat loss from fires and forest clearing	Ospreys rarely use DTA East	American peregrine falcons nest at one location at DTA East
Alternative 2: Eddy Drop Zone					
Construction Footprint	Localized disturbance to habitat, population from forest clearing, range use and potential fires	Localized disturbance to habitat, population from forest clearing, range use and potential fires	Localized disturbance to habitat, population from forest clearing, range use and potential fires	Localized loss of habitat, but area not frequently used	Area not frequently used by American peregrine falcons
Impact	*Moderate*	*Moderate*	*Moderate*	*Minor*	*None*
Maneuver Area	Localized disturbance to habitat, population from forest clearing, range use and potential fires	Localized loss of habitat and increased disturbance rates	Localized loss of habitat and increased disturbance rates	Localized loss of habitat, but area not frequently used	Area not frequently used by American peregrine falcons
Impact	*Moderate*	*Moderate*	*Moderate*	*Minor*	*None*
Alternative 3: Donnelly Drop Zone					
Construction Footprint	Localized disturbance to habitat, and increased disturbance rates	Localized loss of habitat and increased disturbance rates	Localized loss of habitat and increased disturbance rates	Localized loss of habitat, but area not frequently used	Area not frequently used by American peregrine falcons
Impact	*Moderate*	*Moderate*	*Moderate*	*Minor*	*None*
Maneuver Area	Localized disturbance to habitat, and increased disturbance rates	Localized loss of habitat and increased disturbance rates	Localized loss of habitat and increased disturbance rates	Localized loss of habitat, but area not frequently used	Area not frequently used by American peregrine falcons
Impact	*Moderate*	*Moderate*	*Moderate*	*Minor*	*None*
Alternative 4: North Texas Range					
Construction Footprint	Localized disturbance to habitat, and increased disturbance rates	Localized loss of habitat and increased disturbance rates	Localized loss of habitat and increased disturbance rates	Localized loss of habitat, but area not frequently used	Localized loss of habitat; suitable nesting habitat near Delta River bluffs
Impact	*Minor*	*Moderate*	*Moderate*	*Minor*	*Minor*
Maneuver Area	Localized disturbance to habitat, and increased disturbance rates	Localized loss of habitat and increased disturbance rates	Localized loss of habitat and increased disturbance rates	Localized loss of habitat, but area not frequently used	Localized loss of habitat; suitable nesting habitat near Delta River bluffs; range use could disrupt individuals
Impact	*Minor*	*Moderate*	*Moderate*	*Minor*	*Minor*

Alternatives/ Footprint	**White-winged Crossbill** 17,668 acres preferred habitat	**Townsend's Warbler** 36,453 acres preferred habitat	**Blackpoll Warbler** 25,592 acres preferred habitat	**American Osprey** 15,042 acres preferred habitat	**American Peregrine Falcon** 4,593 acres preferred habitat
Alternative 5: North Texas Range/Eddy Drop Zone Combination					
Construction Footprint (NTR BAX)	Localized disturbance to habitat, and increased disturbance rates	Localized loss of habitat and increased disturbance rates	Localized loss of habitat and increased disturbance rates	Localized loss of habitat, but area not frequently used	Localized loss of habitat; suitable nesting habitat near Delta River bluffs
Impact	*Minor*	*Moderate*	*Moderate*	*Minor*	*Minor*
Construction Footprint (EDZ CACTF)	Localized disturbance to habitat, population from forest clearing, range use and potential fires	Localized disturbance to habitat, population from forest clearing, range use and potential fires	Localized disturbance to habitat, population from forest clearing, range use and potential fires	Localized loss of habitat, but area not frequently used	Area not frequently used by American peregrine falcons
Impact	*Moderate*	*Moderate*	*Moderate*	*Minor*	*None*
Maneuver Area (NTR BAX)	Localized disturbance to habitat, and increased disturbance rates	Localized loss of habitat and increased disturbance rates	Localized loss of habitat and increased disturbance rates	Localized loss of habitat, but area not frequently used	Localized loss of habitat; suitable nesting habitat near Delta River bluffs; range use could disrupt individuals
Impact	*Minor*	*Moderate*	*Moderate*	*Minor*	*Minor*
Maneuver Area (EDZ CACTF)	Localized disturbance to habitat, and increased disturbance rates	Localized loss of habitat and increased disturbance rates	Localized loss of habitat and increased disturbance rates	Localized loss of habitat, but area not frequently used	Area not frequently used by American peregrine falcons
Impact	*Moderate*	*Moderate*	*Moderate*	*Minor*	*None*

4.3.5.1.2 Impacts Common to All Alternatives

There are no known federally endangered or threatened species on DTA, but there several rare, uncommon, or priority species are on DTA (USARAK 2002b). Several plant and animal sensitive species and species of concern are found on or near the post (Table 3.3.4.a and Section 3.3.5.2.2). Military activities could affect some of these species.

The increase in personnel utilizing the proposed BAX and CACTF could result in additional adverse impacts to some species of concern. Construction in currently developed areas would unlikely affect any plant or wildlife species of concern. However, new developments could affect habitat, and maneuver training could affect vegetation through damage to plants or alteration of habitat. Likewise, maneuver training could affect sensitive wildlife, disrupting animals or altering habitat. Training intensity and vehicle use would increase, and some plant and animal species of concern could be affected.

4.3.5.1.3 Impacts Attributed to Alternative 1 (No Action)

Potential impacts under the No Action Alternative must incorporate Army transformation activities at USARAK. The ROD on the transformation of USARAK was signed on May 27, 2004. Full transformation of USARAK was selected as the preferred alternative. The overall impact of transformation on threatened or endangered species and species of concern at DTA was determined to be minor (USARAK 2004a).

Transformation would result in increased training intensity as described under the No Action Alternative in Sections 4.2.6, *Wildlife and Fisheries*, and 4.3.4, *Vegetation*. These actions could affect animal and plant species of concern. Transformation could increase disturbance to habitats or wildlife populations, but the effects would still be localized and minor for the white-winged crossbill, Townsend's warbler, blackpoll warbler, American osprey, and American peregrine falcon. Impacts to vegetation (habitat) would be minor (See Section 4.3.4 for a description of vegetation).

4.3.5.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

The overall impact of construction and use of the BAX and CACTF to plant species of concern are expected to be similar as to those discussed under the No Action Alternative. Moderate impacts to the white-winged crossbill, Townsend's warbler, and blackpoll warbler could occur because the preferred habitat of these species includes boreal forest types, which would be cleared for the range and used for training. Increased edge and forest fragmentation can result in increased predation. Large-scale fires could result in long-term loss of habitat. The Eddy Drop Zone study area is not considered prime habitat for American osprey or American peregrine falcon and any impacts would be none to minor.

4.3.5.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

The overall impact of construction and use of the BAX and CACTF to plant species of concern are expected to be similar as to those discussed under the No Action Alternative. Moderate impacts to the white-winged crossbill, Townsend's warbler, and blackpoll warbler could occur because the preferred habitat of these species includes boreal forest types, which would be cleared for the range and used for training. Increased edge and forest fragmentation can result in increased predation. Large-scale fires could result in long-term loss of habitat. The Donnelly Drop Zone study area is not considered prime habitat for American osprey or American peregrine falcon and any impacts would be none to minor.

4.3.5.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

Impacts to plant species of concern are expected to be similar as to those discussed under the No Action Alternative. Moderate impacts to Townsend's warbler and blackpoll warbler could occur because the preferred habitat of these species includes forest types that would be cleared for the range and used for training. Increased edge and forest fragmentation can result in increased predation. Large-scale fires could result in long-term loss of habitat. The North Texas Range study area has a low percentage of preferred habitats for white-winged crossbill, so any impacts would be minor. The study area does include potential habitat for American osprey and American peregrine falcon. The installation is within their breeding range, and they have been known to nest at one location along the east bluff of the Delta River (Mason 2005). Use of the range could affect sensitive wildlife by disrupting animals during training. Proposed activities would have no effect on the recovery of the peregrine falcon in this area and are expected to be minor.

4.3.5.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

Impacts to plant species of concern are expected to be similar as to those discussed under the No Action Alternative. Moderate impacts to the white-winged crossbill, Townsend's warbler, and

blackpoll warbler could occur because the preferred habitat of these species includes boreal forest types, which would be cleared for the range and used for training at both the BAX and CACTF. Increased edge and forest fragmentation can result in increased predation. Large-scale fires could result in long-term loss of habitat. The North Texas BAX area does include potential habitat for American osprey and American peregrine falcon. Use of the range could affect sensitive wildlife by disrupting animals during training. Proposed activities would have no effect on the recovery of the peregrine falcon in this area and are expected to be minor.

4.3.5.2 Mitigation

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts to threatened or endangered species and species of concern. The appendix states how the offered mitigation would serve to eliminate or lessen the foreseen impact and offers an assessment of the potential success of the mitigation. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

4.3.5.2.1 Existing Mitigation

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts.

- Continued extraction of information regarding threatened or endangered species from other ongoing surveys.
- Development of management guidelines with the USFWS and the ADF&G to address threatened or endangered species if found on USARAK lands.

4.3.5.2.2 Proposed Mitigation

Current management practices are sufficient to mitigate adverse impacts and monitor for the possible future presence of threatened or endangered species or species of concern.

4.3.6 Socioeconomics

This section analyzes and compares the social and economic impacts of the proposed action, primarily in the areas adjacent to DTA East. This includes the community of Delta Junction, as well as numerous, though dispersed, pockets of human populations over a broad area. Baseline data for this comparison was presented in Section 3.3.6.

4.3.6.1 Comparison of Alternatives

4.3.6.1.1 Description of Methodology

Economic modeling and forecasting is used to estimate the socioeconomic effects of USARAK transformation and the BAX/CACTF activities. Given the inescapable interdependencies (and economic linkages) of the DTA vicinity with other regions; it is difficult to specify DTA impacts. Therefore, all the impacts estimated and presented relate to the total impact, most of which are assumed to primarily affect the Delta Junction community. The qualitative terms used are defined as:

- None – No measurable adverse impacts are expected to occur.
- Minor – Adverse impacts are expected to occur; impacts would be measurable and may have slight effects on socioeconomics.
- Moderate – Adverse impacts are expected to occur; impacts would be noticeable and would have measurable effects on socioeconomics.
- Severe – Adverse impacts are expected to occur; impacts would be obvious and would have serious consequences to socioeconomics.
- Beneficial – Overall beneficial impacts are expected to occur.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant in this analysis. The next category (severe) is considered significant.

Table 4.3.6.a presents a summary of environmental consequences to socioeconomics for each alternative.

Table 4.3.6.a Summary of Consequences to Socioeconomics.

Alternatives/Footprints	Resource Issues				
	Monetary	**Construction**	**Operation**	**Quality of Life**	**Public Safety**
Alternative 1: No Action					
Impact within Delta Junction community	Beneficial due to construction and operation, but small	Beneficial, but small and temporary	Beneficial, but small due to few personnel permanently stationed at DTA	Beneficial overall due to increased employment and monetary contributions to local economy, although some negative impacts expected from recreational access restrictions	Beneficial due to federal funds for public safety infrastructure
Alternative 2: Eddy Drop Zone					
Area of consideration: Delta Junction community	Positive short-term increase	Positive short-term increase	Beneficial, but small	Beneficial overall due to increased employment and monetary contributions to local economy, although some negative impacts expected from recreational access restrictions	Beneficial due to federal funds for public safety infrastructure
Impact	*Beneficial*	*Beneficial*	*Beneficial*	*Beneficial*	*Beneficial*
Alternative 3: Donnelly Drop Zone					
Area of consideration: Delta Junction community	Positive short-term increase	Positive short-term increase	Beneficial, but small	Beneficial overall due to increased employment and monetary contributions to local economy, although some negative impacts expected from recreational access restrictions	Beneficial due to federal funds for public safety infrastructure
Impact	*Beneficial*	*Beneficial*	*Beneficial*	*Beneficial*	*Beneficial*
Alternative 4: North Texas Range					
Area of consideration: Delta Junction community	Positive short-term increase; loss of CRTC facilities would be negative	Positive short-term increase	Beneficial, but small	Beneficial overall due to increased employment and monetary contributions to local economy, although some negative impacts expected from recreational access restrictions	Beneficial due to federal funds for public safety infrastructure
Impact	*Minor*	*Beneficial*	*Beneficial*	*Beneficial*	*Beneficial*

Alternatives/Footprints	Resource Issues				
	Monetary	**Construction**	**Operation**	**Quality of Life**	**Public Safety**
Alternative 5: North Texas Range/Eddy Drop Zone Combination					
Area of consideration: Delta Junction community	Positive short-term increase; loss of CRTC facilities would be negative	Positive short-term increase	Beneficial, but small	Beneficial overall due to increased employment and monetary contributions to local economy, although some negative impacts expected from recreational access restrictions	Beneficial due to federal funds for public safety infrastructure
Impact	*Minor*	*Beneficial*	*Beneficial*	*Beneficial*	*Beneficial*

4.3.6.1.2 Impacts Common to All Alternatives

Social and economic effects occur in a number of ways. This includes direct monetary impacts and impacts to other values, such as recreation and lifestyle. General socioeconomic impacts can be summarized by the following categories:

- **Monetary Impacts** – Direct alteration of the quantity of money circulating in an area's economy, and, consequential local employment and income.
- **Construction Impacts** – Direct economic impact of BAX and CACTF construction.
- **Operational Impacts** – Long-term economic impact of BAX and CACTF operation.
- **Quality of Life** – Indicates values inherent in lifestyle preferences and non-employment activities pursued, such as recreation.
- **Housing and Public Services** – Indicators of the economic climate of an area; changes in vacancy rates and availability of public services in turn affect an area's economy.
- **Public Safety** – Public safety and crime.

Monetary Impacts – These effects would be greater if the immediate economic region was more developed, mature, and inter-connected. As is, many of the major suppliers of goods and services are located in either Fairbanks or Anchorage. This notwithstanding, significant benefits still accrue to the local economy through the payment of wages, purchases of materials and capital investments by various businesses performing either construction and/or maintenance services.

The major impact, over the long-term, would stem from the ongoing operation of the training facilities. The activities being considered for the proposed action are consistent with levels of operation covered in the *Final Environmental Impact Statement for Transformation of U.S. Army Alaska, Vols. 1 and 2* (USARAK 2004a) for all affected economic areas, including the immediate vicinity of DTA. While the nature of activities may change as result of the new BAX and CACTF training facilities, the overall level of operation would remain approximately the same.

Construction activities would provide noticeable, specific and positive short-term increases in local economic activity. Following initial construction activity, the social and economic effects of facility operations do not vary significantly among the various alternative sites. The No Action Alternative would also exhibit similar or comparable effects during the operational phases. In short, operational impacts would be similar and comparable, even in the case of the No Action Alternative. The expansion of range activities is an inevitable part of Army transformation, and the increased long-term operational employment and income effects are essentially the same, though the details of the activity may vary slightly among alternatives.

Construction Impacts – Construction impacts are more consequential, albeit short-term in nature. As noted earlier, major procurements would likely be awarded to businesses outside Delta

Junction. However, they would have a pronounced impact on Delta's economy and would add significantly to the overall development of infrastructure and commercial development in the area. The proposed construction period for the range facilities varies slightly between alternative but all anticipate at least two years. Below are the construction costs for all alternatives except the No Action Alternative:

Alternative	Estimated Cost ($)	Total with Multiplier
2: Eddy Drop Zone	$68.5 million	$135.6 million
3: Donnelly Drop Zone	$124.9 million	$247.3 million
4: North Texas Range	$127.6 million	$252.6 million
5: Texas/Eddy Combo	$170.3 million	$337.2 million

While substantially greater than those construction expenditures that were projected to support Army transformation, impacts in the immediate vicinity consist of short-term employment and income effects, depending upon the skills required and the ability of the local economy to provide them. Some construction workers would also commute from outside the local region and would thus have only incidental effects in the region.

Operational Impacts – For all alternatives, operational impacts would be attributable to the employment of support staff (uniformed and non-uniformed) operating and maintaining the ranges, military personnel utilizing the ranges, and local procurements for supplies and services. As these would be comparable to the impacts assessed for Army transformation (the new "status quo" at DTA), they would remain beneficial but small.

Quality of Life – The most significant quality of life aspect of the proposed action, as defined through public involvement, revolves around recreational access, subsistence, and traffic congestion. These issues are only briefly discussed in this section as they are addressed in detail in other sections of this EIS (see Sections 4.3.7, *Subsistence*; 4.3.8, *Public Access and Recreation*; and 4.3.5, *Human Health and Safety*). Operation of a BAX would, under several alternative sites, create occasional noise spillover to adjacent private property. The deployment of troops for training at DTA would create periods of traffic congestion and possibly crowd local retail and hospitality establishments between training exercises if training personnel are allowed to visit Delta Junction. Despite these factors, overall impacts would be expected to be positive under each alternative.

Housing and Public Services – Despite Delta Junction's recent economic expansion, the direct monetary and population impacts associated with each alternative are considered beneficial, but small. In short, expansion of the region's economy through development and employment provides a stronger, diversified economic base. This, in turn, benefits infrastructure development including transportation, retail/shopping, and utilities (including enhanced communications) by providing them at relatively lower costs to users.

Public Safety – Public scoping and involvement identified some issues, such as increased risk of wildfire, of particular concern to the public. These issues are considered separately in this EIS (see Sections 4.2.3, *Fire Management*; 4.2.5, *Human Health and Safety*; and 4.3.8, *Public Access and Recreation*). In this socioeconomics analysis, public safety refers more specifically to crime and local police, fire, and health services. As part of the Space and Missile Defense Command (SMDC) project, federal funds amounting to $25 million have been earmarked for infrastructure

development. These funds have financed a new fire station, ambulance, and other fire protection equipment.

4.3.6.1.3 Impacts Attributed to Alternative 1 (No Action)

Currently, USARAK activities have a beneficial impact on the Delta Junction economy. Transformation is expected to provide a steady-state contribution of economic and social benefits and costs as described in the *Transformation of U.S. Army Alaska Final Environmental Impact Statement* (USARAK 2004a). There would be no new stationing of uniformed personnel although employment of additional support personnel is expected. This would not affect the area's demographics, housing, public and social services, public schools, or public safety. Expected impacts involve training activities and planned construction. Overall impacts to the region's economy would have a small but beneficial impact (USARAK 2004a).

Planned construction activity associated with SBCT transformation was projected at $1.5 million for DTA. This amount, combined with the associated indirect economic effects, would result in an estimated transitory total economic benefit of nearly $3 million to the Delta Junction economy. This is in addition to existing USARAK mission-essential construction projects on DTA valued at $68 million (USARAK 2004a).

Increased levels of training exercises under transformation will result in decreased recreational access to USARAK training lands and is expected to have a minor impact at DTA (USARAK 2004a). The value of this loss depends on the extent and duration of training closures. The worst case scenario (no public access during prime hunting) would result in a maximum loss of $3.5 million for hunting (USARAK 2004a). Fishing would be impacted much less since fish stock could be placed in other area lakes not subject to restrictions. Access restrictions are not expected to affect other recreational activities.

DTA training deployments from FWA and Fort Richardson (FRA) may incorporate both road and air transport, and would increase in size and frequency under transformation. Scheduled deployments may temporarily cause elevated noise and traffic congestion in the Delta Junction area. Increased congestion has a social impact to both recreational and commercial drivers through the increased opportunity cost of time spent in traffic. This impact is considered minor and can be offset through public announcement of scheduled deployments and smaller convoys (USARAK 2004a). Further discussion concerning traffic impacts can be found in Section 4.2.5, *Human Health and Safety*.

Temporary spending for construction activities and ongoing maintenance expenditures would produce beneficial but small economic impacts to the Delta Junction economy. As noted, permanent increases in Delta's employment base stimulate investments in infrastructure that enhances the overall quality of life.

4.3.6.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

Under the proposed action, stationing of additional uniformed personnel at DTA is not being considered. Therefore, aside from contributions to the local economy from BAX/CACTF construction and operation, socioeconomic effects of this alternative would not be expected to differ from the No Action Alternative. The overall impact of construction and use of the BAX and CACTF on local socioeconomics is considered beneficial overall.

Construction expenditures for the BAX and CACTF facilities under this alternative are estimated at $68.5 million, resulting in a total, temporary economic impact from construction of $135.6 million (including multiplier). The BAX/CACTF facilities would have a $2.5 million per year maintenance budget expected to have an economic impact of approximately $4.95 million or 99 jobs in the Delta Junction region.

As mentioned under the No Action Alternative, some additional traffic congestion would be associated with increased training levels and convoys. Noise associated with firing points located on the northern portion of the proposed BAX would result in some additional noise outside of the military installation boundary under certain conditions. For single event noise to be detectable off DTA, adverse weather condition must occur and this is predicted to occur during less than 10 percent of the scheduled training activities. This issue is considered separately in this EIS (see Section 4.2.4, *Noise*).

Public access restrictions would likely be greater than under the No Action Alternative because it includes the 33-Mile Loop Road and 12-Mile Crossing Road used for access to hunting and trapping areas. As mentioned under the No Action Alternative, the extent and duration of restrictions determines the degree of impact. Several possible mitigation measures have been proposed to maximize access to areas safe for public use during training exercises (see Section 4.3.8, *Public Access and Recreation*, for additional discussion).

4.3.6.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

This alternative is of similar scale and scope to Alternative 2. Therefore, socioeconomic impacts associated with that alternative are also applicable here. Overall impacts of construction and use of the BAX and CACTF on local socioeconomics are considered beneficial.

Construction expenditures under this alternative are more than 80 percent greater than under Alternative 2. Construction in the Donnelly Drop Zone location is estimated at $124.9 million, which would result in a total, temporary economic impact from construction of $247.3 million (including multiplier). The BAX and CACTF facilities would have the same maintenance budget ($2.5 million per year), which would be expected to have an economic impact of approximately $4.95 million or 99 jobs in the Delta Junction region.

As mentioned under Alternative 2, some additional traffic congestion would be associated with increased training levels and convoys. Public access restrictions to hunting and trapping areas would likely be similar to those under Alternative 2 because it includes the 33-Mile Loop Road and 12-Mile Crossing Road used for access to these areas. As mentioned above, the extent and duration of restrictions determine the degree of impact. Several possible mitigation measures have been proposed to maximize access to areas safe for public use during training exercises (see Section 4.3.8, *Public Access and Recreation*, for additional discussion).

4.3.6.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

This alternative is of similar scale and scope to Alternatives 2 and 3. Therefore, the socioeconomic impacts associated with those alternatives are applicable to Alternative 4. Overall impacts of construction and use of the BAX and CACTF on local socioeconomics are considered beneficial.

Construction expenditures under this alternative are more than 80 percent greater than under Alternative 2 and are slightly more than under Alternative 3. Construction at the North Texas Range location is estimated at $127.6 million, which would result in a total, temporary economic impact from construction of $252.6 million (including multiplier). The BAX and CACTF facilities would have the same maintenance budget ($2.5 million per year), which would be expected to have an economic impact of approximately $4.95 million or 99 jobs in the Delta Junction region.

As mentioned under Alternatives 2 and 3, some additional traffic congestion would be associated with increased training levels and convoys. Public access restrictions to fishing areas would likely be greater than those under the No Action Alternative because it includes Meadows Road and Windy Ridge Roads, which are used for access to stocked lakes. The extent and duration of restrictions determine the degree of impact. The worst case would result in fish stock being redistributed to other area lakes not subject to access restrictions. Several possible mitigation measures have been proposed to maximize access to areas safe for public use during training exercises (see Section 4.3.8, *Public Access and Recreation*, for additional discussion).

This study site for this alternative includes a portion of the Delta bison herd summer range. Active training may result in an earlier seasonal migration from their summer range north into agricultural areas (see Section 4.2.6, *Wildlife and Fisheries*). The potential impact from bison depredation on potato, small grain and hay crops could be large. The affected area includes almost 7,800 acres of crops with a 2003 market value in excess of $2.9 million. Currently, some level of depredation occurs each year contingent on when bison arrive from their summer grazing area. However, there are no baseline data available on existing depredation from bison to compare.

Under this alternative, impacts to existing Cold Regions Test Center (CRTC) testing facilities would occur, which could negatively impact its mission. CRTC contributes approximately $5 million to the local Delta Junction economy each year (Bond 2006) as a result of testing military equipment, through salaries and local procurement. The loss of CRTC's testing capability could result in a minor impact to the local economy.

4.3.6.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

This alternative is of similar scale and scope to Alternatives 2, 3, and 4. Therefore, the socioeconomic impacts associated with those alternatives are also applicable to Alternative 5. Overall impacts of construction and use of the BAX and CACTF on local socioeconomics are considered beneficial.

Construction expenditures under this alternative are more than twice than under Alternative 2 and are more than 30 percent greater under Alternatives 3 and 4. Construction under this alternative is estimated at $170.3 million, which would result in a total, temporary economic impact from construction of $337.2 million (including multiplier). The BAX and CACTF facilities would have the same maintenance budget ($2.5 million per year), which would be expected to have an economic impact of approximately $4.95 million or 99 jobs in the Delta Junction region.

As mentioned under previous alternatives, some additional traffic congestion would be associated with increased training levels and convoys. Public access restrictions to fishing areas would likely

be greater than those under the No Action Alternative because it includes the Meadows Road used for access to stocked lakes. The extent and duration of restrictions determine the degree of impact.

As the BAX is proposed to be located at North Texas Range under this alternative, active training may result in an earlier seasonal bison migration from their summer range north into agricultural areas (see Section 4.2.6, *Wildlife and Fisheries*). The potential impact from bison depredation on potato, small grain and hay crops could be large.

Minor impacts to the local economy as a result of impacts to CRTC testing facilities would also occur under this alternative.

4.3.6.2 Mitigation

No additional mitigation measures are proposed for socioeconomic impacts.

4.3.7 Subsistence

This section analyzes and compares the subsistence impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.3.7.

Subsistence entails the customary and traditional use of regional natural resources needed to meet the requirements of a rural existence. Subsistence is prevalent in many parts of rural Alaska and involves harvesting resources, such as fish, animals, plants, and wood, for direct consumption rather than obtaining those goods through commercial markets. Title VIII of Alaska National Interest Lands Conservation Act (ANILCA) obligates federal agencies to manage their lands so as to provide procedural requirements designed to perpetuate customary and traditional subsistence activities on federal land and by giving rural Alaskans preference in the take of fish and wildlife on federal lands, particularly when resources are scarce (16 USC 3114).

DTA East is situated within GMU 20. GMU 20 is subdivided into six subunits. These subunits are very large, and DTA East makes up approximately 2.5 percent of GMU 20D. Federal subsistence management regulations apply to all of GMU 20 (Appendix, Figure 3.m). The city of Delta Junction and surrounding communities have been designated rural communities under Title VIII of ANILCA and federal subsistence management regulations (50 CFR Part 100 and 36 CFR Part 242).

4.3.7.1 Comparison of Alternatives

4.3.7.1.1 Description of Methodology

Analysis of potential impacts to subsistence practices is based on a number of variables that might be affected by the proposed action. The primary variables include proximity of Army training lands and other federal property to regional rural communities, the types of subsistence activities that occur on Army and other federally-managed lands, the availability of subsistence resources on USARAK and other regional federal land, and the accessibility of Army and other federally-managed land for subsistence activities.

Qualitative analysis of subsistence impacts will be utilized. Qualitative data used scientific and historic data to predict positive or negative changes to subsistence resources. The following categories were used in assessing these impacts:

- None – No measurable adverse impacts are expected to occur to subsistence resources.
- Minor – Some adverse impacts would probably occur and might result in a slight change in subsistence patterns.
- Moderate – Adverse impacts are expected to occur, would be noticeable, and would have a measurable effect on subsistence, either in reduction of harvest, alteration of resource harvested, or change in harvest location.
- Severe – Adverse impacts would occur, with unavoidable effects on subsistence.
- Beneficial – Impacts are expected to improve subsistence resources.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant in this analysis. The next category (severe) is considered significant. Existing and proposed future measures to mitigate adverse impacts to subsistence practices are presented in Section 4.3.7.2, *Mitigation*.

Table 4.3.7.a presents a summary of environmental consequences to subsistence for each alternative location.

Table 4.3.7.a Summary of Environmental Consequences to Subsistence.

Alternatives/Footprints	Resource Issues	
	Subsistence Access	**Subsistence Resource Availability**
Alternative 1: No Action		
Impact within DTA East (104,601 acres)	Access closures during military training	Resources unavailable when ranges are closed to public use
Alternative 2: Eddy Drop Zone		
Construction Footprint *Impact*	Creation of additional roads/trails; increased training area closures; ready access to adjacent federal lands is available *Minor to Beneficial*	Range use, road construction would impact local wildlife habitat and behavior; ready access to adjacent federal lands is available *Minor*
Maneuver Area *Impact*	Increased training area closures, impact to taking of furbearers, small game, upland birds; ready access to adjacent federal lands is available *Minor*	Range use, road construction would impact local wildlife habitat and behavior; ready access to adjacent federal lands is available *Minor*
Surface Danger Zone *Impact*	Increased training area closures, impact to taking of furbearers, small game, upland birds; ready access to adjacent federal lands is available *Minor*	Range use, road construction would impact local wildlife habitat and behavior; ready access to adjacent federal lands is available *Minor*
Alternative 3: Donnelly Drop Zone		
Construction Footprint *Impact*	Creation of additional roads/trails; increased training area closures; ready access to adjacent federal lands is available *Minor to Beneficial*	Range use, road construction would impact local wildlife habitat and behavior; ready access to adjacent federal lands is available *Minor*
Maneuver Area *Impact*	Increased training area closures, impact to taking of furbearers, small game, upland birds; ready access to adjacent federal lands is available *Minor*	Range use, road construction would impact local wildlife habitat and behavior; ready access to adjacent federal lands is available *Minor*

Alternatives/Footprints	Resource Issues	
	Subsistence Access	**Subsistence Resource Availability**
Surface Danger Zone *Impact*	Increased training area closures, impact to taking of furbearers, small game, upland birds; ready access to adjacent federal lands is available *Minor*	Range use, road construction would impact local wildlife habitat and behavior; ready access to adjacent federal lands is available *Minor*
Alternative 4: North Texas Range		
Construction Footprint *Impact*	Creation of additional roads/trails; increased training area closures; ready access to adjacent federal lands is available *Minor to Beneficial*	Range use, road construction would impact local wildlife habitat and behavior; ready access to adjacent federal lands is available *Minor*
Maneuver Area *Impact*	Increased training area closures, impact to taking of furbearers, small game, upland birds; ready access to adjacent federal lands is available *Minor*	Range use, road construction would impact local wildlife habitat and behavior; ready access to adjacent federal lands is available *Minor*
Surface Danger Zone *Impact*	Area off limits to public access (impact area) *None*	Area off limits to public access (impact area); ready access to adjacent federal lands is available *None*
Alternative 5: North Texas Range/Eddy Drop Zone Combination		
Construction Footprint (NTR BAX) *Impact*	Creation of additional roads/trails; increased training area closures; ready access to adjacent federal lands is available *Minor to Beneficial*	Range use, road construction would impact local wildlife habitat and behavior; ready access to adjacent federal lands is available *Minor*
Construction Footprint (EDZ CACTF) *Impact*	Creation of additional roads/trails; increased training area closures; ready access to adjacent federal lands is available *Minor to Beneficial*	Range use, road construction would impact local wildlife habitat and behavior; ready access to adjacent federal lands is available *Minor*
Maneuver Area (NTR BAX) *Impact*	Increased training area closures, impact to taking of furbearers, small game, upland birds; ready access to adjacent federal lands is available *Minor*	Range use, road construction would impact local wildlife habitat and behavior; ready access to adjacent federal lands is available *Minor*
Maneuver Area (EDZ CACTF) *Impact*	Increased training area closures, impact to taking of furbearers, small game, upland birds; ready access to adjacent federal lands is available *Minor*	Range use, road construction would impact local wildlife habitat and behavior; ready access to adjacent federal lands is available *Minor*
Surface Danger Zone (NTR BAX) *Impact*	Area off limits to public access (impact area) *None*	Area off limits to public access (impact area); ready access to adjacent federal lands is available *None*
Surface Danger Zone (EDZ CACTF) *Impact*	Increased training area closures, impact to taking of furbearers, small game, upland birds *Minor*	Range use, road construction would impact local wildlife habitat and behavior; ready access to adjacent federal lands is available *Minor*

4.3.7.1.2 Impacts Common to All Alternative Actions

Impacts to subsistence can stem from a number of sources. Subsistence success depends upon on the user's ability to locate and harvest natural resources. Subsistence impacts can arise from the following issues:

- **Access** – Subsistence lifestyles require access to locations of harvestable resources, particularly wildlife, fish, and plant resources. This means both spatial and temporal access. Those aspects of the proposed action that are likely to affect access to subsistence resources are much the same as those impacting recreational access (i.e. area closures due to training, changes to terrain, pressure on wildlife), which are analyzed in detail in Section 4.3.8, *Public Access and Recreation*.
- **Resource Availability** – Subsistence success depends upon availability of those natural resources used in a subsistence lifestyle, such as game animals, fish, edible plants and other plant materials. Consequently, those aspects of the proposed action likely to impact vegetation resources (analyzed in Section 4.3.4, *Vegetation*) and animal resources (analyzed in Section 4.2.6, *Wildlife and Fisheries*) will also impact subsistence activities.

In addition to the analysis provided in this EIS, USARAK evaluated the potential impact that transformation will have on subsistence activities (USARAK 2004a). Prior to this, the BLM completed a Section 810 evaluation for the legislative withdrawal of federal lands for Army use. This evaluation was included in an EIS (USARAK 1999a). The conclusions reached in these studies remain valid and form a baseline for this review. The overall impact of transformation on subsistence at DTA was determined to be minor (USARAK 2004a).

Access – There would be an increase in the frequency of training area closures under the proposed action. In the past, public access closures during moose hunting season have been very limited. Construction and operation of the BAX and CACTF is likely to change this pattern. Increased training area access closures would affect primarily subsistence users' taking of furbearers, small game and upland birds. This impact is expected to be minor because alternate areas within DTA East and West and surrounding lands would still be available for access to subsistence resources including wildlife, fish, and plants (USARAK 2004a).

Construction of the BAX and CACTF would necessitate the creation of additional roads and maneuver trails on the training area. This is expected to have a beneficial effect on subsistence activities, as the new trails would make more areas of DTA East more readily accessible.

Resource Availability – As a consequence of the proposed range facilities, use of DTA East would intensify. New trails would expand training area availability. These new trails and increased road use would likely affect existing wildlife populations and habitat, with potential disruption to current activity patterns, movement, and higher incidental mortality of individuals. Wildlife populations can tolerate some disturbance from vehicular traffic; however, available information is insufficient to determine the extent of population-wide effects. For this reason, wildlife would be closely monitored by USARAK's ecosystem management program to better understand the impacts and the extent of disturbance resulting from increased road use and development (USARAK 2004a).

The proposed action is likely to have a minor adverse impact to individual moose and a moderate adverse impact to individual caribou within DTA East. Note that the current overall harvest of caribou is minimal in GMU 20D. Current regulations do not afford rural residents a priority for harvesting of caribou from the Macomb herd in GMU 20D. Current harvest of these animals is by special permit, and only 25 animals from this herd are harvested each year. As with area caribou, rural residents are not afforded a priority for taking moose within GMU 20D. Increases in training frequency and intensity could temporarily affect the distribution of moose. Moose appear well adapted to multiple use management (forestry, hunting, and military activities), and military

training appears no more detrimental to moose populations than other land uses (Andersen et al. 1996). Impacts to moose populations are potentially moderate if winter habitat were degraded. However, at most, approximately 4.5 percent of quality habitat at DTA East would be disturbed for ranges, leading to the growth of grass, shrub and successional habitat. This habitat is of high value to moose and other species. Moose make up a large portion of the overall subsistence harvest in interior Alaska (Marcotte 1991; ADF&G 2000) (USARAK 2004a). The creation of new early succession habitat also represents a detriment to local individuals. This changed habitat would serve to attract moose and other animals into the range area, which increases the potential for accidental injury or death to individual animals. Overall, the impact to the availability of moose would be minor to subsistence hunters (USARAK 2004a).

Training could also result in minor impacts to waterfowl and fisheries. Expected increases in training levels could lead to higher rates of erosion and sedimentation, as well as an increased potential for petroleum spills during refueling. However, such impacts would be localized within waterways. Fires could also be a result of increased training frequency, contributing to potential erosion into streams, ponds and waterways, and thus potentially affecting waterfowl and fisheries resources (USARAK 2004a).

Some wildlife populations might benefit from construction of the BAX and CACTF. USARAK would clear land for ranges, leading to grass, shrub, and successional habitat. This habitat is of high value to moose and bison. Moose make up a large portion of the overall subsistence harvest in interior Alaska (Marcotte 1991; ADF&G 2000) (USARAK 2004a).

The implementation of management actions associated with transformation are expected to improve monitoring and management of wildlife, fisheries, vegetation and habitat on DTA East.

DTA East is not the only federal land readily available to the regional rural community. Immediately south of DTA East, and running along the length of the Richardson Highway to the town of Glennallen, are vast tracks of federal land. These large tracts of federal land offer the same natural resources and game as are found within DTA East. Much of the land south of DTA East is managed to provide subsistence harvest preference for large game animals. The proximity to a major road offers regional residents ready access to small game and plant resources. This ensures access to an adequate range of natural resources sufficient to meet subsistence needs.

4.3.7.1.3 Impacts Attributed to Alternative 1 (No Action)

The No Action Alternative would maintain the status quo. The status quo involves considerable use of DTA East training lands by USARAK transformation forces. The impacts of these activities on subsistence practices within DTA East is set forth in the *Final Environmental Impact Statement for Transformation of U.S. Army Alaska, Vols. 1 and 2* (USARAK 2004a). Training intensity with DTA would increase as a direct consequence of transformation. Transformation includes greater numbers of personnel and the assignment of light armored vehicles. Local subsistence resources could be affected by increased frequency and intensity of training, as well as more extensive land use. Such foreseeable change would not significantly restrict access to subsistence resources, with an overall minor impact to subsistence resources (USARAK 2004a).

4.3.7.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

As this proposed action is of similar scale and scope, the access and resources impacts to subsistence are the same for each alternative. The minor impacts associated with the No Action

Alternative discussed above are applicable to this alternative. Although the proposed action would limit access to a large portion of DTA East, there is other sufficient and reasonably accessible federal land to ensure adequate natural resources to meet regional subsistence needs.

4.3.7.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

As this proposed action is of similar scale and scope, the access and resources impacts to subsistence are the same for each alternative. The minor impacts associated with the No Action Alternative discussed above are applicable to this alternative. Although the proposed action would limit access to a large portion of DTA East, there is other sufficient and reasonably accessible federal land to ensure adequate natural resources to meet regional subsistence needs.

4.3.7.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

As this proposed action is of similar scale and scope, the access and resources impacts to subsistence are the same for each alternative. The minor impacts associated with the No Action Alternative discussed above are applicable to this alternative. Although the proposed action would limit access to a large portion of DTA East, there is other sufficient and reasonably accessible federal land to ensure adequate natural resources to meet regional subsistence needs.

4.3.7.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

As this proposed action is of similar scale and scope, the access and resources impacts to subsistence are the same for each alternative. The minor impacts associated with the No Action Alternative discussed above are applicable to this alternative. Although the proposed action would limit access to a large portion of DTA East, there is other sufficient and reasonably accessible federal land to ensure adequate natural resources to meet regional subsistence needs.

4.3.7.2 Mitigation

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts to subsistence. The appendix states how the offered mitigation would serve to eliminate or lessen the foreseen impact and offers an assessment of the potential success of the mitigation. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

4.3.7.2.1 Existing Mitigation

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts.

- Continued compliance with regulations listed under the ANILCA. Work with relevant federal and state officials to protect local subsistence populations through a priority system when resources are reduced to protect the viability of subsistence in the area.
- Continued implementation of the INRMPs, with specific actions for the management of wildlife, fisheries, vegetation, and habitat.
- Continued ongoing soil and water quality monitoring to trace the fate of munitions constituents as described in INRMPs. This would be done to address concerns of contamination to subsistence resources.

- Continued establishment of government-to-government relationships with Alaska Native tribes whose interests may be significantly affected by USARAK activities. This would ensure efficient and effective communication between both leadership and staff members of tribal governments and USARAK.

4.3.7.2.2 Proposed Mitigation

The following mitigation measure is essential in addressing impacts associated with the proposed action.

- Make USARAK long-term training and convoy schedules available to the public, allowing regional residents to better plan subsistence activities within DTA East.
- Initiate and continue consultations with Alaska Native tribes to identify and evaluate traditional cultural properties that may be present on military managed land in interior Alaska.

4.3.8 Public Access and Recreation

This section analyzes and compares the public access and recreation impacts associated with each alternative. Baseline data for this comparison were presented in Section 3.3.8.

Public access to recreation on Army lands in Alaska is an important part of many residents' lifestyles. In accordance with the Sikes Act, USARAK works to ensure that its lands are available for public use, as much as possible, without affecting its primary military mission. Common activities include hiking, fishing, hunting, sightseeing, skiing, and trail use.

Complete information regarding access methods (ground, off-road recreational vehicles [ORRVs], air, and boat) and current use of DTA for public access and recreation can be found in Section 3.3.8.

4.3.8.1 Comparison of Alternatives

4.3.8.1.1 Description of Methodology

Analysis of public access and recreation impacts is based on a number of variables. The primary variables in this analysis include the level, frequency, type, and timing of public access and recreation use on USARAK lands.

Due to a lack of quantitative data for public access and recreation, qualitative analysis of public access and recreation impacts is utilized. Qualitative data uses scientific and historic data to predict positive or negative changes to public access and recreation. The following categories will be used in assessing these impacts:

- None – No measurable impacts are expected to occur to public access and recreation.
- Minor – Some adverse impacts would occur and would result in a slight change in public access and recreation patterns. A portion of the range would be closed up to 33 percent of the year (zero to 120 days).
- Moderate – Adverse impacts are expected to occur, would be noticeable, and would have a measurable effect on public access and recreation, such as reduction in access, alteration of recreational opportunities, or change in activity location. A portion of the range would be closed between 34 percent and 65 percent of the year (121 to 240 days).

- Severe – Adverse impacts are highly probable and would definitely limit public access and recreation. A portion of the range would be closed for more than 66 percent of the year (241 days or more).
- Beneficial – Impacts are expected to improve public access and recreation.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant in this analysis. The next category (severe) is considered significant. Mitigation measures have been developed to offset adverse impacts. Existing mitigation for impacts to public access and recreation are presented in Section 4.3.8.2, *Mitigation*.

Tables 4.3.8.a and 4.3.8.b present a summary of quantitative impacts to several public access and recreation parameters for each alternative. Further discussions of environmental consequences for each alternative are within Table 4.3.8.c and subsequent sections.

Table 4.3.8.a Quantitative Summary of Impacts to Recreation.

Alternatives/Footprint	Parameters (acres)			
	Area	ADF&G Delta Junction Management Area	ADF&G Game Management Unit	
			20D	20A
Eddy Drop Zone – BAX				
Construction Footprint	254	234	254	0
Maneuver Area	2,872	2,682	2,872	0
Surface Danger Zone	23,741	11,748	23,741	0
Eddy Drop Zone – CACTF				
Construction Footprint	96	96	96	0
Maneuver Area	1,184	1,184	1,184	0
Surface Danger Zone	1,123	1,123	1,123	0
Donnelly Drop Zone – BAX				
Construction Footprint	508	0	508	0
Maneuver Area	3,413	0	3,413	0
Surface Danger Zone	19,313	4,257	19,313	0
Donnelly Drop Zone – CACTF				
Construction Footprint	44	0	44	0
Maneuver Area	694	0	694	0
Surface Danger Zone	871	0	871	0
North Texas Range – BAX				
Construction Footprint	552	552	552	0
Maneuver Area	2,548	2,548	2,548	0
Surface Danger Zone	22,041	4,382	6,551	15,490
North Texas Range – CACTF				
Construction Footprint	105	105	105	0
Maneuver Area	771	771	771	0
Surface Danger Zone	1,318	1,318	1,318	0

Alternatives/Footprint	Parameters (acres)			
	Area	ADF&G Delta Junction Management Area	ADF&G Game Management Unit	
			20D	20A
Combined North Texas Range and Eddy Drop Zone				
Construction Footprint – NTR BAX	727	727	727	0
Construction Footprint – EDZ CACTF	96	96	96	0
Maneuver Area – NTR BAX	4,081	4,033	4,033	0
Maneuver Area – EDZ CACTF	1,184	1,184	1,184	0
Surface Danger Zone – NTR BAX	23,741	5,451	5,451	14,749
Surface Danger Zone – EDZ CACTF	1,123	1,123	1,123	0

Table 4.3.8.b Quantitative Summary of Impacts to Public Access.

Alternatives/Footprint	Parameters				
	Area (acres)	Access Roads (miles)			
		33-Mile Loop Road	12-Mile Crossing Road	Meadows Road	Windy Ridge Road
Eddy Drop Zone – BAX					
Construction Footprint	254	4	0	0	0
Maneuver Area	2,872	4	0	0	0
Surface Danger Zone	23,741	11	1	0	0
Eddy Drop Zone – CACTF					
Construction Footprint	96	<1	0	0	0
Maneuver Area	1,184	2	0	0	0
Surface Danger Zone	1,123	1	0	0	0
Donnelly Drop Zone – BAX					
Construction Footprint	508	0	0	0	0
Maneuver Area	3,413	0	0	0	0
Surface Danger Zone	19,313	8	1	0	0
Donnelly Drop Zone – CACTF					
Construction Footprint	44	0	0	0	0
Maneuver Area	694	0	0	0	0
Surface Danger Zone	871	0	0	0	0
North Texas Range – BAX					
Construction Footprint	552	0	0	1	<1
Maneuver Area	2,548	0	0	2	2
Surface Danger Zone	22,041	0	0	3	1
North Texas Range – CACTF					
Construction Footprint	105	0	0	0	1
Maneuver Area	771	0	0	0	1
Surface Danger Zone	1,318	0	0	0	2

Alternatives/Footprint	Parameters				
	Area (acres)	Access Roads (miles)			
		33-Mile Loop Road	12-Mile Crossing Road	Meadows Road	Windy Ridge Road
Combined North Texas Range and Eddy Drop Zone					
Construction Footprint – NTR BAX	727	0	0	1	<1
Construction Footprint – EDZ CACTF	96	0	0	0	0
Maneuver Area – NTR BAX	4,081	0	0	3	1
Maneuver Area – EDZ CACTF	1,184	2	0	0	0
Surface Danger Zone – NTR BAX	23,741	0	0	5	1
Surface Danger Zone – EDZ CACTF	1,123	1	0	0	0

Table 4.3.8.c Summary of Environmental Consequences to Public Access and Recreation.

Alternatives/Footprints	Resource Issues		
	Temporal Availability	Spatial Availability	Recreational Availability
Alternative 1: No Action			
Impact within DTA East (104,601 acres)	Range closures during military training	Development of new trails increases recreational access; range closures during military training reduce spatial availability of recreation	Development of new trails increases recreational access; impacts to hunting/ trapping and increased competition for resources
Alternative 2: Eddy Drop Zone			
Construction Footprint *Impact*	Permanently closed *Severe*	Permanently closed *Severe*	Permanently closed *Severe*
Maneuver Area *Impact*	Permanently closed *Severe*	Permanently closed *Severe*	Permanently closed *Severe*
Surface Danger Zone *Impact*	Closed for a maximum of 238 days; open when range is not in use *Moderate*	Closed for a maximum of 238 days; open when range is not in use *Moderate*	Closed for a maximum of 238 days; open when range is not in use *Moderate*
Alternative 3: Donnelly Drop Zone			
Construction Footprint *Impact*	Permanently closed *Severe*	Permanently closed *Severe*	Permanently closed *Severe*
Maneuver Area *Impact*	Permanently closed *Severe*	Permanently closed *Severe*	Permanently closed *Severe*
Surface Danger Zone *Impact*	Closed for a maximum of 238 days; open when range is not in use *Moderate*	Closed for a maximum of 238 days; open when range is not in use *Moderate*	Closed for a maximum of 238 days; open when range is not in use *Moderate*
Alternative 4: North Texas Range			
Construction Footprint *Impact*	Permanently closed *Severe*	Permanently closed *Severe*	Permanently closed *Severe*
Maneuver Area *Impact*	Permanently closed *Severe*	Permanently closed *Severe*	Permanently closed *Severe*

Alternatives/Footprints	Resource Issues		
	Temporal Availability	**Spatial Availability**	**Recreational Availability**
Surface Danger Zone *Impact*	Most of area currently permanently off limits to public access (impact area); closure would impact some portion of area open to public for 238 days *Moderate*	Most of area currently permanently off limits to public access (impact area); closure would impact some portion of area open to public for 238 days *Moderate*	Most of area currently permanently off limits to public access (impact area); closure would impact some portion of area open to public for 238 days *Moderate*
Alternative 5: North Texas Range/Eddy Drop Zone Combination			
Construction Footprint (NTR BAX) *Impact*	Permanently closed *Severe*	Permanently closed *Severe*	Permanently closed *Severe*
Construction Footprint (EDZ CACTF) *Impact*	Permanently closed *Severe*	Permanently closed *Severe*	Permanently closed *Severe*
Maneuver Area (NTR BAX) *Impact*	Permanently closed *Severe*	Permanently closed *Severe*	Permanently closed *Severe*
Maneuver Area (EDZ CACTF) *Impact*	Permanently closed *Severe*	Permanently closed *Severe*	Permanently closed *Severe*
Surface Danger Zone (NTR BAX) *Impact*	Most of area currently permanently off limits to public access (impact area); closure would impact some portion of area open to public for 238 days *Moderate*	Most of area currently permanently off limits to public access (impact area); closure would impact some portion of area open to public for 238 days *Moderate*	Most of area currently permanently off limits to public access (impact area); closure would impact some portion of area open to public for 238 days *Moderate*
Surface Danger Zone (EDZ CACTF) *Impact*	Closed for a maximum of 238 days; open when range is not in use *Moderate*	Closed for a maximum of 238 days; open when range is not in use *Moderate*	Closed for a maximum of 238 days; open when range is not in use *Moderate*

4.3.8.1.2 Impacts Common to All Alternatives

Military impacts on public access and recreation may occur in a number of ways. The Army must manage its lands to meet the primary military mission: military readiness. USARAK affects access and recreation by managing recreational opportunities and access through the following means:

- Temporal availability – The Army may decide how often, or for how long, its lands are available for public access.
- Spatial availability – To meet mission goals and to protect human health and safety, USARAK must keep certain lands or areas off-limits to public access. This can be temporary or permanent, such as dedicated impact areas and some ranges.
- Recreation availability – To protect and sustain Army lands, wildlife populations, or human health, the Army may alter the types or frequency of recreation allowed on its properties.

The increase in troops stationed on USARAK properties, and their subsequent use of training areas, could affect recreational demand and access. Construction, especially range facilities, could reduce the area available for some types of recreation, such as hunting. Increased training space requirements would reduce the time available for public access to training lands.

The portions of DTA East being considered for construction and operation of the BAX and CACTF are moderately important areas for large and small game hunting, and other recreational

activities. However, the transportation corridors that transit the proposed range footprints provide access to other important and heavily used recreational lands outside of the BAX and CACTF construction footprint and maneuver area. This includes both military and non-military (other federal, state, Native Alaskan, and privately) owned lands. If access to these areas is not maintained, the general public's ability to conduct recreational activities would be reduced.

Lakes stocked for recreational fishing by ADF&G on DTA are important recreational opportunities especially to Army and SMDC employees and construction workers. Because of the increased construction and expansion in the Delta Junction area, these lakes are absorbing increased demand for recreational fishing. These fishing opportunities are close to military installations and their closure due to military training could cause recreational expansion into other already heavily used wild stock and stocked fisheries (Coal Mine Lakes) in the area.

Entry without a valid Recreational Access Permit (RAP) and without calling the USARTRAK system is the most common form of trespass at DTA. Such trespass includes crossing the installation boundary (or the internal boundary of an off-limits area) without approval. Without increased education material and enforcement by USARAK, there may be an increase in trespass due to transformation and SMDC (more personnel) activities. Increased off-limits areas from construction of the BAX and CACTF are anticipated.

4.3.8.1.3 Impacts Attributed to Alternative 1 (No Action)

Potential impacts under the No Action Alternative must incorporate Army transformation activities at USARAK. The ROD on the transformation of USARAK was signed on May 27, 2004. Full transformation of USARAK was selected as the preferred alternative. The overall impact of transformation on public access and recreation at DTA was determined to be moderate (USARAK 2004a).

Transformation is expected to lead to development of new maneuver trails on DTA, particularly DTA East. More trails would provide positive impacts for ground and ORRV access, and would create more recreational opportunities for skiing, hiking, dog sledding, hunting, and trapping.

Transformation would also require a greater frequency of training land closures due to increased maneuver training requirements, including all-seasons training on DTA. Impacts could be moderate, depending on duration and timing of access closures. However, other portions of the training area and adjacent non-military lands would still be available for recreation.

The UAV would comply with existing FAA regulations and would use existing airspace restrictions during training operations. The UAV is not designed to fly during high wind or extremely cold conditions, which would limit the periods during which operation is possible. Operations are expected to have a negligible impact on public access and recreation. Airspace restrictions and other aircraft would continue to have a minor impact to air access.

Transformation could affect some game species. The overall harvest of caribou is minimal (less than 45 annually since 1997) in GMU 20D. The upper Jarvis Creek/Coal Mine Road area accounts for the majority of caribou taken in the general area (DuBois 2003). Increases in training frequency and intensity could temporarily affect the distribution of moose. Impacts to moose populations are potentially moderate if winter habitat were degraded. However, moose are readily adaptable to creation of new early succession habitat. Overall, the impact of transformation to the

availability of caribou and moose as game species would be minor. Overall hunting and trapping impacts are expected to remain minor.

Slight increases in sediment loads on DTA could have impacts to water quality, leading to a possibility that local fish populations could be affected. Impacts to fishing from decreased water quality are not expected. Use of stocked lakes, especially those along Meadows Road, is increasing. This would lead to reduced fish stocks and to increased competition among recreational anglers, unless stocking was increased to accommodate the increase. Impacts from increased competition could be minor. If pressure on the DTA East stocked lakes continues to increase, then USARAK would work with ADF&G to increase stocking.

Management actions relating to range management, the ITAM program, environmental management, and sustainable range management would continue. Mitigation measures under transformation would also involve fully implementing both a Training Area Recovery Plan and USARAK ecosystem management.

4.3.8.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

Under this alternative, the overall impact of construction and use of the BAX and CACTF on public access and recreation at Eddy Drop Zone is considered severe.

Lands proposed for use for these projects would be affected in terms of timing. Such use would be coordinated with ongoing public use of the areas surrounding the proposed ranges, consistent with current practices. In order to meet necessary training and maintenance needs, and protect equipment and facilities and ensure public safety, a permanent closure (year-round) of the BAX and CACTF construction footprint and maneuver area (approximately 4,400 acres) to the public would occur. This closure would be a localized severe impact to public access and recreation. The actual number of days of training at the BAX primarily depends on the required weapons training strategy for a particular unit. The DA PAM 350-38, *Standards in Training Commission* (STRAC), delineates the ammunition allocated for training events that are required for Soldiers to meet minimum training standards from the basic individual level through the advanced collective unit level. (see Chapter 2, Section 2.2.1.2.1, *Description of Units Using the BAX and Training Requirements*, for additional information). The maximum potential throughput or use of the BAX per year would be approximately 238 days. The minimum throughput of the BAX would be approximately 106 days. Closure of the surface danger zone to the public during training events would occur at least 106 days out of the year, and would likely occur for 238 days. The remaining portions of DTA East would be available for public access and recreation when military training is not occurring.

Development of the proposed BAX and CACTF at Eddy Drop Zone would be along 33-Mile Loop Road, the primary transportation route to the central and southern portions of DTA East (east of the Richardson Highway), and adjacent non-military lands. Certain portions of 33-Mile Loop Road would be incorporated into the construction footprint and maneuver area of the BAX. As lands within the BAX and CACTF construction footprint and maneuver area would be permanently closed under this alternative, access to 33-Mile Loop Road from the Richardson Highway (Mile Marker 264.8) within the range complex would be prohibited. This permanent closure would also eliminate access to the areas south of Eddy Drop Zone via 33-Mile Loop Road. This would be a severe adverse impact.

Several locations within the BAX and CACTF construction footprint and maneuver area traditionally used as hunting camps by the public during moose hunting season would no longer be available under this alternative. Hunters typically set up a camp and remain in the field for a weekend (or more) at a time. Hunters who camp and hunt within the proposed construction footprint and maneuver area would be adversely impacted during the hunting season, typically late August and September. Appendix, Figure 2.e shows the construction footprint and maneuver area that would be permanently closed.

The proposed Eddy Drop Zone BAX surface danger zone encompasses 23,741 acres. Portions of both 33-Mile Loop Road and 12-Mile Crossing (an additional transportation route providing access to the southern portion of DTA East and adjacent non-military lands) would be within the proposed surface danger zone. Closure of the surface danger zone to the public during training events would occur approximately 238 days out of the year, preventing use of both 33-Mile Loop Road and 12-Mile Crossing during this period. This would be a moderate impact. Appendix, Figure 2.e shows the training areas and portions of access roads within the surface danger zone that would be closed while training is occurring at the BAX and CACTF.

The 33-Mile Loop Road provides access to adjacent non-military lands such as the Granite Mountains, which are used by the general public for sheep, caribou and small game hunting, and other activities. Access to these areas via 33-Mile Loop Road and 12-Mile Crossing would be limited while the BAX and CACTF are in use under this alternative. 12-Mile Crossing may be the easiest access into the Granite Mountains; however, alternate access trails to the Granite Mountains exist off of military lands, and would not be affected by the construction and use of the BAX and CACTF. Limiting access to these trails may have a severe impact to the adjacent non-military lands.

Other recreational activities are not as closely tied to a specific season and can still be enjoyed whenever the surface danger zone or the remaining portion of DTA East surrounding the Eddy Drop Zone construction footprint and maneuver area is not in use. All recreational activities would be allowed to continue outside of the proposed range areas, in accordance with USARAK management policies.

Several methods to allow for continued recreational use and maximum public safety are proposed to reduce the adverse impact to public access and recreation within DTA East (see Section 4.3.8.2, *Mitigation*). Access gates could be placed in certain areas along 33-Mile Loop Road and 12-Mile Crossing to allow continued recreational access in certain areas during training. Exact gate placement would be determined following a decision on where the BAX and CACTF would be constructed. Other considerations include the construction of an “access corridor” through the permanently closed range complex to allow recreational use of the surrounding areas, improvement of Fleet Street (located northeast of the proposed BAX) and use as an access point to 33-Mile Loop Road, or construction of a new road that would avoid the range complex and still allow access to 33-Mile Loop Road and surrounding lands.

Posting of the installation boundary can reduce accidental trespass, but has minimal effect on premeditated trespass and can only be effective if associated enforcement efforts are included to prevent premeditated and deliberate trespass. Informational kiosks have been posted throughout DTA East to convey recreational access rules and regulations, information on recreational opportunities, and other important information. These information points can be used to inform the public about the use and location of the BAX and CACTF range complex.

4.3.8.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

The overall impact of construction and use of the BAX and CACTF on public access and recreation at Donnelly Drop Zone is considered severe.

In order to meet necessary training and maintenance needs, and protect equipment and facilities and ensure public safety, a permanent closure (year-round) of the BAX and CACTF construction footprint and maneuver area (approximately 4,650 acres) to the public would occur. This closure would be a localized severe impact to public access and recreation. The actual number of days of training at the BAX primarily depends on the required weapons training strategy for a particular unit. The DA PAM 350-38 delineates the ammunition allocated for training events that are required for Soldiers to meet minimum training standards from the basic individual level through the advanced collective unit level. (see Chapter 2, Section 2.2.1.2.1, *Description of Units Using the BAX and Training Requirements*, for additional information). The maximum potential throughput or use of the BAX per year would be approximately 238 days. The minimum throughput of the BAX would be approximately 106 days. Closure of the surface danger zone to the public during training events would occur at least 106 days out of the year and would likely occur for 238 days. The remaining portions of DTA East would be available for public access and recreation when military training is not occurring.

Development of the proposed BAX and CACTF at the Donnelly Drop Zone study area would be along MIDAS Site Road, an entry point used to access the southern portions of DTA East and adjacent non-military lands. As lands within the BAX and CACTF construction footprint and maneuver area would be permanently closed under this alternative, access to the southern portions of DTA East and adjacent non-military lands through the range complex would be prohibited. This would be a severe adverse impact.

Several locations within the BAX and CACTF construction footprint and maneuver area at Donnelly Drop Zone are used by the public to hunt and camp during moose hunting season. Hunters who have used the Donnelly Drop Zone proposed construction footprint and maneuver area in the past would be adversely impacted during the hunting season, typically late August and September. Appendix, Figure 2.f shows the construction footprint and maneuver area that would be permanently closed.

The proposed Donnelly Drop Zone BAX surface danger zone encompasses 19,313 acres. Portions of both 33-Mile Loop Road and 12-Mile Crossing would be within the proposed surface danger zone. Closure of the surface danger zone to the public during training events would occur approximately 238 days out of the year, preventing use of both 33-Mile Loop Road and 12-Mile Crossing during this period. This would be a moderate impact. Appendix, Figure 2.f shows the training areas and portions of access roads within the surface danger zone that would be closed while training is occurring at the BAX and CACTF.

Other recreational activities are not as closely tied to a specific season and can still be enjoyed whenever the surface danger zone or the remaining portion of DTA East surrounding the Donnelly Drop Zone construction footprint and maneuver area is not in use. All recreational activities would be allowed to continue outside of the proposed range areas, in accordance with USARAK management policies.

Several methods to allow for continued recreational use and maximum public safety are proposed to reduce the adverse impact to public access and recreation within DTA East (see Section 4.3.8.2, *Mitigation*). Access gates could be placed in certain areas along 33-Mile Loop Road and 12-Mile Crossing to allow continued recreational access in certain areas during training. Exact gate placement would be determined following a decision on where the BAX and CACTF would be constructed. Other considerations include the construction of an "access corridor" through the permanently closed range complex to allow recreational use of the surrounding areas or construction of a new road that would avoid the range complex and still allow access to 12-Mile Crossing, 33-Mile Loop Road and surrounding lands.

Posting of the installation boundary can reduce accidental trespass, but has minimal effect on premeditated trespass and can only be effective if associated enforcement efforts are included to prevent premeditated and deliberate trespass. Informational kiosks have been posted throughout DTA East to convey recreational access rules and regulations, information on recreational opportunities, and other important information. These information points can be used to inform the public about the use and location of the BAX and CACTF range complex.

4.3.8.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

The overall impact of construction and use of the BAX and CACTF on public access and recreation at North Texas Range is considered severe under this alternative.

In order to meet necessary training and maintenance needs, and protect equipment and facilities and ensure public safety, a permanent closure (year-round) of the BAX and CACTF construction footprint and maneuver area (approximately 4,860 acres) to the public would occur. This closure would be a localized severe impact to public access and recreation. The actual number of days of training at the BAX primarily depends on the required weapons training strategy for a particular unit. The DA PAM 350-38 delineates the ammunition allocated for training events that are required for Soldiers to meet minimum training standards from the basic individual level through the advanced collective unit level. (see Chapter 2, Section 2.2.1.2.1, *Description of Units Using the BAX and Training Requirements*, for additional information). The maximum potential throughput or use of the BAX per year would be approximately 238 days. The minimum throughput of the BAX would be approximately 106 days. Closure of the portion of the surface danger zone not within an existing dedicated impact area during training events would occur at least 106 days out of the year and would likely occur for 238 days. This closure is consistent with current access restrictions, as impact areas are closed to all public access. The remaining portions of DTA East would be available for public access and recreation when military training is not taking place.

Development of the proposed BAX and CACTF at the North Texas Range study area would be along Meadows and Windy Ridge roads. These roads are the primary transportation routes within the portion of DTA East that is west of the Richardson Highway. As lands within the BAX and CACTF construction footprint and maneuver area would be permanently closed under this alternative, the transportation loop created by Meadows Road, Windy Ridge Road and the Old Richardson Highway would be eliminated. Elimination of this loop would create several dead end roads, and reduce the amount of recreational area available to the public. This would be a severe adverse impact. Appendix, Figure 2.g shows the construction footprint and maneuver area that would be permanently closed.

The 14 stocked lakes along Meadows Road would not be impacted directly by construction and operation of the BAX, but all 14 would be unavailable to anglers if access to Meadows Road is eliminated. In addition, access to Big Lake, which is a popular camping area and is surrounded by the BAX maneuver area, would be permanently closed. Big Lake is maintained as a rearing nursery for rainbow trout by ADF&G. If access to stocked lakes is severely limited or eliminated, ADF&G would likely stop stocking affected lakes, resulting in a more permanent loss of recreational opportunity to the public (DuBois 2004). Their closure due to military training could also cause recreational expansion into other already heavily used wild stock and stocked fisheries in the area.

Meadows Road provides access to recreational lands used by the general public for moose and small game hunting, sightseeing, and many other activities. Access to these areas via Meadows and Windy Ridge roads would be limited. However, since there are only 10 permits issued for the Delta Junction Management Area, moose hunting in the North Texas Range study area would be minimally affected under this alternative. Other suitable alternate areas would be available for small game hunting.

The proposed North Texas Range BAX surface danger zone encompasses 22,041 acres. Portions of both Meadows and Windy Ridge roads would be within the proposed surface danger zone. Closure of the surface danger zone to the public during training events would occur approximately 238 days out of the year, preventing use of both these roads during this period. This would be a moderate impact. The remaining portion of the surface danger zone falls within an existing impact area, which is permanently off-limits to access. Appendix, Figure 2.g shows the training areas and portions of access roads within the surface danger zone that would be closed while training is occurring at the BAX and CACTF. The closure of the surface danger zone would close normal Meadows Road access to six stocked lakes: Mark, North and South Twin, Doc, Rockhound and No Mercy lakes. All but Mark Lake may be accessed by dirt trails from Bolio Lake by ORRV or snowmachine.

Other recreational activities are not as closely tied to a specific season and can still be enjoyed whenever the surface danger zone or the remaining portion of DTA East surrounding the North Texas Range construction footprint and maneuver area is not in use. All recreational activities would be allowed to continue outside of the proposed range areas, in accordance with USARAK management policies.

Several methods to allow for continued recreational use and maximum public safety are proposed to reduce the adverse impact to public access and recreation within DTA East (see Section 4.3.8.2, *Mitigation*). Access gates could be placed in certain areas along Meadows and Windy Ridge Roads to allow continued recreational access in certain areas during training, including access to stocked lakes. Exact gate placement would be determined following a decision on where the BAX and CACTF would be constructed. Other considerations include the construction of an “access corridor” through the permanently closed range complex to allow recreational use of the surrounding areas or construction of a new road that would avoid the range complex and still allow access to Meadows Road, stocked lakes and surrounding lands.

Posting of the installation boundary can reduce accidental trespass, but has minimal effect on premeditated trespass and can only be effective if associated enforcement efforts are included to prevent premeditated and deliberate trespass. Informational kiosks have been posted throughout DTA East to convey recreational access rules and regulations, information on recreational

opportunities, and other important information. These information points can be used to inform the public about the use and location of the BAX and CACTF range complex.

4.3.8.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

The overall impact of construction and use of the BAX at North Texas Range and CACTF at Eddy Drop Zone on public access and recreation is considered severe.

In order to meet necessary training and maintenance needs, and protect equipment and facilities and ensure public safety, a permanent closure (year-round) of the BAX and CACTF construction footprint and maneuver area (approximately 6,100 acres) to the public would occur. This closure would be a localized severe impact to public access and recreation. The actual number of days of training at the BAX primarily depends on the required weapons training strategy for a particular unit. The DA PAM 350-38 delineates the ammunition allocated for training events that are required for Soldiers to meet minimum training standards from the basic individual level through the advanced collective unit level. (see Chapter 2, Section 2.2.1.2.1, *Description of Units Using the BAX and Training Requirements*, for additional information). The maximum potential throughput or use of the BAX per year would be approximately 238 days. The minimum throughput of the BAX would be approximately 106 days. Closure of the portion of the surface danger zone not within an existing dedicated impact area during training events would occur at least 106 days out of the year and would likely occur for 238 days. This closure is consistent with current access restrictions, as impact areas are closed to all public access. The remaining portions of DTA East would be available for public access and recreation when military training is not taking place.

Development of the proposed CACTF at Eddy Drop Zone would be along 33-Mile Loop Road. Certain portions of 33-Mile Loop Road may be incorporated into the construction and maneuver footprints of the CACTF. As lands within CACTF construction footprint and maneuver area would be permanently closed under this alternative, access to 33-Mile Loop Road from the Richardson Highway (Mile Marker 264.8) within the range complex would be prohibited. This permanent closure would also eliminate access to the areas south of Eddy Drop Zone via 33-Mile Loop Road. The 33-Mile Loop Road would also fall within the CACTF surface danger zone. When the range is in use (approximately 238 days per year), 33-Mile Loop Road would be closed. This would be a severe adverse impact.

Development of the lower portion of the CACTF at Eddy Drop Zone would be in the same location as described in Alternative 2. Several locations used for hunting and other recreation would no longer be available. Hunters who have used areas within the proposed construction and maneuver footprints would be adversely impacted during the hunting season, typically late August and September. Appendix, Figure 2.h shows the construction and maneuver footprints that would be permanently closed. Access to 33-Mile Loop Road through Fleet Street or 12-Mile Crossing Road would not be impacted, nor would alternate access trails to the Granite Mountains off of military lands by the construction and use of the CACTF.

Other recreational activities are not as closely tied to a specific season and can still be enjoyed whenever the surface danger zone or the remaining portion of DTA East surrounding the Eddy Drop Zone construction footprint and maneuver area is not in use. All recreational activities

would be allowed to continue outside of the proposed range areas, in accordance with USARAK management policies.

The North Texas Range study area has numerous lakes, some of which are intensively managed for fisheries. Access to all ADF&G stocked lakes along Meadows Road would be maintained when training does not take place. Only Mark Lake would not be accessible during training because it is located within the surface danger zone under Alternative 4. Five other lakes, No Mercy, Doc, Rockhound and North and South Twin, would require alternate access by ORRV or snowmachine by a gravel road near Bolio Lake. Appendix, Figure 2.h shows areas that would be closed for training at the BAX, including the surface danger zone. This closure would cause a moderate but localized impact.

The 14 stocked lakes along Meadows Road would not be impacted directly by construction and operation of the BAX, but all 14 would be unavailable to anglers if access to Meadows Road is eliminated. Impacts to stocked lakes are similar to those described in Alternative 4.

Access gates could be placed in certain areas along 33-Mile Loop, Meadows and Windy Ridge roads to allow continued recreational access in certain areas during training and to reduce the adverse impact to public access and recreation within DTA East (see Section 4.3.8.2, *Mitigation*). Exact gate placement would be determined following a decision on where the BAX and CACTF would be constructed. Other considerations include the construction of an “access corridor” through the permanently closed range complex to allow recreational use of the surrounding areas or construction of a new road that would avoid the range complex and still allow access to the area, stocked lakes and surrounding lands.

Posting of the installation boundary can reduce accidental trespass, but has minimal effect on premeditated trespass and can only be effective if associated enforcement efforts are included to prevent premeditated and deliberate trespass. Informational kiosks have been posted throughout DTA East to convey recreational access rules and regulations, information on recreational opportunities, and other important information. These information points can be used to inform the public about the use and location of the BAX and CACTF range complex.

4.3.8.2 Mitigation

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts to public access and recreation. The appendix states how the offered mitigation would serve to eliminate or lessen the foreseen impact and offers an assessment of the potential success of the mitigation. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

4.3.8.2.1 Existing Mitigation

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts.

- Continued implementation of recreational vehicle use policies, per the most recent INRMPs (USARAK 2002b,c). The INRMPs outline specific actions to maintain and improve public access and recreation opportunities on USARAK lands.

- Continued implementation of the USARTRAK automated check-in phone system. This would provide information regarding daily closures and should greatly simplify the public access process.
- Continued streamlining of public access to USARAK lands through the RAP.
- Maintenance of the extended two-year renewal duration on the FWA and DTA RAPs. A two-year permit duration would simplify public access to USARAK lands.
- Continue to work with ADF&G to provide hunter education safety courses. Hunter safety courses and educational opportunities would allow USARAK to better and more safely manage its lands for a wide range of public uses.
- Monitoring of recreational usage of each training area through the USARTRAK phone system. This would inform USARAK and ADF&G regarding use patterns, which should improve management for public access and recreation.
- Maintenance of kiosks at all primary entrances to recreational areas on USARAK lands and provision of visitor maps and information. Information kiosks can help users quickly identify areas designated for recreational use, as well as the times and locations of military activities.
- Monitoring of recreational impacts on stocked lakes, and upgrading of access and recreational opportunities when needed. Improved monitoring of and access to stocked lakes would allow USARAK and ADF&G to better manage the stocked lakes program on Army lands.
- Full commitment and funding of permanent conservation officers by the Garrison Command and PMO to enforce state and federal game laws, and military rules and restrictions.

4.3.8.2.2 Proposed Mitigation

The following mitigation measures are essential in addressing impacts associated with the proposed action.

- Make USARAK long-term training and convoy schedules available to the public, allowing regional residents to better plan public access and recreation activities within DTA East.
- Determine placement of access gates along Meadows Road, Windy Ridge Road, 12-Mile Crossing and 33-Mile Loop Road to allow for maximum continued recreational use and to maximize public safety.
- Maintain access to ADF&G stocked lakes.
- Allow all other recreational activities outside of the construction footprint and maneuver area per current USAG-AK policies.
- Work with ADF&G to support stocked lake program brochures, signs and improvements.
- Upgrade road access at Fleet Street (under Alternative 2 or 5 only).
- Upgrade trail from Bolio Lake to Twin Lakes (under Alternative 4 or 5 only).

4.3.9 Environmental Justice

This section analyzes and compares the environmental justice impacts associated with proposed alternatives. Baseline data for this comparison are presented in Section 3.3.9.

Environmental justice focuses on potential disproportionate and adverse effects of federal actions on minority communities and low-income communities. Such effects may include ecological, cultural, human health, economic, or social impacts. Executive Order 12898, *Federal Actions to*

Address Environmental Justice in Minority Populations and Low-Income Populations, specifically directs a focus on the effects of actions on subsistence related to the reliance of many minority communities and low-income communities on subsistence harvesting. This analysis is particularly important in Alaska, where subsistence is not only essential to the survival of individual low-income families, but is also an integral part of Alaska Native cultural values. In addition, impacts on TCPs would be felt more intensely by Alaska Native groups. More information on environmental justice and a list of the communities analyzed can be found in Section 3.3.9.

4.3.9.1 Comparison of Alternatives

4.3.9.1.1 Description of Methodology

The following definitions will be used to characterize potential impacts on minority communities and low-income communities:

- None – No measurable disproportionate impacts are expected to occur.
- Minor – Minority or low-income populations would experience the same impacts as other communities, but these may have slightly more significant effects on standard of living or lifestyle.
- Moderate – Minority or low-income communities may experience adverse effects not equally shared by the general population.
- Severe – Minority or low-income communities may experience serious adverse effects not felt by other communities.
- Beneficial – Minority or low-income populations may experience positive effects from activities that other communities would not.

The first three qualitative impact categories (none, minor, and moderate) are considered insignificant in this analysis. The next category (severe) is considered significant. Existing mitigation for impacts to environmental justice are presented in 4.3.9.2, *Mitigation*.

The region of influence for activities occurring on DTA East includes seven minority or low-income communities within the Southeast Fairbanks Census Area: Big Delta, Delta Junction, Dot Lake Village, Dry Creek, Fort Yukon, Healy Lake, and Tanana. In addition, a number of Alaska Native tribes outside of this region may experience impacts due to their use of subsistence resources on and around the installation, as well as association with archaeological sites and TCPs. Initial consultations with tribes suggest that TCPs that may exist on DTA East would be associated with traditional subsistence practices.

Table 4.3.9.a presents a summary of environmental consequences to environmental justice for each alternative.

Table 4.3.9.a Summary of Environmental Consequences to Environmental Justice.

Alternatives/ Footprints	Resource Issues			
	Minority Communities	**Alaska Native Communities**	**Low-Income Communities**	**Children**
Alternative 1: No Action				
Impact within Southeast Fairbanks Census Area	No disproportionate impacts; all communities affected equally by air quality, water resources, socioeconomics, noise, and human health and safety impacts	Restricted access and/or impacts to cultural sites affects local tribes affiliated with those resources	No disproportionate impacts; all communities affected equally by air quality, water resources, socioeconomics, noise, and human health and safety impacts	No construction or training exercises occurring near schools, day care facilities, or other areas with large populations of children
Alternative 2: Eddy Drop Zone, Alternative 3: Donnelly Drop Zone, Alternative 4: North Texas Range, and Alternative 5: North Texas Range/Eddy Drop Zone Combination				
Area of consideration: Southeast Fairbanks Census Area *Impact*	Increased training temporarily reduces air quality, increases noise, and disrupts wildlife; potential impacts to integrity of cultural sites, if not protected *Minor*	Increased training limits subsistence access and disturbs wildlife; potential disturbance of cultural sites *Moderate*	Increased training temporarily reduces air quality, increases noise, and disrupts wildlife; potential impacts to integrity of cultural sites, if not protected *Minor*	No construction near schools, day care, or other areas with large populations of children *None*

Environmental impacts from transformation are analyzed in previous sections of Chapter 4 and have been generally determined to be either minor or moderate. All communities in the vicinity of DTA East would be equally (proportionately) affected by potential impacts to air quality, water resources, socioeconomics, noise, and human health and safety, and no disproportionate adverse impacts to minority or low-income populations are expected. All communities would be impacted to the same degree. However, in light of concerns raised during the scoping process by members of the public and tribal representatives, activities on each installation have the potential to impact cultural resources and subsistence resources and practices. Given the unique relationship of Alaska Native communities to cultural resources and subsistence practices, and the reliance of certain low-income Alaskan communities on resources for subsistence, there is the potential for these communities to experience disproportionately adverse impacts from installation activities. These impacts are discussed below.

Impacts on children in accordance with Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks,* will also be addressed in each section.

4.3.9.1.2 Impacts Common to All Alternatives

Construction and operation of the ranges would result in additional personnel in the Delta Junction area. This population increase could create competition for fish and game resources.

Construction activities may temporarily increase noise levels, and ground-disturbing activities could potentially damage cultural resources associated with local Alaska Native tribes.

The frequency of maneuver and weapons training would increase with the use of the BAX and CACTF. This could affect local minority communities or low-income communities by reducing air quality, imposing noise disturbances, disrupting wildlife integral to local subsistence activities, or possibly threatening the integrity of cultural sites.

4.3.9.1.3 Impacts Attributed to Alternative 1 (No Action)

Potential impacts under the No Action Alternative must incorporate Army transformation activities at USARAK. The ROD on the transformation of USARAK was signed on May 27, 2004. Full transformation of USARAK was selected as the preferred alternative. Overall impacts of Army transformation would be expected to be moderate for Alaska Native communities and minor for low-income groups (USARAK 2004a).

Transformation involves increased levels of training activities, greater utilization of existing ranges, possible creation of new trails, more frequent training area closures, and construction activities. Along with possible impacts to wildlife populations and migration patterns, specifically the Macomb and Delta caribou herds (Section 4.2.6, *Wildlife and Fisheries*), and accessibility of USARAK lands for subsistence activities (Section 4.3.7, *Subsistence*), an increase in personnel stationed at FWA would likely increase competition for wildlife resources between local subsistence users and sport hunters and anglers.

Management actions relating to range management, the ITAM program, environmental management, and sustainable range management would continue. Full implementation of Army Alternate Procedures, 36 CFR 800, for cultural resources management programs would also result in improved resource management, benefiting tribes associated with cultural sites on USARAK lands.

General – No disproportionately adverse impacts would be experienced by any minority or low-income populations in relation to air quality, water resources, socioeconomics, noise or human health and safety.

Cultural Resources – There have been a number of cultural resources identified within DTA. Reports of undocumented TCPs have also been made, although none have been explicitly identified to date (see Section 4.2.7, *Cultural Resources*). These sites are significant cultural resources to tribes, and it is possible that under this alternative, restricted access to cultural areas and/or impacts to cultural sites may be unavoidable. Moderate impacts to local Alaska Native minority communities associated with cultural sites may be expected.

Subsistence – There may be a slight positive impact on moose populations in the area (Section 4.3.7, *Subsistence*). Moose hunting is known to account for a large percentage of the harvest in interior Alaska (Marcotte 1991; ADF&G 2000). Although not all subsistence users qualify as minority or low-income populations, they would all be affected to the same degree by USARAK transformation activities. However, considering the potential hardship on low-income subsistence users and the cultural importance of subsistence to Alaska Native tribes, any impact on subsistence from transformation activities may be disproportionately adverse to low-income and Alaskan Native minority communities.

Children – No construction projects or training exercises would take place near schools, day care facilities, or other areas with large populations of children.

4.3.9.1.4 Impacts Attributed to Alternative 2 (Eddy Drop Zone)

Activities at the Eddy Drop Zone study area would involve increased levels of training activities, utilization of more areas of existing ranges, possible creation of new trails, more frequent training

area closures, and construction activities. Along with possible impacts to wildlife populations and migration patterns, specifically the Delta and Macomb caribou herds, and accessibility of USARAK lands for subsistence activities, overall impacts are minor to low-income communities and moderate to Alaska Native communities. No impacts are expected to children or to other minority communities.

General – No disproportionately adverse impacts would be experienced by any minority or low-income populations in relation to air quality, water resources, socioeconomics, noise or human health and safety.

Cultural Resources – There have been a number of cultural resources identified within DTA. Reports of undocumented properties of traditional, religious, and cultural significance have also been made, although none have been explicitly identified to date (see Section 3.2.7, *Cultural Resources*). These sites are significant cultural resources to tribes, and it is possible that under this alternative, restricted access to cultural areas and/or impacts to cultural sites may be unavoidable. Moderate adverse disproportionate impacts to local Alaskan Native minority communities associated with cultural sites may be expected.

Subsistence – There may be a slight positive impact on moose populations in the area (see Section 4.2.6, *Wildlife and Fisheries*). Moose hunting is known to account for a large percentage of the harvest in interior Alaska (Marcotte 1991; ADF&G 2000). Although not all subsistence users qualify as minority or low-income populations, they would all be affected to the same degree by proposed range activities. Migratory patterns of big game within localized areas of the proposed ranges could be adversely impacted. However, considering the potential hardship on low-income subsistence users and the cultural importance of subsistence to Alaska Native tribes, any impact on subsistence from range activities may be disproportionately adverse to low-income and Alaska Native minority communities.

4.3.9.1.5 Impacts Attributed to Alternative 3 (Donnelly Drop Zone)

Overall impacts are minor to low-income communities and moderate to Alaska Native minority communities. No impacts are expected to other minority communities or children, as stated in Alternative 2.

4.3.9.1.6 Impacts Attributed to Alternative 4 (North Texas Range)

Overall impacts are minor to low-income communities and moderate to Alaska Native minority communities. No impacts are expected to other minority communities or children, as stated in Alternative 2.

4.3.9.1.7 Impacts Attributed to Alternative 5 (North Texas Range/Eddy Drop Zone Combination)

Overall impacts are minor to low-income communities and moderate to Alaska Native minority communities. No impacts are expected to other minority communities or children, as stated in Alternative 2.

4.3.9.2 Mitigation

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts to minority communities and children. The appendix states how the offered mitigation would serve to eliminate or lessen the foreseen impact and offers an assessment of the potential success of the mitigation. Mitigation measures to be implemented will be identified in the ROD, which follows the Final EIS.

4.3.9.2.1 Existing Mitigation

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts.

- Maintenance of a USARAK website to provide up-to-date information to members of local communities that may be affected by activities on USARAK lands.
- Continued publication and distribution of the Environmental Resources Newsletter and the Environmental Restoration Newsletter. Newsletters ensure that members of local communities who may not have access to the Internet are kept informed about USARAK policies and activities, allowing for identification and communication of pertinent concerns.
- Continued Restoration Advisory Boards as appropriate. Restoration Advisory Boards provide an established, effective strategy for communication between affected local communities and USARAK.
- Ensured existence of full-time Native Tribal coordination within USARAK. A Native Liaison serves as a reliable, consistent source of information on issues of concern for both tribes and USARAK staff.
- Publication and distribution of a newsletter geared toward Alaska Native tribes and organizations. A tribal newsletter would address the need to distribute information to many of the minority and low-income communities within USARAK's area of influence.
- Establishment of government-to-government relationships with Alaska Native tribes whose interests may be significantly affected by USARAK activities. This would ensure efficient and effective communication between both leadership and staff members of tribal governments and USARAK.

4.3.9.2.2 Proposed Mitigation

The following mitigation measure is essential in addressing impacts associated with the proposed action.

- Undertake measures identified as necessary to minimize impact to cultural resources.

4.3.10 Cumulative Effects Analysis

This section of the EIS analyzes cumulative impacts associated with the proposed action in the context of other "past, present, and reasonably foreseeable" actions in the Delta Junction region. A broader analysis of cumulative impacts from Army transformation in Alaska is available in the *Final Environmental Impact Statement for Transformation of U.S Army Alaska, Vols. 1 and 2* (USARAK 2004a), and the conclusions of these analyses are generally applicable to the proposed action (construction and operation of a BAX and CACTF) in DTA and Delta Junction region. Analyzing the specific impacts of the BAX and CACTF at DTA, the following cumulative analyses will address specific issues for the candidate alternatives. These requirements

are established by NEPA (42 USC 4321 - 4347), Council on Environmental Quality (CEQ) regulation (40 CFR Parts 1500 - 1508), Army regulation (32 CFR Part 651), and CEQ guidelines for conducting cumulative impact analysis (*Considering Cumulative Effects under the National Environmental Policy Act,* Executive Office of the President, January, 1997).

The 1997 CEQ guidelines clarify NEPA requirements for cumulative impact analysis, focusing on issues affected by the proposed action and using resource-based analyses as opposed to activity-based analyses. The recommended CEQ methodology identifies and analyzes other past and present projects and forecasts for future actions that have affected (or will affect) resource or issues in the region.

The direct and indirect effects of the No Action Alternative are summarized in Table 4.3.10.a., and the proposed action alternatives are shown in Table 4.3.10.b, as well as in respective sections of Chapter 4. The primary issues of concern were identified through public interaction and include:

- Soil Resources
- Surface Water
- Fire Management
- Noise
- Human Health and Safety
- Wildlife and Fisheries
- Cultural Resources
- Airspace

Other impacts were addressed in the remaining resource areas:

- Air Quality
- Groundwater
- Wetlands
- Vegetation
- Threatened or Endangered Species and Species of Concern
- Socioeconomics
- Subsistence
- Public Access and Recreation
- Environmental Justice

In terms of other actions (past, present, and reasonably foreseeable), most DTA impacts are related to military activities associated with Army transformation in Alaska, are already evaluated (USARAK 2004a), and serve as a baseline (the No Action Alternative) in these analyses.

These impacts of Army transformation, while greater than recent years, are well within the previous activity levels on DTA from previous decades. While Base Realignment and Closure (BRAC) Commission decisions reduced military activity levels in the late 1990s, Army transformation will re-establish these range activity levels as the status quo, a level of training which reflects past levels at DTA prior to 1990 BRAC. While the permanent stationing will remain small, DTA range utilization will increase.

Other military entities use DTA (near the old Fort Greely cantonment area) for experimentation, testing, and implementation of missile defense initiatives including the Cold Regions Test Center (CRTC). The Unmanned Aerial Vehicle (UAV) support facilities (in support of transformation) have also been constructed at DTA. While concurrent, these efforts seldom overlap USARAK's

military training mission. Outside of short-term construction impacts and some negligible social and economic disturbance, the ongoing impacts of these activities have proven minor and will likely continue as the cantonment area of DTA is still under-utilized.

Cumulative effects analysis (CEA) as defined by CEQ (40 CFR Parts 1500-1508) addresses the cumulative effects of agency actions, which alone may be insignificant but when added to other past, present, and reasonably foreseeable actions may become cumulatively significant. Under the CEQ guidelines, CEA is resource-specific and addresses those resources directly or indirectly affected by a proposed action or alternative. Table 4.3.10.a contains a summary of environmental consequences under the No Action Alternative. Table 4.3.10.b contains a matrix of the other action alternatives, comparing and contrasting environmental consequences (impacts) for each resource category.

Although certain direct and indirect impacts are determined insignificant, they require further evaluation for potential contributions to cumulative impacts on the resource. Three levels of cumulative effects analyses were used on the resources or issues covered in this Supplemental Draft EIS (Quick Look, Analysis and Discussion, and Detailed Analysis). The level of analysis was based on Quick Look questions (Canter et al. 2005). Quick Look questions are used to determine if detailed cumulative effects analyses are needed for each resource or issue. If the answers to the Quick Look questions are no, the likelihood of significant cumulative impacts is small and no further analysis is necessary (Canter et al. 2005). If the answer to a Quick Look question is less certain, more detailed attention was required to address potential effects using a second level of analysis (Analysis and Discussion). Issues that had definite, potentially significant incremental impacts required more rigorous analysis (Detailed Analysis). Additional information is presented in the Methodology section.

Table 4.3.10.a Summary of Environmental Consequences under the No Action Alternative.

Resource/Issue	Alternative 1: No Action
Soil Resources DTA East	
Soils	Minimal impacts when soils are frozen but measurable impacts to unfrozen soils in low-lying areas and areas with poorly-drained soils
Permafrost	Disturbance to permafrost due to high explosive munitions, but limited to impact areas
Surface Water DTA East	
Waterways	Sedimentation caused by vehicle and personnel use of trails, stream crossings, and ice bridge approaches
Flooding	No information available
Floodplains	No information available
Lakes and Ponds	Sedimentation caused by vehicle and personnel use of trails, stream crossings, and ice bridge approaches
Surface Water Quality	Slight sedimentation from trail use and chemical decomposition of munitions constituents from impact area
Fire Management DTA East	
Fire Hazard/Risk	Military training in forested and potentially flammable areas
Fire Policy	No changes to Alaska Wildland Fire Management policy proposed
Fuels Management	INRMP and fire management plans provide for fuels management on training lands

Resource/Issue	Alternative 1: No Action
Noise DTA East	
Small Arms Noise – Average	Training occurs at least two miles from residential areas
Large Caliber Weapons and Demo. Noise – Average	Training primarily occurs in Washington and Mississippi impact areas; noise contours from high-explosive munitions remain within the training areas
Single Event Noise	No information available
Vehicle Noise	Short-term increases during deployments and large-scale training exercises
Aircraft Noise	Aircraft flyovers occur during training exercises, including helicopters and C-130 transport planes; short-term increases during deployments and large-scale training exercises
Human Health and Safety DTA East	
Traffic/Convoys	Periodic traffic congestion due to company and battalion-sized deployments
Hazardous Materials/ Wastes	Possible petrochemical spills due to fuel transport and refueling operations; Army procedures and controls minimize impacts
Contaminated Sites	Possible site contamination due to fuel transport and refueling operations; Army procedures and controls minimize impacts
Use of Munitions	Range safety program and regulations protect Soldiers and civilians
Range Safety	Possible occurrences from airborne training exercises
Wildlife and Fisheries DTA East	
Bison	Army training and infrastructure affect Delta bison herd, but populations have been sustained at current levels up until 2004, when population decline has been observed.
Black Bear	Training activities may disturb individual animals
Brown Bear	Training activities may disturb individual animals
Caribou	Caribou are sensitive to habitat alteration and disturbance; Army training may influence distribution and habitat use
Gray Wolf	Army training and infrastructure affect the distribution of wolves
Little Brown Bat	Information on distribution and abundance of bats in interior Alaska are not well known; these bats are susceptible to logging and habitat disturbance
Lynx	Army training and infrastructure would affect some individuals
Meadow Jumping Mouse	Army activities would impact some portions of the population
Moose	Army training and infrastructure would affect some individuals, but moose are tolerant to disturbance
Wolverine	Army training and infrastructure would disturb individual wolverine and local population
Boreal Owl	Susceptible to forest thinning and clearing, but large scale clearing not planned
Great Gray Owl	Susceptible to forest thinning and clearing, but large scale clearing not planned
Northern Goshawk	Susceptible to forest thinning and clearing, but large scale clearing not planned
Olive-sided Flycatcher	Susceptible to habitat disturbance, but not common on DTA
Rusty Blackbird	Susceptible to habitat disturbance, but not common on DTA
Sandhill Crane	Susceptible to habitat disturbance, but cranes can adapt to human activity
Sharp-tailed Grouse	Susceptible to disturbance during breeding; disturbance rates relatively infrequent
Trumpeter Swan	Susceptible to disturbance during breeding; disturbance rates relatively infrequent
Wood Frog	Training and construction would affect local habitat and populations
Stocked Fisheries	Fish stocking and use on stocked lakes would continue

Resource/Issue	Alternative 1: No Action
Wild Fisheries	Training and construction would not affect local habitat and populations (esp. anadromous populations)
Cultural Resources DTA East	
Historic Structures	No impacts have been identified
Prehistoric Archaeological Sites	Impacts resulting from ongoing vehicular off-road traffic, live-fire munitions, and other training activities
Traditional Cultural Properties/Grave Sites	No TCPs have been identified: Consultations indicate probability of presence is undetermined
Airspace DTA East	
Terminal and En Route Airspace	A Class D area is centralized over the Allen Army Airfield located on Fort Greely
Special Use Airspace	The types of special use airspace are Restricted Areas and MOAs including civilian flight corridors; CFAs and SARSAs are also used by the Army to ensure the safety of aircraft transiting the area
Air Quality DTA East	
Stationary Source Emissions	Temporary impacts to air quality
Mobile Source Emissions	No information available
Fugitive Dust	Levels are below the standard
Groundwater DTA East	
Groundwater Flow	Soil compaction resulting from vehicle and pedestrian use could lead to greater overland flow and reduced groundwater percolation and flow
Groundwater Quality	Possible alteration of groundwater chemistry due to munitions constituents leaching into groundwater
Alteration of Groundwater System Due to Permafrost Disruption	Impacts to vegetation could affect underlying permafrost by changing dynamics between groundwater and surface water or between different groundwater tables
Wetlands DTA East	
Higher Function Wetlands	Forty or more acres of wetlands, including higher function, may be impacted (less than 1 percent of total wetlands on DTA East)
Other Wetlands	Forty or more acres of wetlands, including higher function, may be impacted (less than 1 percent of total wetlands on DTA East)
Vegetation DTA East	
Vegetative Cover	Localized impacts from training and land use activities, but impacts are sustainable
Rare Plants	There have not been large-scale impacts to rare plant communities, and relatively few new impacts expected
Invasive Plant Species	DTA is relatively free of widespread invasive plant infestations
Forest Resources	Frequency of fires affects forest resources
Threatened or Endangered Species and Species of Concern DTA East	
Plant Species of Concern	There have not been large-scale impacts to rare plant communities, and relatively few new impacts expected. Currently 18 AKNHP-listed rare plant species have been documented on DTA
White-winged Crossbill	Habitat loss from fires and forest clearing
Townsend's Warbler	Habitat loss from fires and forest clearing

Resource/Issue	Alternative 1: No Action
Blackpoll Warbler	Habitat loss from fires and forest clearing
American Osprey	Ospreys rarely use DTA East
American Peregrine Falcon	American peregrine falcons nest at one location at DTA East
Socioeconomics Delta Junction Community	
Monetary	Beneficial due to construction and operation, but small
Construction	Beneficial, but small and temporary
Operation	Beneficial, but small due to few personnel permanently stationed at DTA
Quality of Life	Beneficial overall due to increased employment and monetary contributions to local economy, although some negative impacts expected from recreational access restrictions
Public Safety	Beneficial due to federal funds for public safety infrastructure
Subsistence DTA East (104,601 acres)	
Subsistence Access	Access closures during military training
Subsistence Resource Availability	Resources unavailable when ranges are closed to public use
Public Access and Recreation DTA East	
Temporal Availability	Range closures during military training
Spatial Availability	Development of new trails increases recreational access; range closures during military training reduce spatial availability of recreation
Recreational Availability	Development of new trails increases recreational access; impacts to hunting/trapping and increased competition for resources
Environmental Justice Southeast Fairbanks Census Area	
Minority Communities	No disproportionate impacts; all communities affected equally by air quality, water resources, socioeconomics, noise, and human health and safety impacts
Alaska Native Communities	Restricted access and/or impacts to cultural sites affects local tribes affiliated with those resources
Low-Income Communities	No disproportionate impacts; all communities affected equally by air quality, water resources, socioeconomics, noise, and human health and safety impacts
Children	No construction or training exercises occurring near schools, day care facilities, or other areas with large populations of children

Table 4.3.10.b Comparison of Action Alternatives and Environmental Consequences (not including Cumulative Effects).

Resource/Issue	Alternatives				
	Alternative 2: Eddy Drop Zone	Alternative 3: Donnelly Drop Zone	Alternative 4: North Texas Range	Alternative 5:	
				Eddy Drop Zone	North Texas Range
Soil Resources					
Soils Construction Footprint Maneuver Area Surface Danger Zone	 Minor Moderate Minor	 Minor Moderate Minor	 Minor Moderate Minor	 Minor Minor Minor	 Minor Moderate Minor
Permafrost Construction Footprint Maneuver Area Surface Danger Zone	 Minor Minor Minor	 Moderate Moderate Minor	 Moderate Moderate Minor	 Minor Minor Minor	 Moderate Moderate Minor

Resource/Issue	Alternatives				
	Alternative 2: Eddy Drop Zone	Alternative 3: Donnelly Drop Zone	Alternative 4: North Texas Range	Alternative 5:	
				Eddy Drop Zone	North Texas Range
Surface Water					
Waterways					
Construction Footprint	Moderate	Minor	Minor	Minor	Minor
Maneuver Area	Moderate	Moderate	Minor	Minor	Minor
Surface Danger Zone	Minor	Minor	Minor	Minor	Minor
Flooding					
Construction Footprint	Moderate	Minor	None	Minor	None
Maneuver Area	Minor	Minor	None	Minor	None
Surface Danger Zone	None	None	None	None	None
Floodplains					
Construction Footprint	Moderate	Moderate	None	Minor	None
Maneuver Area	Minor	Minor	None	Minor	None
Surface Danger Zone	None	None	None	None	None
Lakes and Ponds					
Construction Footprint	None-Minor	None-Minor	None-Minor	None	None-Minor
Maneuver Area	None-Minor	None-Minor	None-Minor	None	None-Minor
Surface Danger Zone	None-Minor	None-Minor	None-Minor	None-Minor	None-Minor
Surface Water Quality					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Minor	Moderate	Minor	Minor	Minor
Surface Danger Zone	Minor	Minor	Minor	Minor	Minor
Fire Management					
Fire Hazard/Risk					
Construction Footprint	Moderate	Minor	Minor	Moderate	Minor
Maneuver Area	Severe	Moderate	Min-Mod	Severe	Min-Mod
Surface Danger Zone	Severe	Moderate	Min-Mod	Severe	Min-Mod
Fire Policy					
Construction Footprint	None	None	None	None	None
Maneuver Area	None	None	None	None	None
Surface Danger Zone	None	None	None	None	None
Fuels Management					
Construction Footprint	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Maneuver Area	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Surface Danger Zone	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Noise					
Small Arms Noise – Average					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Minor	Minor	Minor	Minor	Minor
Surface Danger Zone	None	None	Minor	None	Minor
Large Caliber Weapons and Demolition Noise - Average					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Minor	Minor	Minor	Minor	Minor
Surface Danger Zone	None	None	Minor	None	Minor
Single Event Noise					
Construction Footprint	Moderate	Severe	Moderate	Moderate	Moderate
Maneuver Area	Moderate	Severe	Moderate	Moderate	Moderate
Surface Danger Zone	None	None	Minor	None	Minor
Vehicle Noise					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Minor	Minor	Minor	Minor	Minor
Surface Danger Zone	Minor	Minor	None	Minor	None

Resource/Issue	Alternatives				
	Alternative 2: Eddy Drop Zone	Alternative 3: Donnelly Drop Zone	Alternative 4: North Texas Range	Alternative 5:	
				Eddy Drop Zone	North Texas Range
Aircraft Noise					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Minor	Minor	Minor	Minor	Minor
Surface Danger Zone	Minor	Minor	Minor	Minor	Minor
Human Health and Safety					
Traffic/Convoys					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Moderate	Moderate	Moderate	Moderate	Moderate
Surface Danger Zone	None	None	None	None	None
Hazardous Materials/Wastes					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Minor	Minor	Minor	Minor	Minor
Surface Danger Zone	Minor	Minor	Minor	Minor	Minor
Contaminated Sites					
Construction Footprint	None	None	None	None	None
Maneuver Area	None	None	None	None	None
Surface Danger Zone	None	None	None	None	None
Use of Munitions					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Minor	Minor	Minor	Minor	Minor
Surface Danger Zone	Minor	Minor	Minor	Minor	Minor
Range Safety					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Minor	Minor	Minor	Minor	Minor
Surface Danger Zone	Minor	Minor	Minor	Minor	Minor
Wildlife and Fisheries					
Bison					
Construction Footprint	Minor	Minor	Severe	Severe	
Maneuver Area	Minor	Minor	Severe	Severe	
Black Bear					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Brown Bear					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Caribou					
Construction Footprint	Minor	Moderate	Moderate	Moderate	
Maneuver Area	Minor	Moderate	Moderate	Moderate	
Gray Wolf					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Little Brown Bat					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Lynx					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Meadow Jumping Mouse					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Moose					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	

Resource/Issue	Alternatives				
	Alternative 2: Eddy Drop Zone	Alternative 3: Donnelly Drop Zone	Alternative 4: North Texas Range	Alternative 5:	
				Eddy Drop Zone	North Texas Range
Wolverine					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Boreal Owl					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Great Gray Owl					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Northern Goshawk					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Olive-sided Flycatcher					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Rusty Blackbird					
Construction Footprint	Moderate	Minor	Minor	Minor	
Maneuver Area	Moderate	Minor	Minor	Minor	
Sandhill Crane					
Construction Footprint	Minor	Minor	Moderate	Moderate	
Maneuver Area	Minor	Minor	Moderate	Moderate	
Sharp-tailed Grouse					
Construction Footprint	Moderate	Moderate	Minor	Moderate	
Maneuver Area	Moderate	Moderate	Minor	Moderate	
Trumpeter Swan					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Wood Frog					
Construction Footprint	Moderate	Severe	Severe	Minor	
Maneuver Area	Moderate	Severe	Severe	Minor	
Stocked Fisheries					
Construction Footprint	Minor	Minor	Severe	Severe	
Maneuver Area	Minor	Minor	Severe	Severe	
Wild Fisheries					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Cultural Resources					
Historic Structures					
Construction Footprint	None	None	None	None	None
Maneuver Area	None	None	None	None	None
Surface Danger Zone	None	None	None	None	None
Prehistoric Archaeological Sites					
Construction Footprint	None	None	Minor	None	Minor
Maneuver Area	Minor	Moderate	Minor	None	Minor
Surface Danger Zone	Severe	Severe	Minor	None	Minor
Traditional Cultural Properties/ Grave Sites					
Construction Footprint	Unknown	Unknown	Unknown	Unknown	Unknown
Maneuver Area	Unknown	Unknown	Unknown	Unknown	Unknown
Surface Danger Zone	Unknown	Unknown	Unknown	Unknown	Unknown

Resource/Issue	Alternatives				
	Alternative 2: Eddy Drop Zone	Alternative 3: Donnelly Drop Zone	Alternative 4: North Texas Range	Alternative 5:	
				Eddy Drop Zone	North Texas Range
Airspace					
Terminal and En Route Airspace					
Construction Footprint	Minor	Minor	None	Minor	None
Maneuver Area	Minor	Minor	None	Minor	None
Surface Danger Zone	Minor	Minor	None	Minor	None
Special Use Airspace					
Construction Footprint	None	Minor	None	None	None
Maneuver Area	None	Minor	None	None	None
Surface Danger Zone	Minor	Minor	None	None	None
Air Quality					
Stationary Source Emissions					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Minor	Minor	Minor	Minor	Minor
Surface Danger Zone	Minor	Minor	Minor	Minor	Minor
Mobile Source Emissions					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Minor	Minor	Minor	Minor	Minor
Surface Danger Zone	Minor	Minor	Minor	Minor	Minor
Fugitive Dust					
Construction Footprint	Moderate	Moderate	Moderate	Moderate	Moderate
Maneuver Area	Moderate	Moderate	Moderate	Moderate	Moderate
Surface Danger Zone	Moderate	Moderate	Moderate	Moderate	Moderate
Groundwater					
Groundwater Flow					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Minor	Minor	Minor	Minor	Minor
Surface Danger Zone	Minor	Minor	Minor	Minor	Minor
Groundwater Quality					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Minor	Minor	Minor	Minor	Minor
Surface Danger Zone	Minor	Minor	Minor	Minor	Minor
Alteration of Groundwater System Due to Permafrost Disruption					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Minor	Minor	Minor	Minor	Minor
Surface Danger Zone	Minor	Minor	Minor	Minor	Minor
Wetlands					
Higher Function Wetlands					
Construction Footprint (fill)	Moderate	Severe	Severe	None	Minor
Maneuver Area (fill)	None	None	Minor	Minor	Minor
Surface Danger Zone	Minor	Minor	None	Minor	None
Other Wetlands					
Construction Footprint (fill)	Minor	Severe	Severe	Minor	Severe
Maneuver Area (fill)	None	Severe	Severe	Minor	Moderate
Surface Danger Zone	Minor	Minor	None	Minor	None
Vegetation					
Vegetative Cover					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Surface Danger Zone	Minor	Minor	Minor	Minor	

Resource/Issue	Alternatives				
	Alternative 2: Eddy Drop Zone	Alternative 3: Donnelly Drop Zone	Alternative 4: North Texas Range	Alternative 5:	
				Eddy Drop Zone	North Texas Range
Rare Plants					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Surface Danger Zone	None	None	None	None	
Invasive Plant Species					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Surface Danger Zone	Minor	Minor	Minor	Minor	
Forest Resources					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Surface Danger Zone	Minor	Minor	Minor	Minor	
Threatened or Endangered Species and Species of Concern					
Plant Species of Concern					
Construction Footprint	Minor	Minor	Minor	Minor	
Maneuver Area	Minor	Minor	Minor	Minor	
Surface Danger Zone	None	None	None	None	
White-winged Crossbill					
Construction Footprint	Moderate	Moderate	Minor	Moderate	Minor
Maneuver Area	Moderate	Moderate	Minor	Moderate	Minor
Townsend's Warbler					
Construction Footprint	Moderate	Moderate	Moderate	Moderate	Moderate
Maneuver Area	Moderate	Moderate	Moderate	Moderate	Moderate
Blackpoll Warbler					
Construction Footprint	Moderate	Moderate	Moderate	Moderate	Moderate
Maneuver Area	Moderate	Moderate	Moderate	Moderate	Moderate
American Osprey					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Minor	Minor	Minor	Minor	Minor
American Peregrine Falcon					
Construction Footprint	None	None	Minor	None	Minor
Maneuver Area	None	None	Minor	None	Minor
Socioeconomics					
Monetary Delta Junction Community	Beneficial	Beneficial	Minor	Minor	
Construction Footprint Delta Junction Community	Beneficial	Beneficial	Beneficial	Beneficial	
Operation Delta Junction Community	Beneficial	Beneficial	Beneficial	Beneficial	
Quality of Life Delta Junction Community	Beneficial	Beneficial	Beneficial	Beneficial	
Public Safety Delta Junction Community	Beneficial	Beneficial	Beneficial	Beneficial	
Subsistence					
Subsistence Access					
Construction Footprint	Minor-Ben	Minor-Ben	Minor-Ben	Minor-Ben	Minor-Ben
Maneuver Area	Minor	Minor	Minor	Minor	Minor
Surface Danger Zone	Minor	Minor	None	Minor	None

Resource/Issue	Alternatives				
	Alternative 2: Eddy Drop Zone	Alternative 3: Donnelly Drop Zone	Alternative 4: North Texas Range	Alternative 5:	
				Eddy Drop Zone	North Texas Range
Subsistence Resource Availability					
Construction Footprint	Minor	Minor	Minor	Minor	Minor
Maneuver Area	Minor	Minor	Minor	Minor	Minor
Surface Danger Zone	Minor	Minor	None	Minor	None
Public Access and Recreation					
Temporal Availability					
Construction Footprint	Severe	Severe	Severe	Severe	Severe
Maneuver Area	Severe	Severe	Severe	Severe	Severe
Surface Danger Zone	Moderate	Moderate	Moderate	Moderate	Moderate
Spatial Availability					
Construction Footprint	Severe	Severe	Severe	Severe	Severe
Maneuver Area	Severe	Severe	Severe	Severe	Severe
Surface Danger Zone	Moderate	Moderate	Moderate	Moderate	Moderate
Recreational Availability					
Construction Footprint	Severe	Severe	Severe	Severe	Severe
Maneuver Area	Severe	Severe	Severe	Severe	Severe
Surface Danger Zone	Moderate	Moderate	Moderate	Moderate	Moderate
Environmental Justice					
Minority Communities					
Southeast Fairbanks Census Area	Minor	Minor	Minor	Minor	
Alaska Native Communities					
Southeast Fairbanks Census Area	Moderate	Moderate	Moderate	Moderate	
Low-Income Communities					
Southeast Fairbanks Census Area	Minor	Minor	Minor	Minor	
Children					
Southeast Fairbanks Census Area	None	None	None	None	

Geographic Scope and Time Frame

The geographic scope and time frame are discussed for each resource (or issue) in the following sections. In general, the geographic scope includes DTA East and nearby lands, from the north slopes of the Alaska Range to the confluence of the Tanana and Delta Rivers. Appendix, Figure 4.1 shows the major projects and activities within the geographic region of interest. Past and current actions include activities from the 1940s and 1950s until the present (2005).

Summary of Past, Present, and Future Projects

Table 4.3.10.c summarizes the major projects and activities on DTA East and nearby lands since the early 1900s to present. The table also summarizes expected future projects through approximately 2035. Most of these projects are shown in Appendix, Figure 4.1.

Table 4.3.10.c Summary of Past, Present, and Future Projects and Activities on DTA and Nearby Lands.

Project or Activity	Time Frame	Spatial Extent (if known)	Probability of Project or Activity Occurring in the Future
Past Military			
Training Heavy Mechanized Division Light Infantry Brigade	1950s to present 1960 to 1984 1984 to 2003	Throughout DTA East 16,800 MIMs/year	High Low High
Development of cantonment area, ranges, and infrastructure	1950s to present	3,124 acres	High
Buildings and Facilities	1970s to present		High
U.S. Air Force	1940s to present	Airspace	High
Recent Military			
Collective Training Range Construction Training	 2003 to 2004 2005	 100 acres	 High High
33-Mile Loop Road upgrade	2005 to 2006	151 acres	High
Cold Regions Test Center Vehicle Test Track and Facility	2003 to 2005	80 acres	High
Space Missile Defense Command and Infrastructure	2003 to present	624 acres	High
Integrated Training Area Management (ITAM) Projects	2000 to present	136 acres	High
Jarvis North Fire Mitigation	2003 to present	550 acres	High
Maneuver Corridor	2005	54 acres	High
U.S. Air Force Training	1997 to present	Airspace	High
Stryker Brigade Training	2004 to present	86,100 MIMs/year	High
UAV Landing Strip	2004 to present	1 acre	High
Future Military			
ITAM Projects	2006 and beyond	Variable	5 years: High 10 years: High 15 to 30 years: Unknown
Range Operations Center	2006 to 2008	2 acres	5 years: High
C-17 Landing Strip	2006 to 2010	35 acres	5 years: High
Direct Fire Range	2006	1 acre	5 years: Medium 10 years: unknown
U.S. Air Force Training	2006 and beyond	Airspace	15 – 30 years High
Stryker Brigade, Airborne Brigade and other Army training	2004 and beyond	86,100 MIMs/year	5 years: High 10 years: High 15 – 30 years: High
BAX/CACTF Construction Use	2006 to 20072007 to 2035	4,600 acres	5 years: High 5 years: High

Project or Activity	Time Frame	Spatial Extent (if known)	Probability of Project or Activity Occurring in the Future
Past – Other Activities and Projects			
Development of Delta Junction and Big Delta Communities (including agricultural lands)	Early 1900s to present	150,000 acres Private land	High
Richardson & Alaska Highways Construction Use	1920s to 1948 1920s to present	10 acres (DTA only)	High
Trans-Alaska Pipeline Construction Operation and Maintenance	1973 to 1976 1977 to present	10 acres (DTA only)	High
Multiple use land management	Pre 1950s to present		High
Subsistence	Pre-history to present	Throughout region	High
Recreation	Early 1900s to present	Throughout region	High
Future – Other Activities and Projects			
Development of Delta Junction and Big Delta Communities	2005 and beyond	Throughout private lands	High
Alaska Railroad Expansion	2007	60 acres	5 years: Medium 15 – 30 years: High
Tanana River Bridge	Unknown	Unknown	5 years: Medium 10 years High
Natural Gas Pipeline	Unknown	Along Trans-Alaska Pipeline right-of-way	5 years: Low 10 years: Medium 15 – 30 years: High
Richardson Highway upgrade	2005 to 2006	10 acres	15 – 30 years: High
Richardson and Alaska Highways	2005 and beyond		15 – 30 years: High
Delta Agricultural Project	2005 and beyond		15 – 30 years: High
Multiple use land management	2005 and beyond	Tanana Valley Management Plan	15 – 30 years: High
Subsistence	2005 and beyond	On public lands	15 – 30 years: High
Recreation	2005 and beyond	On public and private lands	15 – 30 years: High

Methodology

Cumulative effects analyses for the resources (and issues) covered in this EIS are analyzed using the 11-step process described by CEQ (1997) and enumerated in the Army draft CEA manual (Canter et al. 2005). The 11 steps are summarized in Table 4.3.10.d. The analyses were compiled in a report (USAG-AK NEPA 2005), which is presented in narrative form in the following subsections (USAG-AK NEPA 2005).

Table 4.3.10.d Description of 11-Step Process Used for Cumulative Effects Analysis.

Step	Action Taken for Each Issue or Resource
(1) Quick Look	Does the project (i.e., construction of the new range) result in sufficient direct or indirect impacts to warrant further CEA? • If not, the issue does not need to be analyzed further. • If so, proceed with 11-step process.
(2) Determine Geographic Scope	Depends on characteristics and location of resources, ecosystems, and human communities.
(3) Establish Time Frame	Past, present, future trends • Past – from development of DTA region (1950s) to present. • Future – through life of the range (approx. 25-30 years).
(4) Identify Other Actions	• Past, present, future actions on and adjacent to DTA.
(5) Characterize Potential Responses to Change	• How are respective resources or issues affected?
(6) Characterize Stresses	• How do stresses affect the resources or issues? • Are regulatory thresholds exceeded?
(7) Define Baseline	• Define current conditions and describe future without proposed action (these are described in Chapter 3 of this EIS, as well as in the Transformation EIS, USARAK 2004a).
(8) Identify Cause and Effect Relationships	• Use matrices and network diagrams to evaluate impacts to resources and issues of concern from projects.
(9) Determine Magnitude and Significance of Cumulative Effects	• Use quantitative and qualitative information to evaluate the magnitude and significance of cumulative effects on respective resources and issues. Do actions affect sustainability?
(10) Modify or Add Alternatives to Minimize Cumulative Effects	• Not necessary for insignificant incremental effects but may be desirable to reduce impacts. • If significant, on and off-installation mitigation may be necessary.
(11) Monitoring and Adaptive Management	• Management of many important resources and issues already requires intensive monitoring. Adjust monitoring if necessary. • Incorporate monitoring with Environmental Management Systems or similar adaptive management process.

Source: Canter et al. 2005

The following analyses constitute an additional evaluation for each resource or issue. The nature of identified direct and indirect impacts are evaluated (from Chapters 3 and 4), along with the recommended mitigation measures, and the final nature and characteristics of these impacts are used to ascertain the need for further CEA. This CEA has evaluated each resource (or issue) with Quick Look questions, and, based on the answers, three levels of analyses are used for this document: Levels 1, 2, and 3.

Level 1 reflected resources (or issues) that did not have any potential cumulative effects concerns, thus no further analyses were needed. For the Level 1 analysis, the answers to the questions

were included along with a brief summary statement of the findings. Level 1 resources or issues included soils, noise, human health and safety, airspace, air quality, groundwater, threatened or endangered species and species of concern and socioeconomics.

Level 2 analyses were conducted for those resources (or issues) that might be subject to potentially significant cumulative effects. These analyses involved considering the direct and indirect effects of the potential actions along with other past, present, and foreseeable future actions and impacts. Specific attention was directed to relevant topics within the given resource (or issue). Finally, reference was made to existing and proposed Army mitigation measures included in the corresponding earlier section of Chapter 4.

Although the direct, indirect, and potential cumulative impacts to surface water, cultural resources, vegetation and subsistence were potentially significant, the effects could be lessened through existing or proposed mitigation. Therefore, these resources were analyzed at Level 2. The purpose of Level 2 was to determine if any significant cumulative effects were likely. If the cumulative effects would appear imminent or likely, then a Level 3 analysis would ensue.

Level 3 analyses were conducted for those resources (or issues) that were identified as having significant cumulative effects resulting from the direct and indirect effects of the potential actions and other past, present, or future actions. Level 3 analyses included a more in-depth review of the combined effects on specific relevant topics within the given resource (or issue). Further, specific information was included on existing Army mitigation measures for the direct and indirect effects, as well as proposed mitigation measures related to the cumulative effects concerns. These combined mitigation measures should aid in minimizing cumulative effects on the four resources (or issues) subjected to the Level 3 analysis. Impacts to fire management, wildlife and fisheries, wetlands, and aspects of public access and recreation at DTA East were deemed likely to be significant. These issues were analyzed at Level 3, and, if necessary, additional mitigation would be considered.

Table 4.3.10.e Level of Cumulative Effects Analysis for Each Resource.

Level 1: Quick Look	**Level 2: Analysis and Discussion**	**Level 3: Detailed Analysis**
Soil Resources Noise Human Health and Safety Airspace Air Quality Groundwater T/E and Species of Concern Socioeconomics Environmental Justice	Surface Water Cultural Resources Vegetation Subsistence	Fire Management Wildlife and Fisheries Wetlands Public Access and Recreation

4.3.10.1 Soil Resources

Quick Look Questions

No	Would the proposed action result in a significant impact to soil resources? *Impacts are minor to moderate at all locations.*
Yes	Does the proposed action involve a new range or maneuver area, or does it extend beyond the existing boundaries of either? *The ranges, while new, would be sited on lands that have previously been used for training of a similar nature.*
Yes	Is the proposed site effectively managed as part of an installation ITAM Program? *Previous impacts over decades have produced only very minor impacts. The recent institutional implementation of sustainable Army management strategies should ensure less impacts and proactive management of the ranges.*
Yes	Does the proposed action increase the level of intensity of military activity at DTA? *While intensity would be increased, it would be accompanied by more proactive management at a holistic or ecosystem level.*
No	Are there other potential impacts to soil resources that individually or collectively could result in significant cumulative effects?
No	Is the site characterized by gullies and or/poor vegetative cover?
No	Are there sensitive downstream land uses, and has sedimentation/pollution been a downstream issue in the past? *The rivers carry a naturally heavy sediment load and the Army's impact is negligible. Pollutants of concern degrade rapidly and do not reach the waterways.*
No	Will permafrost be significantly impacted? *Strategies are being implemented to avoid permafrost areas, and specific BMPs are in place to address protection of permafrost areas when encountered.*
No	***Is additional cumulative effects analysis needed?***
CEA Level: (1) Quick Look	

Given the localized nature of impacts to soil resources, and the institutional management available to protect them, the potential contributions of the proposed action do not warrant further CEA.

4.3.10.2 Surface Water

Quick Look Questions

No	Would the proposed action result in a significant impact to surface water? *Impacts to floodplains and waterways, lakes or ponds, or water quality would range from none or minor to moderate.*
Yes	Does the proposed action involve a new range or maneuver area, or does it extend beyond the existing boundaries of either? *The ranges, while new, would be sited on lands that have previously been used for training of a similar nature.*
Yes	Is the proposed site effectively within a floodplain? *Alternatives 2 (Eddy Drop Zone BAX only) and 3 (Donnelly Drop Zone BAX and CACTF) study areas are within the Jarvis Creek floodplain. A portion of the Alternative 4 (North Texas Range) surface danger zone is within the Delta River floodplain. Part of Alternative 5 (North Texas Range BAX surface danger zone) is within the Delta River floodplain, and no part of the Eddy Drop Zone CACTF is within the Jarvis Creek floodplain.*
Yes	Are streams, lakes, or ponds present within the footprint? *All alternatives would include some lakes and ponds. Alternatives 2 and 3 contain streams.*
Yes	Does the proposed action increase the level of intensity of military activity at DTA? *While intensity would be increased, it would be accompanied by more proactive management at a holistic or ecosystem level.*
No	Are there other potential impacts to surface water that individually or collectively could result in significant cumulative effects?
No	Has sedimentation/pollution been a downstream issue in the past? *The rivers carry high sediment loads. Studies have demonstrated that munitions residues either degrade rapidly or have low mobility.*
Yes	***Is additional cumulative effects analysis needed?***
CEA Level: (2) Analysis and Discussion	

Analyses in Chapters 3 and 4 evaluated impacts on waterways and floodplains, lakes and ponds, and water quality. No significant direct or indirect impacts were identified. Selection of Alternatives 2 (Eddy Drop Zone) or 3 (Donnelly Drop Zone) would result in moderate impacts to floodplains. In addition, selection of Alternative 3 would result in moderate sedimentation impacts to Ober Creek from stream crossings during maneuvers.

Geographic Scope, Time Frame, and Impact Criteria

The geographic scope includes impacts within DTA East and downstream segments of Jarvis Creek and the Delta River. Past, present, and reasonably foreseeable future actions include activities dating from the 1950s when Army activities began, through the present, to the expected life of the range (approximately 2035). The significance threshold would be violation of water quality standards. The qualitative and quantitative criteria are the same as those described for Section 4.3.2, *Surface Water* (i.e., None, Minor, Moderate, Severe, or Beneficial).

Cause and Effect Relationships

The factors that influence water quality and surface water can be summarized as follows: surface flow over the ground is accelerated by soil compaction and vegetation removal, which increase soil erosion and subsequent stream and lake sedimentation. Natural physical and chemical processes (such as the high sediment loads of Jarvis Creek and Delta River) affect water quality and are exacerbated by human-induced erosion, spills, and other sources of contamination.

Past, Present, and Foreseeable Future Impacts

Surface water impacts often result from direct impacts on other resources such as soils and vegetation, altering natural flow dynamics and water quality. Greater overland flows and reduced groundwater percolation will likely result, and any reduced vegetation cover will increase soil erosion and windborne sedimentation. Vehicle crossings will stimulate streambank erosion, increase sedimentation, and widen waterways, mostly in the Jarvis Creek watershed, where summer training is possible and soils are more conducive for maneuver training. Sedimentation impacts would be minor given their localized nature and the relatively high (natural) base levels of sediment in Jarvis Creek and other waterways.

Munitions would include only small arms ammunition, training rounds, and inert projectiles, and no high explosive munitions would be used. Only trace depositions of munitions residues (such as propellants) will be released, and they are immobile and non-persistent at DTA. Increased sedimentation and water quality effects are minor, given the low rate of chemical decomposition (of any residues) and the slight sediment increases when compared to current base sediment loads.

Smoke generation releases only small amounts of chemicals and is permitted only in designated locations. Surface waters are protected by mitigation measures (USARAK 2000c).

Issues Analysis

Floodplains – Construction impacts from Alternatives 2 (Eddy Drop Zone) and 3 (Donnelly Drop Zone) would be moderate, as the projects would be within the Jarvis Creek floodplain where range development could increase water flow and sedimentation. However, selection of these or Alternatives 4 (North Texas Range) or 5 (North Texas Range BAX and Eddy Drop Zone CACTF) would not contribute to significant impacts to the floodplain. Likewise, there would be training within these floodplains, but the impacts would not be significant. Recreational impacts would decrease within the selected study area because of reduced access. Impacts from recent and future construction projects would not affect water flow in the Jarvis Creek or Delta River Floodplains.

Lakes and Ponds – Impacts to lakes and ponds would be minor from construction and training; further, these areas are avoided and best management practices are used to prevent impacts. Thus, impacts would be none to minor. At each of the sites, there would be some sedimentation from construction, and the impacts could be minor. Any residues from munitions training would have limited mobility or they would dissolve quickly. Recreational impacts within the selected study areas would decrease, as access would be reduced. Impacts from other construction projects would be none to minor. Overall cumulative effects to lakes and ponds would be minor regardless of the alternative.

Water Quality – Increased sedimentation would result in minor impacts to the surface water quality of Jarvis Creek and the Delta River. However, Jarvis Creek and the Delta River carry high natural sediment loads, so any impacts would be temporary (i.e., during construction or training events). These impacts would be minor except for Alternative 3 (Donnelly Drop Zone), where crossings over Ober Creek would cause moderate impacts. Recreational impacts within the study areas would decrease due to reduced access. Construction from other projects would be localized and temporary and would not result in significant cumulative impacts to water quality on DTA East.

Mitigation Measures

Mitigation for impacts to surface water was discussed in Section 4.2.2.2.

4.3.10.3 Fire Management

Quick Look Questions

Yes	Would the proposed action result in a significant impact to fire management? *While the likelihood of a military fire would be increased, other fire threats still exist from civilian access including recreational use and other activities in the region. While the Eddy and Donnelly Drop Zone sites exhibit a higher risk than the North Texas Range site, Army mitigation measures (including fuel reduction and response team provisions) may reduce military-specific risks. Still, overall risks from all potential sources would be high and potential effects are catastrophic.*
Yes	Does the proposed action involve a new range or maneuver area, or does it extend beyond the existing boundaries of either? *The BAX and CACTF would be new, although they would be sited on lands that have been used for similar purposes for decades.*
Yes	Is the proposed site managed as Full or Critical fire management zones? *The entire DTA East is a major fire risk zone during specific weather conditions, and given the location of Delta Junction and prevailing winds, significant risks exist. All alternatives are located within a Full fire management category. For Alternative 4 and 5 surface danger zones fall within a Limited fire management category.*

Yes	Does the proposed action increase the level of intensity of military activity at DTA? *The proposed action does increase the overall level of training at DTA East, with a specific increase in intensity at the selected BAX and CACTF sites. The overall level of DTA military activity was higher in past years. Current increases in training, associated with Army transformation, are analyzed in detail in the Transformation EIS (USARAK 2004a).*
Yes	Does the area contain flammable vegetative "fuels"? *DTA vegetation resources are generally intact and will remain in good condition over time. In some cases, the existing vegetation would act as "fuel." While the nature of the vegetation will become less volatile, it will support the spread of wildfires and require specific mitigation measures.*
Yes	Has fire management been a issue in the past? *The threat of wildfires has been prominent throughout Alaskan history. Natural wildfires have been recognized as essential to a healthy functional ecosystem. However, as human occupation increases, wildfires threaten human health and property. Human-induced fires, including those of the military, exacerbate this threat.*
Yes	Will fire risk be significantly impacted? *In spite of mitigations to reduce military-induced risks, the threat to Alaskan communities remains significant and potentially catastrophic.*
Yes	***Is additional cumulative effects analysis needed?***
CEA Level: (3) Detailed Analysis	

Wildfire Risks

The historical record firmly establishes wildfires as an Alaskan phenomenon. Naturally occurring wildfires (from lightning strikes) pose a significant threat to human health and property in Alaska. The fire history of Alaska and the DTA region is easily summarized (See Section 3.2.3) and analyzed in previous EISs (USARAK 2004a). From a baseline perspective, these historic fires have met their natural purpose by rejuvenating the ecosystem in which they occurred and reducing fire risks through the removal of fuels. The predominant DTA ecosystems have thus remained in a natural setting, though activities on Army ranges have slightly altered composition of the vegetation species. Natural wildfires and their effects are exacerbated by human activities, which can initiate more wildfires. Human presence as well as the presence of supporting infrastructure increase the significance of these fires and dictates more stringent fire management policies (See Section 3.2.3.2).

Existing fire management policy has been established based on the ability to prevent fires (and their spread) over the immense Alaskan acreages as well as the recognition of fire's value to healthy ecosystems. This policy incorporates a fire risk index (Low, High, Moderate, Extreme) (See Section 3.2.3.1) and a mix of management options (Critical, Full, Modified and Limited) (See Section 3.2.3.2). In summary, existing wildfire policies limit containment or firefighting unless (or until) risks extend to human health and property (Critical and Full Management Options).

Table 3.2.3.d summarizes historical recent wildfires in the local region and their origins. While military activities caused the most fires, the cumulative natural and non-military human sources are comparable. As the region grows and development create more non-military activities that non-military fires will certainly increase. In any case, the potential severity and importance of the wildfire issue is well-established, given the catastrophic nature of uncontrolled wildfires. The proximity of Delta Junction and other local communities, coupled with the speed that a wildfire can exhibit under ideal conditions, creates a regional risk that must be addressed regardless of the selected alternative.

Geographic Scope, Time Frame, and Impact Criteria

The geographic scope for the analysis of cumulative wildfire risks must include the installation boundary and immediate vicinity (i.e., critical zone along Alaska Highway). The accepted critical fire management area encompasses Delta Junction and Big Delta from the post boundary to north of Tanana River. While this regional definition reflects DTA's proximity to potentially affected communities and the prevailing wind conditions, fire risks can materialize from any direction with the same negative effects.

The time frame for wildfire CEA consists of two distinct periods: (1) prior to "settlement," before historical events precipitated European and North American in-migrations, and (2) after this settlement began. In the earlier period, wildfires occurred, but affected indigenous (or local) cultures were adaptable. In the latter period (1950-2005), as in-migration rose, the risks to human health and property grew proportionately. In the future (2006-2035), as populations increase and property investments grow, these risks will continue to rise.

Cause and Effect Relationships

The specific aspects of activities do affect their relative contributions to fire risk. Whether military (i.e., pyrotechnics) or civilian (i.e., campfires or cigarettes) or natural (i.e., lightning), the cause-effect relationships are the same once a fire starts. Wildfire risks will increase in relation to development in the local region. Compounding this risk, growing property investments are likely in the region and the potential cumulative damage may increase much more rapidly.

The outbreak of wildfires represents direct impacts on human health and safety, natural vegetation and habitat, and air quality. These in turn produce further indirect effects on human respiratory health, long-term and structural alterations to habitat, loss of forest species, permafrost degradation and loss, and erosion and subsequent sedimentation issues. Most of these indirect effects are irreversible (such as permafrost loss) and irretrievable (such as human life or health).

Past, Present, and Foreseeable Future Actions

The past, present, and future activities on DTA and nearby lands are summarized in Table 4.3.10. c. As shown, present military activities are increasing as a result of Army transformation and will continue into the near future. Other longer-term future actions include civilian or community activities, such as the further development and growth of Delta Junction and Big Delta, expansion of the Alaska Railroad, a natural gas pipeline, upgrade of the Richardson and Alaska highways, the Delta Agricultural Project, and continued multiple use land management, including subsistence and recreational uses.

The potential significance of resultant cumulative effects is dictated by the increased risk, the intensity of unmanaged wildfires, the current and increasing magnitude of potential damage (both monetary and human risk), and the contextual proximity of threatened communities. Even relatively small wildfires can have far-reaching effects on affected populations including visibility, respiration, and reduced air quality. These risks and their context meet significance criteria. The potential severity of wildfire effects can be extensive and the risks are increasing from both regional development and population growth, and from military activities at DTA.

Existing and Proposed Army Mitigation Measures

Numerous mitigation measures and best management practices are specified under the proposed action, some of which are currently integrated into Army policies and actions (USARAK 2002b, USARAK 2004a). All reasonable and practicable measures to mitigate adverse Army impacts to fire management are enumerated in Sections 4.2.3.2.1 and 4.2.3.2.2. The appendix evaluates the efficacy of these mitigation measures and assesses their potential success. To insure both optimal control of Army wildfire sources and resources for the mitigation measures, the effectiveness of mitigation will be identified in the Record of Decision, following publication of the Final EIS.

Regional Mitigation Measures

The Army has implemented numerous management strategies to reduce fire risks, and it has recommended additional mitigation measures as part of this proposed action. These actions can reduce the potential start and spread of Army-induced wildfires, but will only slightly contribute to protection from civilian or other non-military activities on Army or adjacent lands.

A longer-term, more comprehensive fire management and mitigation strategy may eventually be required for the local DTA region. A regional strategy would necessarily include controls and protections from both the Army and other community constituents. Adaptive management policies and management of community land use and activities during specific risk conditions, could reduce non-military risks. Areas that constitute a likely fire threat could be more actively managed to reduce community risks from non-military wildfires. Mitigation measures could include landscape treatment or alterations to reduce wildfire threats. For example, mechanized vegetation removal controlled burns in high-risk areas may lessen potential wildfire intensity and spread.

While Army mitigation measures are limited to military-induced wildfire threats, they constitute only partial reductions to the overall cumulative threat of wildfires in the community. A more comprehensive and regional approach is a possible long-term solution to cumulative wildfire threats, given growth and development in the region, and accompanying risks of wildfire starts. While Army mitigation measures (Sections 4.2.3.2.1 and 4.2.3.2.2) will reduce these risks from military activities, accompanying mitigation measures for non-military activities will be required to reduce the growing long-term cumulative risks at a regional level.

4.3.10.4 Noise

Quick Look Questions

Yes	Is the proposed action near the edge of the installation boundary? *The Eddy Drop Zone site is approximately five to seven miles from the installation boundary, close enough that peak noise levels will be heard if atmospheric conditions are sufficient to convey the noise. Noise levels, both peak levels and long-term average noise zones (NZs), are within acceptable levels.*
Yes	Has the adjacent civilian community (nearest the location of the proposed action) complained about any noise associated with past or ongoing activities? *Levels of noise are best characterized as a nuisance level, within established and acceptable levels. The adjacent civilian community has complained about noise from both Army and Air Force activities.*
Yes	Does the proposed action increase the level or intensity of military activity? *Overall noise levels would remain approximately the same and within acceptable levels.*
No	Does the proposed action include the use of noisier equipment (or munitions) than that historically used at the proposed site(s)? *Some firing locations would change, but NZs stay within boundaries and at acceptable levels.*
No	Are there other potential noise impacts that individually or collectively could result in significant cumulative effects? *Noise from the Alaska/Richardson highways and military airfields contribute to the noise environment, but the additive effects would not be significant.*
No	Are there any human populations or populations of sensitive animal species near the proposed site? *Sensitive receptors are well outside the predicted NZs.*
No	***Is additional cumulative effects analysis needed?***
CEA Level: (1) Quick Look	

Non-military noise sources are also minor in nature, and no other extensive or major sources exist. As a result, the direct and indirect effects of the proposed action do not warrant additional CEA.

4.3.10.5 Human Health and Safety

Quick Look Questions

No	Are there any known or suspected contaminated sites at (or near) the proposed site?
Yes	Would the proposed action increase the use of hazardous materials? *Military activity would increase at DTA from ongoing Army transformation (USARAK 2004a). While the BAX/CACTF would not significantly increase the overall use of hazardous materials beyond these levels, usage would be concentrated at the selected sites. This increased use and focus at these sites would simplify management and monitoring of hazardous materials and wastes, as use and potential releases would be more geographically contained.*
Slight	Does the proposed action involve new hazardous material/hazardous waste (HM/HW) management activities or procedures at the installation? *While the same HM/HW management would be required, some additional focus on the BAX/CACTF sites would be required.*
Yes	Is the proposed site currently and effectively managed to reduce health and safety threats from HM/HW or munitions? *Procedures are in place to both prevent contamination and to clean up any releases that might occur. Surface danger zones are designed to eliminate the risk of munitions escaping from military boundaries.*
No	Have any major HM/HW releases or spills been recorded at the installation?
Yes	Are there any other potential safety or health risks to the public? *In the analyses, two potential risks were identified: (1) increased risks due to additional convoy traffic, and (2) perceived risks due to munitions use at the ranges.*
No	Do any risks remain that cannot be mitigated? *Both risks, from traffic or munitions use, are mitigated by the Army. Convoy procedures and community coordination reduce public risks from increased military transportation. Due to surface danger zone design and their proposed orientations at each of the alternative sites, all surface danger zones would fall within installation boundaries and ensure that no projectiles would carry onto neighboring properties.*
No	***Is additional cumulative effects analysis needed?***

CEA Level: (1) Quick Look

Given the institutional controls that are used to protect human health and safety, the potential impacts of the proposed action do not warrant further CEA.

4.3.10.6 Wildlife and Fisheries

Quick Look Questions

Yes	Would the alternatives result in a significant impact to wildlife or fisheries? *Potentially severe impacts to the Delta bison herd if North Texas Range is used as a BAX/CACTF or BAX.*
Yes	Does the proposed action involve a new range or maneuver area, or does it extend beyond the existing boundaries of either?
Yes	Is the proposed site effectively managed as part of an installation ITAM Program?
Yes	Does the proposed action increase the level of intensity of military activity at DTA?
Yes	Is the area characterized by sensitive habitat? *Important bison habitat located adjacent to North Texas Range site.*
Yes	Are there special interest management areas in the vicinity? *Sites overlap (or are adjacent to) bison and sandhill crane special interest management areas.*
Yes	***Is additional cumulative effects analysis needed?***

CEA Level: (3) Detailed Analysis

Priority Species

Section 4.6.2 evaluates impacts to local populations of priority species within DTA East and regional populations within Game Management Unit (GMU) 20D. This cumulative effects section will focus on species that exhibit moderate to severe local impacts from the proposed action, in addition to those deemed important by wildlife managers. The species include bison, black bear, brown bear, moose, caribou, gray wolf, lynx, rusty blackbird, sharp-tailed grouse, and sandhill crane.

Geographic Scope, Time Frame, and Impact Criteria

The geographic scope encompasses DTA impacts within the southern portions of GMU 20D. Past, present, and foreseeable future actions date from the 1950s when Army activities began, through the present, to the expected life of the range (approximately 2035). The significance threshold for any cumulative effects would be triggered by changes in large scale population trends or harvest objectives (i.e., at the population level). The qualitative and quantitative criteria are the same as those for wildlife and fisheries, described in Section 4.2.6 (i.e., None, Minor Moderate, Severe, or Beneficial).

Cause and Effect Relationships

Important cause and effect relationships are described in Section 4.2.6, *Wildlife and Fisheries*. Direct impacts include loss of habitat from construction of military facilities and infrastructure, as well as the fragmentation of habitats for some species, thus reducing habitat suitability. In addition, human disturbance can directly affect wildlife, including death or injury from military training or by vehicles. These many combined factors affect the short or long-term behavior of animals. Short-term responses include attention behavior or increased vigilance, temporary movement, or alteration of activity patterns. These repeated short-term perturbations can produce long-term effects such as habitat or home range abandonment or changes in movement and migration patterns. Both short and long-term factors can result in physiological effects such as decreased nutritional condition, stress response, or deteriorated body condition, which could result in illness, declines in reproductive success, or increased mortality rates.

Past, Present, and Foreseeable Future Actions

On DTA East, military and non-military construction has removed approximately 4,660 acres of habitat (Table 4.3.10.c). Much of the land has been altered (e.g., the Delta Agricultural Project), developed (Delta Junction), and parceled by the communities' inhabitants. Nevertheless, populations of most high-profile species have remained stable and sustainable. No state or federally listed endangered or threatened species occur on USARAK lands or waterways. Although the American peregrine falcon was delisted as an endangered species in 1999, the USFWS requests consultation on any projects that may hinder their recovery. The installation is within their breeding range, and they have been known to nest at one location along the east bluff of the Delta River (Mason 2005). Proposed activities will have no effect on the recovery of the peregrine falcon in this area.

Other past, present and future projects (and activities) include infrastructure and land management activities. Infrastructure, such as the Trans-Alaska Pipeline and proposed natural gas pipeline (following the same corridor), the Alaska and Richardson highways, networks of roads in the Delta Junction community, and the proposed Alaska Railroad extension (connecting Delta Junction and Fort Greely to Eielson Air Force Base) result in altered or lost habitat, habitat fragmentation, increased linear corridors, and increased human access. Land management activities include the Tanana Basin Area Plan, the Delta Agricultural Project, the Bison Range, and BLM activities. Consumptive and non-consumptive recreation result in a relatively frequent human presence in DTA East and nearby areas throughout the year.

Species by Species Analysis

Bison – The region of influence for bison encompasses their traditional range, as described by DuBois and Rogers (2000). Development of Delta Junction, the agricultural fields, and military infrastructure coincided from the 1950s through the 1970s. While the effects of military activities on the Delta bison herd are unknown (DuBois and Rogers 2000), some studies indicate that bison can habituate to human presence. The distribution of the Delta bison herd is heavily influenced by the availability of high quality forage, which has declined on the bison's natural range due to fire suppression, forcing them to rely more on agricultural crops and plantings on the Bison Range.

Past and recent development on Fort Greely (including the cantonment area, SMDC, the CRTC Test Track and associated fencing) has created a fragmented migration corridor between the Bison Range and the Delta River calving/summer range.

The Delta Agricultural Project and Bison Range developments have benefited the Delta bison herd in recent decades, but the habitat has degraded from fire suppression, bison grazing on the same lands (i.e., continuous seasonal grazing), and human activities, including military training, recreation, and development of infrastructure on (and near) DTA East. These have contributed to moderate cumulative impacts to the Delta bison herd.

As described in Section 4.2.6, changes in bison distribution could force the herd to exceed natural carrying capacity resulting in habitat degradation, moderate population declines, or early seasonal migration onto adjacent agricultural lands. The Delta herd's pre-calving population has averaged about 360 animals since the 1980s and a loss of 90 animals would represent a severe impact to the herd. Considering all potential influences on the Delta bison herd, Alternatives 1 (No Action), 2 (Eddy Drop Zone), and 3 (Donnelly Drop Zone) would have a minor impact on the distribution and population structure of the herd. However, Alternatives 4 (North Texas Range) or 5 (North Texas Range BAX and Eddy Drop Zone CACTF) could have a severe impact to the bison herd if no mitigation measures are implemented.

Moose – Given their economic importance, both wildlife managers and the general public are concerned about impacts on moose. Moose appear well-adapted to multiple use management (forestry, hunting and military activities), but project construction could remove portions of habitat in a high density moose area, where populations exceed four moose per square mile. At this density throughout DTA East, the land could support approximately 650 moose, or approximately 11 percent of GMU 20D's current estimated population (DuBois 2005). The proposed action would directly remove portions of this moose habitat, but the impact within DTA East and GMU 20D would be relatively small, affecting no more than 2 percent to 5 percent of the DTA East moose population and less than 1 percent of GMU 20D. However, some individuals would be displaced and disturbed from the sites.

Moose populations in Alaska, including the interior region, have proven adaptable to human activities and have benefited from habitat improvement projects, as well as the creation of the Delta Agricultural Project and Bison Range. However, moose habitat has been lost from the development of local infrastructure.

Analyses in Section 4.2.6 indicate relatively little difference, in terms of impacts to moose, between Alternatives 2 (Eddy Drop Zone), 3 (Donnelly Drop Zone), 4 (North Texas Range) and 5 (North Texas Range BAX and Eddy Drop Zone CACTF). While some moose would be disturbed and displaced, creating greater impacts than Alternative 1 (the No Action Alternative), the proposed activities would create only minor impacts at the GMU 20D population or harvest level.

Black Bear and Grizzly Bear – Black bears are adaptable to human activity, but are especially affected by disturbance during denning or hibernation. Black bear densities in interior Alaska, south of the Tanana River, are approximately 18 bears per 1,000 square miles (ADF&G 2002). Grizzly bears avoid trails or roads during high human use (Gibeau et al. 2002), producing moderate impacts in heavily used areas. If a trail area is high quality habitat, this avoidance can

result in poor body condition for females, and subsequent lower fecundity and survival rates (Mattson et al. 1987; Mace et al. 1996). Grizzly bear densities in the DTA portion of interior Alaska average approximately 10-12 animals per 1,000 square miles (ADF&G 1998a).

DTA East encompasses approximately 163 square miles, and the footprint maneuver areas would affect about 4 percent to 5 percent of DTA East's preferred habitat, depending on the selected alternative. Range construction would impact the home range of relatively few bears of either species, and would not affect population levels within DTA East or GMU 20D. These impacts would be minor. However, increased infrastructure development and human activity within DTA East and the Delta Junction area will continue to have moderate impacts on bear populations.

Caribou – The region of influence for the caribou extends throughout the range of the Delta and Macomb caribou herds (USARAK 2004a). While the Delta caribou herd has become habituated to military training (Davis et al. 1985), low flying jets during late winter disrupt resting patterns of caribou, particularly during post-calving period. This can decrease calf survival (Harrington and Veitch 1992; Maier, et al. 1998). Brigade-level winter exercises could disperse the herd segment that winters on DTA East and result in moderate impacts. Army training would not directly affect caribou calving areas as they are 20 to 40 miles away. Increased infrastructure development and human activity within DTA East and around the Delta Junction area will continue to moderately impact caribou.

Considering all potential influences on the Delta and Macomb caribou herds, Alternatives 1 (No Action) and 2 (Eddy Drop Zone) have minor impacts on the distribution and population dynamics. Alternatives 3 (Donnelly Drop Zone), 4 (North Texas Range), or 5 (North Texas Range BAX and Eddy Drop Zone CACTF) could produce moderate impacts on these herds. These study areas and other extensively developed areas are outside critical habitat areas. Overall, human activity has produced moderate impacts on these herds and the proposed action would not create additional cumulative effects resulting in severe impacts.

Gray Wolf – Wolves avoid areas with high road densities (>1 mi/mi^2) (Thurber et al. 1994; Fuller et al. 1992), and studies have shown increased glucocorticoid activity in response to snowmobiles (Creel et al. 2002). DTA East has three to five wolf packs (USARAK 2004a) and GMU 20D includes approximately 125 wolves (DuBois 2005). Development of the BAX and CACTF would likely impact one or two of the resident packs on DTA East, as these wolves would avoid ranges and road networks.

All alternatives would have minor impacts on the distribution and population dynamics of wolf packs within GMU 20D. The cumulative effect of additional infrastructure development and human activity within DTA East and the Delta Junction area will remain on wolf populations. The wolf population appears sustainable and, as long as the prey base is stable, wolf populations will not significantly change.

Rusty Blackbird – While the populations of breeding rusty blackbirds are declining in North America, these losses appear related to land management in the wintering range, thousands of miles from Alaska (Avery 1995). However, loss of wetland and nearby woodland habitat may negatively affect rusty blackbird populations and allow more aggressive competitors to fill their niche (Avery 1995). The extent of available habitat on DTA East is relatively small, and rusty

blackbirds have only been observed while migrating through the post (Mason 2005). Alternative 2 (Eddy Drop Zone) could moderately impact migrating rusty blackbirds on DTA East, but the effects of other alternatives would be minor to none. None of the alternatives would significantly contribute to population declines at the regional population level.

Sandhill Crane – Sandhill cranes can be affected by low flying airplanes (Herter 1992), but can habituate to human disturbance (Dwyer and Tanner 1992). Approximately 300,000 sandhill cranes, a large portion of the world's population, migrate through DTA from late-April through mid-May, and again in August and September (Anderson et al. 2000). DTA is part of a sandhill crane special interest management area.

Impacts from Alternatives 1 (No Action), 2 (Eddy Drop Zone), and 3 (Donnelly Drop Zone) would be minor. Moderate impacts could result from Alternatives 4 (North Texas Range) or 5 (North Texas Range BAX and Eddy Drop Zone CACTF), but the area is not considered critical habitat. Overall cumulative effects to sandhill cranes would remain minor to moderate.

Sharp-tailed Grouse – Disturbances at sharp-tailed grouse breeding grounds can result in population declines (Baydak and Hein 1987; USARAK 2004a). The Delta Agricultural Project has probably benefited sharp-tailed grouse populations in the DTA and Delta Junction region since the 1980s (Raymond 2001).

Impacts from Alternatives 1 (No Action), 2 (Eddy Drop Zone), and 3 (Donnelly Drop Zone) would be minor. Moderate impacts could result from Alternatives 4 (North Texas Range) or 5 (North Texas Range BAX and Eddy Drop Zone CACTF). No alternatives would contribute to significant population-level impacts on DTA East or adjoining lands.

Fisheries – Training could negatively impact fisheries through higher erosion rates and sedimentation, potential petrochemical spills, and increased fire frequency (which can also increase erosion into streams, ponds, and waterways).

Overall potential impacts on fish from Alternatives 2 (Eddy Drop Zone) and 3 (Donnelly Drop Zone) are considered minor. Impacts from Alternatives 4 (North Texas Range) and 5 (North Texas Range BAX and Eddy Drop Zone CACTF) are considered severe to stocked lakes because Alaska Department of Fish and Game would probably cease the stocking program if access was highly restricted. If the lakes were not stocked the fish populations would die out over the winter. Under Alternative 2 (Eddy Drop Zone), impacts to fish are believed insignificant. Under Alternative 3 (Donnelly Drop Zone), Jarvis Creek serves as an important migration route for grayling, between spawning and winter habitat. In addition to Butch Lake, a few small lakes (smaller than two acres) are located on the far eastern edge of the study area and impacts to fish in the Jarvis Creek watershed are believed insignificant. Care should be taken under both Alternatives 2 and 3 to avoid erosion into Jarvis Creek (see Section 3.2.1). Multiple kettle lakes at the North Texas Range site (Alternatives 4 and 5) support important local fisheries, with fourteen stocked lakes along Meadows and Windy Ridge roads. Big Lake is an ADF&G rearing nursery for rainbow trout.

Wood Frog – Wood frog habitat within higher function wetlands (ponds with margins of emergent vegetation) could be impacted at all sites. Locally moderate impacts could occur to wood frog habitat with Alternative 2 (Eddy Drop Zone), locally severe impacts with Alternatives 3 (Donnelly Drop Zone) and 4 (North Texas Range), and locally minor impacts with Alternative 5 (North Texas Range/Eddy Drop Zone Combination).

Summary

Impacts on wildlife and fisheries are most evident at the North Texas Range study area (under Alternatives 4 and 5), but are also evident for other game species at the other sites. For example, moose, sharp-tailed grouse, and sandhill cranes are the predominant wildlife at the Eddy Drop Zone site; moose, bison, caribou, and sharp-tailed grouse are predominant at the Donnelly Drop Zone site; and a plethora of wildlife (bison, moose, grizzly bear, sandhill cranes, trumpeter swans, waterfowl, and wood frogs) predominate the North Texas Range site. Such resources have traditionally been shared with hunting and fishing communities around DTA, for both recreation and subsistence, producing little cumulative impacts on the population counts (periodically performed on wildlife species of interest). Stocking programs assure long-term, viable fish resources at lakes in the North Texas Range study area.

Cumulative impacts to bison could be severe if Alternative 4 (North Texas Range) or 5 (North Texas Range BAX and Eddy Drop Zone CACTF) is selected. Impacts to other wildlife species would be minor or moderate.

Existing and Proposed Army Mitigation Measures

Existing Mitigation Measures

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts.

Wildlife

- Continued implementation of INRMPs. These contain specific actions to inventory, maintain, and improve wildlife habitat.
- Continued monitoring of effects of military training and regional development on selected wildlife species (especially herd animals and waterfowl) during vital seasons such as breeding, rearing of young, and migration. This knowledge will be used to develop and implement management strategies that minimize disturbance to priority wildlife, allowing natural resources and range managers to coordinate training schedules to minimize such impacts.
- Continued annual moose, bison, and caribou surveys in partnership with the Alaska Department of Fish and Game, and swan surveys with the U.S. Fish and Wildlife Service.
- Continued implementation of USARAK natural resources conservation programs, including INRMPs and ecosystem management. This would improve management of wildlife resources.
- Continued development and implementation of an information and education program for personnel using USARAK lands. This program would emphasize conservation of wildlife and natural resources, as well as reduction of wildlife disturbance and negative wildlife-human interactions (e.g., bear or moose attacks). This would enhance the conservation of wildlife resources on USARAK lands.
- Continued compliance with USARAK Range Regulation 350-2 (July 2004), requiring that units discovering wildlife on training ranges (or in training areas) while conducting live-fire exercises to immediately cease firing and report locations and numbers of animals to the Range Control office.

- USARAK has agreed not to conduct activities or operations in or near bison habitat during mid-February to early September when bison are present to minimize adverse effects on bison (USARAK 1999a).
- Continued compliance with federal and state laws and regulations relating to fish and wildlife conservation or management.
- Continued maintenance of existing bison food plots at DTA East.

Fisheries

- Continued implementation of INRMPs. These contain specific actions to inventory, maintain, and improve fisheries resources.
- Full implementation of natural resources conservation programs, INRMPs, and ecosystem management. This would improve management of fisheries resources.
- Continued development and implementation of an information and education program for personnel using USARAK lands. This would enhance the conservation of fisheries resources on USARAK lands.

Proposed Mitigation Measures

Wildlife

- Develop monitoring and adaptive management strategies for species that would be moderately or severely impacted by the selected alternative.
- Replace and maintain a minimum of 50 acres of bison food plots on DTA East if Alternative 4 or 5 is selected.
- Increase bison monitoring surveys between the months of April and September in partnership with Alaska Department of Fish and Game.
- Conduct bison habitat studies.
- Conduct prescribed burning on DTA East to improve or maintain habitat.
- Provide additional radio collars for systematic radio-telemetry surveys of bison.
- Conduct trumpeter swan brood surveys in DTA West if Alternative 4 or 5 is selected.
- Place access gates along Meadows Road and Windy Ridge Road, 12-Mile Crossing, and 33-Mile Loop Road, maximizing continued recreational use and public safety.
- Allow all other recreational activities outside the construction and maneuver footprints, consistent with current USAG-AK management policies.
- Consider placing bison food plots within DTA West (west side of Delta River) excluding existing dedicated impact areas if Alternative 4 or 5 is selected as a means of altering bison calving and summer grazing locations.
- Consider fertilization of the Delta River floodplain to encourage growth of vegetation for bison forage if Alternative 4 or 5 is selected.
- Consider additional bison food plots along 33-Mile Loop Road and Butch Lake area if Alternative 4 or 5 is selected.
- Consider prescribed burns at DTA West (west site of Delta River) near Buffalo Dome to increase the bison forage area.
- Conduct crane surveys during spring and fall migration periods.

Fisheries

- Determine the placement of access gates along Meadows Road and Windy Ridge Road to allow for maximum continued recreational use and maximum public safety to allow ADF&G access to stocked lakes and regulated hunting areas.
- Maintain access to all 14 stocked lakes.

- Allow other recreational activities outside the construction and maneuver footprints, consistent with current USAG-AK management policies.
- Conduct baseline fish surveys in Ober Creek.
- Support additional baseline fish surveys in Jarvis Creek and the Delta River.

4.3.10.7 Cultural Resources

Quick Look Questions

Yes	Would the proposed action result in a significant impact to any cultural resources? *The Eddy Drop Zone and Donnelly Drop Zone surface danger zones would be severely impacted.*
Mostly	Has the area been surveyed for cultural resources? *Some areas were not surveyed due to lack of access to existing impact areas. Approximately half of Donnelly Drop Zone was not surveyed.*
Yes	Are prehistoric sites present? *Prehistoric sites have been found on DTA East (see Section 3.2.7, Cultural Resources)*
Some	Have these sites been evaluated for National Register eligibility? *Consultation is ongoing.*
Yes	Are any sites eligible for listing on the National Register? *Consultation is ongoing.*
No	Are the sites contributing resources to an eligible or listed district or cultural landscape? *The area has not been evaluated for eligibility.*
Yes	Are there other potential impacts to cultural resources that individually or collectively could result in significant cumulative effects. *Activities from other projects and activities could result in negative impacts to prehistoric sites in the area.*
Unknown	Is the project located in or near an Alaskan Native cemetery, traditional cultural property or sacred site? *Consultation is ongoing.*
Yes	***Is additional cumulative effects analysis needed?***

CEA Level: (2) Analysis and Discussion

Issues and Concerns

The primary variables analyzed in Chapters 3 and 4 include impacts of the BAX and CACTF construction and operation on cultural resources, including historic structures, archaeological (both prehistoric and historic) sites, and traditional cultural properties (TCPs).

Geographic Scope, Time Frame, and Impact Criteria

The geographic scope includes impacts within DTA, as well as to the archaeological and historic record (including TCPs) for interior Alaska from approximately the Gerstle River area to the foothills of the Alaska Range. These lands, including DTA East, record the rich cultural history of the specific region as well as interior Alaska as a whole. Past, present, and foreseeable future actions date from the 1950s when Army activities began, through the present, to the expected life of the range (approximately 2035). The cumulative effects significance threshold would be severe, if impacts cause damage or destruction to (1) more than 5 percent of the total cultural resources within DTA East during construction, (2) more than 10 percent of the total cultural resources located within DTA East during maneuver activities, (3) and/or more than 15 percent of the total cultural resources located within DTA East during munitions training in the surface danger zone. The qualitative and quantitative criteria are the same as those described for cultural resources in Section 4.2.7 (i.e., None, Minor, Moderate, Severe, or Beneficial).

Cause and Effect Relationships

Cultural resources are affected by access to (and use of) USARAK lands. Adverse effects on archaeological sites are caused by such activities as driving motorized vehicles over archaeological sites, construction, or other ground disturbing activities, as well as vandalism. Traditional cultural properties may be adversely affected by the presence of military personnel for training activities, construction, or a variety of other activities. Historic resources may be adversely affected by demolition, unsympathetic project design, neglect, or other activities.

Past, Present, and Foreseeable Future Actions

On DTA East, past and present military and non-military construction has damaged and/or destroyed cultural resources. While archaeological sites have been inadvertently destroyed in the past, an active cultural resources program (since 2001) precludes or reduces the likelihood of such outcomes in the present or future. Much of the land between DTA East and the Tanana River has been altered (e.g., the Delta Agricultural Project), developed (Delta Junction), and parceled by the communities' inhabitants. Such developments can remove culturally-important lands from federal protection, investigation, and management, thus potentially leading to resource destruction.

Other past, present, and future activities include infrastructure such as the Trans-Alaska Pipeline and proposed natural gas pipeline, the Alaska and Richardson highways, networks of roads in the Delta Junction community, and the proposed Alaska Railroad extension, which would connect Delta Junction and Fort Greely to Eielson Air Force Base. These projects will require some additional cultural resources studies (where required by federal law) and would damage and/or destruct some cultural resources.

Additional Army infrastructure would probably be required in the future, and archaeological investigations will be conducted prior to their construction.

Issues Analysis

Historic Resources – The Donnelly Flats MIDAS site, the only historic cultural resource identified near the proposed alternatives, is ineligible for National Register listing. As no eligible sites are impacted by the proposed alternatives, no further CEA will be conducted for historic cultural resource impacts.

Archaeological Sites – Archaeological surveys for DTA East have identified 323 archaeological sites. If Alternative 2 (Eddy Drop Zone) is selected, 105 sites could be impacted, which would be a severe impact on DTA East. If Alternative 3 (Donnelly Drop Zone) is selected, 87 sites could be adversely impacted, a severe impact on DTA East. If Alternative 4 (North Texas Range) is selected, 11 sites could be impacted, and the impact would be minor. Finally, Alternative 5 (North Texas Range/Eddy Drop Zone Combination) would impact 10 sites, also a minor impact.

DTA East contains one of the largest concentrations of archaeological sites in interior Alaska. As such, any severe impacts would also be a severe impact for interior Alaska. The cumulative impacts on archaeological resources will be minor for the North Texas Range or Texas Range/ Eddy Drop Zone alternatives. Archaeological resource impacts will be severe if the Donnelly Drop Zone or Eddy Drop Zone alternatives are chosen, given the large number of impacted sites (within the context of all known sites) for DTA East and for interior Alaska, in general.

Traditional Cultural Properties – No traditional cultural properties have been identified in (or near) proposed sites, though consultation regarding TCPs has not been completed. Consultations will be continued with Alaskan Native tribes that have local expertise and knowledge, to insure that TCPs are identified and mitigation strategies are developed. Cumulative TCP impacts cannot be fully assessed until this consultation is complete.

Mitigation Measures

Mitigation for cultural resources impacts are discussed in Section 4.3.7.2.

4.3.10.8 Airspace

Quick Look Questions

No	Are the current airspaces over-utilized? *Airspace for private flights are narrowed through the DTA and Delta Junction region.*
Yes	Are public concerns about airspace usage and environmental consequences being routinely expressed? *Concerns were expressed during the BAX CACTF Draft EIS public comment period.*
Yes	Are there non-military uses of the current airspaces and are conflicts being articulated? *Problems are voiced through U.S. Air Force public comment meetings.*

No	Will the proposed action cause increased usage of existing airspace, leading to over-utilization? *Existing airspace will be utilized.*
Yes	Are future actions by non-military and other military entities expected and would they cause impacts on airspace resources? *Expanded use of Allen Airfield by the Missile Defense Agency could lead to additional restrictions.*
No	Will the proposed action require new airspace designations?
No	***Is additional cumulative effects analysis needed?***

CEA Level: (1) Quick Look

Given the institutional controls that are used to protect civilian and non-civilian airspace users during military training events, the potential impacts of the proposed action do not warrant further CEA.

4.3.10.9 Air Quality

Quick Look Questions

No	Is the installation located completely or partially in a designated non-attainment area or maintenance area relative to compliance with ambient air quality standards? *No such compliance areas are near DTA East.*
Yes	Will the proposed action exhibit emissions of criteria and/or hazardous air pollutants during its construction and/or operational phase? *Such emissions would be highly localized.*
No	Will such emissions exceed “de minimus” standards, as designated in federal or state air quality regulations? *No federal or state air quality standards would be exceeded.*
No	Are there any sensitive receptors of air pollutant effects associated with the installation (examples of such receptors include forests, agricultural crops, threatened or endangered plant or animal species, and human beings with breathing difficulties or other respiratory illnesses)? *Any impacts to sensitive receptors would be short-term and minor.*
Yes	Are there wide variations in the monthly and/or seasonal patterns of atmospheric dispersion conditions at the installation? *Wintertime inversions can occur. Ice fog also develops during colder temperatures (-20°F).*

No	Within the last 5 years, has the installation been subject to Notices of Violations (NOVs) or fines relative to Clean Air Act requirements?
No	Are there any concerns that federal and state source-oriented permits may not be up to date, and are there any specified conditions not being met?
No	***Is additional cumulative effects analysis needed?***

CEA Level: (1) Quick Look

Air quality effects are essentially negligible. Some cumulative visibility issues remain with respect to Denali, but any BAX/CACTF effects are easily mitigated (See Section 4.3.1). The primary source of impaired visibility is local wildfires (See Section 4.3.10.3 for a discussion of cumulative wildfire risks) and naturally-generated fugitive dust from dry river beds during high winds.

4.3.10.10 Groundwater

Quick Look Questions

No	Are there any known or suspected contaminated sites at (or near) the proposed site?
Yes	Are there any major groundwater aquifers under the project site? *Groundwater flows from the Alaska Range toward the Tanana River.*
No	Is there risk of aquifer contamination? *Risk of any subsurface water contamination or soil contamination is very minor (negligible), given Army management control and spill response provisions.*
No	Is any water being removed from existing aquifers to support the proposed action? *Negligible water removal for range operations.*
N/A	Will surface water diversions reduce aquifer recharge? *No surface water diversions are proposed as part of this action.*
No	Is the region characterized by periodic water shortages?
Yes	Are aquifers a major source of community water supplies? *The primary water supply is groundwater. However, risk of contamination or loss of aquifer productivity is negligible*
No	***Is additional cumulative effects analysis needed?***

CEA Level: (1) Quick Look

Groundwater resources at DTA, as well as associated surface water resources, are both dynamic and well-established. The proposed action will not alter these natural systems. While some minor diversions may be incorporated into the final BAX/CACTF designs at the Eddy Drop Zone, such diversions would be small and minor, given local hydrologic conditions and the overall volumes of runoff involved.

4.3.10.11 Wetlands

Quick Look Questions

Yes	Would the proposed action result in a significant impact to wetlands? *Selection of Alternatives 3 (Donnelly Drop Zone), 4 (North Texas Range), or 5 (North Texas Range/Eddy Drop Zone Combination) would result in severe impacts to higher function or other wetlands within the construction and/or maneuver areas.*
No	Are DTA East's wetlands subject to a significant decrease in overall size due to the proposed action and other military actions? *Impacts would be localized within BAX/CACTF.*
No	Are there any threatened or endangered species associated with the wetlands in the vicinity of the proposed action?
Yes	Are any wetlands in the vicinity of the proposed action considered to be particularly ecologically important? *Higher function wetlands exist within all BAX/CACTF footprints.*
Yes	Will the proposed action cause losses in the size and/or function of local wetland resources? *Wetlands exist within all BAX/CACTF footprints.*
Yes	Have past actions caused negative potential impacts to wetlands resources? *USARAK impacts are moderate to wetlands.*
Yes	Are future actions by non-military and other military entities expected and would they cause impacts on wetland resources? *Wetland impacts from non-military and other military entities would be localized and not extensive.*
Yes	***Is additional cumulative effects analysis needed?***

CEA Level: (3) Detailed Analysis

Wetland Issues

Wetlands are important ecological resources and comprise a large portion of USARAK lands. Approximately 68 percent of DTA is classified as wetland (Lichvar 2000). As a consequence, construction of the BAX or CACTF at any of the alternative sites would impact some amount of wetlands. These impacts affect all wetland types on DTA East. USARAK will continue to avoid

and/or minimize impacts to wetlands to the maximum extent possible (Section 4.3.3, *Wetlands*). A wetlands functional assessment at DTA East described four types of higher function wetlands: lacustrine fringe, depressional water bodies, riverine, and slope wetlands (USAG-AK 2005a). These wetlands are classified as higher function because they are important for water storage, sediment collection, or removal of dissolved elements during runoff or flood events, and/or they provide valuable wildlife habitat for a variety of species (USAG-AK 2005a).

Geographic Scope, Time Frame, and Impact Criteria

The geographic scope for these analyses includes DTA East, as wetland impacts would be localized. Past, present, and foreseeable future actions date from the 1950s, when Army activities began, through the present, to the expected life of the range (approximately 2035). A functional assessment of all wetlands on DTA East has not been conducted, thus the methodology for analyzing cumulative wetland impacts is different from Section 4.3.3, *Wetlands*. The National Wetlands Inventory (NWI) total wetland acreage was mapped and calculated for DTA East. Higher function wetlands were delineated using the following categories: lacustrine, riverine, depressional, lacustrine fringe and the Jarvis Creek 100-year floodplain (USAG-AK 2005a). Other wetlands were classified as low function (or other wetlands). The impact criteria for DTA East were similar to those in Section 4.3.3, *Wetlands* (i.e., None, Minor, Moderate, Severe, and Beneficial), but minor impacts to higher function or other wetlands are set at 1 percent or less for cumulative effects analysis.

Cause and Effect Relationships

Military damage to wetlands can occur from off-road maneuvers and weapons training (typically within impact areas as a result of detonations of high explosive munitions) during summer when the wetlands are unfrozen (Radforth and Burwash 1977). Impacts to vegetation include the breaking and crushing of plants and disturbance to soils or wetland substrates, and vegetation removal by heavy equipment and resulting in wetland degradation. Wetlands can be lost during construction of roads, buildings, or other structures and military pollutants and hazardous materials can affect wetlands.

Soils at disturbed sites tend to become more compacted, thus affecting seedling establishment, water and nutrient uptake, root penetration, and re-establishment of plant communities. The removal of vegetative cover (and underlying supportive root systems) can increase soil erosion and transport. Wetland damage can affect the insulating layer that protects permafrost (see Section 3.2.1, *Soil Resources*), which creates thermokarst conditions and induces subsidence and sediment delivery to nearby waterways. As a result, water quality and aquatic habitats could be degraded.

If wetlands are disturbed and soils are overturned, small annual plants or invasive species often replace large perennial plants. Maneuvers could decrease plant cover and densities of woody vegetation in wetlands, reducing wetland functions and habitat quality.

Past, Present, and Foreseeable Future Actions

The past, present, and foreseeable future activities on DTA and nearby lands are summarized in Table 4.3.10.c. As shown, present military activities are increasing as a result of Army transformation and will continue into the near future. Other longer-term future actions include

civilian or community actions such as the further development and growth of Delta Junction and Big Delta, expansion of the Alaska Railroad, a natural gas pipeline, upgrade of the Richardson and Alaska highways, the Delta Agricultural Project, and continued multiple use land management, including subsistence and recreational uses.

Analysis of Wetland Impacts

Higher Function Wetlands – Approximately 6,217 acres of higher function wetlands exist on DTA East, and the training area includes an additional 16,053 acres of other wetlands. Overall impacts would be moderate with Alternative 1 (No Action). Although some higher function wetlands would be impacted by construction and use of the BAX and CACTF, the effects would be localized and would affect only a small fraction of these higher function wetlands. For example the construction footprints for the respective alternatives would affect about 0.3 percent of DTA East's higher function wetlands under Alternative 2 (Eddy Drop Zone), 1.2 percent with Alternative 3 (Donnelly Drop Zone), 0.3 percent for Alternative 4 (North Texas Range), and 0.06 percent for Alternative 5 (North Texas Range/Eddy Drop Zone Combination). The impacts would be minor for each alternative (i.e., resulting in <5 percent cumulative impacts to wetlands on DTA East). Impacts to higher function wetlands within the surface danger zones would be dispersed and would not affect wetland function.

Maneuver area development and use would also affect higher function wetlands. Much of Alternatives 3, 4, and 5 contain wetlands that are unable to support year-round training with military vehicles. Filling of some higher function wetlands within the BAX maneuver area would be required to accommodate the minimum vehicle throughput and maneuverability requirements for Alternatives 4 and 5 (0.03 percent of higher function wetlands at DTA East, respectively). Filling of wetlands within the maneuver area would not be required under Alternative 2, as soils at the Eddy Drop Zone are able to support throughput and maneuverability requirements. The remaining higher function wetlands within the BAX maneuver area could be disturbed from vehicular maneuver under this alternative. However, in combination with existing and proposed mitigation measures, including wetland avoidance, disturbance to wetlands by vehicles within the maneuver area would likely be lower. Higher function wetlands would mapped as off limits to maneuvers, and these areas would be avoided.

The overall incremental impact to higher function wetlands would be minor, and the cumulative effects from any of the alternatives would not change the training land's impact to severe.

Other Wetlands – Other wetlands comprise about 16,053 of DTA East's 104,601 acres. Cumulative wetland impacts to date have been moderate. The construction footprints would affect 0.04 percent of DTA East's remaining wetlands under Alternative 2 (Eddy Drop Zone), 2.0 percent with Alternative 3 (Donnelly Drop Zone), 1.0 percent for Alternative 4 (North Texas Range), and 1.3 percent for Alternative 5 (North Texas Range/Eddy Drop Zone Combination). Additional cumulative impacts from these alternatives would contribute to the existing moderate impacts at DTA East, but the cumulative effects would not be severe (i.e., resulting in more than 10 percent the wetlands impacted on DTA East).

There would also be some impacts to other wetlands within the maneuver areas. Filling of other wetlands within the BAX maneuver area would be required to accommodate the minimum vehicle throughput and maneuverability requirements for Alternatives 3, 4 and 5. Filling within the BAX maneuver area would affect 1.2 percent of DTA East's remaining wetlands under

Alternative 3 (Donnelly Drop Zone), 0.7 percent for Alternative 4 (North Texas Range), and 0.6 percent for Alternative 5 (North Texas Range/Eddy Drop Zone Combination). Filling of wetlands within the maneuver area would not be required under Alternative 2, as soils at the Eddy Drop Zone are able to support throughput and maneuverability requirements. The impacts would be minor for each alternative (i.e., resulting in <5 percent cumulative impacts to wetlands on DTA East).

The exact locations of vehicular maneuver impact within the maneuver area cannot be predicted as maneuver can be performed anywhere not designated as off-limits. As a result, a worst case scenario predicting wetland disturbance throughout the entire maneuver area except open water areas was used in this analysis. However, the actual amount of maneuver disturbance would be substantially less. For example, during summer months the wetland areas would be avoided, as required by USARAK Regulations 350-2 (also see Section 3.3.3.1, *Wetlands*). Impacts to other wetlands within the surface danger zones would be dispersed and would not affect wetland function.

Analysis of Past, Present, and Future Impacts – A differentiation of past impacts (between higher function wetlands and other wetlands) has not been conducted for DTA East. However, there is sufficient information to analyze impacts to total wetlands.

Excluding past (pre-2000) construction on the Fort Greely cantonment area, approximately 400 acres of DTA East's wetlands have been impacted by construction projects and activities, including damage from bivouac, maneuvers, and firing points, and use of drop zones (does not include damage from construction or munitions). This represents about 1.8 percent of DTA East's wetlands. The additive impacts from fill as a result of construction of range facilities and maneuverability requirements at the alternative sites would increase. Under Alternative 2 (Eddy Drop Zone) the total acreage of wetland damage would increase from 1.8 percent to 1.9 percent, for Alternative 3 (Donnelly Drop Zone) 3.5 percent, for Alternative 4 (North Texas Range) 2.6 percent, and for Alternative 5 (North Texas Range/Eddy Drop Zone Combination) 2.8 percent. Combined with expected potential maneuver impacts (up to 40 acres per year), these values could increase by an additional 0.9 percent over the first five years of the range's life. (USARAK's previous Clean Water Act, Section 404 permit, allowing 40 acres wetland maneuver damage per year, has expired. During the permit time frame [2000 to 2004], the actual wetland disturbance amount from military vehicle maneuver was approximately 2 acres per year. The permit also required rehabilitation of all damaged wetlands). Overall, cumulative impacts to wetlands on DTA East would continue to be moderate.

Existing and Proposed Army Mitigation Measures

Existing Mitigation Measures

The following mitigation measures are currently in place and continually reviewed and revised to respond to new or increasing impacts.

- Continued classification of wetlands as "higher function" or "other wetlands" for management purposes, and continued use of the environmental limitations overlays for planning military training activities and managing wetlands.
- Continued production of planning-level surveys, wetlands management and re-vegetation plans.

- Continued implementation of INRMPs, with specific actions for management of wetlands.
- Compliance with training exercise regulations, as stipulated by USARAK Range Regulation 350-2.
- Application of the ITAM program to inventory and monitor, repair, maintain, and enhance training lands.
- Continued damage control measures.

Proposed Mitigation Measures

The following mitigation measures are essential in addressing impacts associated with the proposed action.

- Site facilities, targetry, access and firing roads/trails to avoid construction within wetlands, as much as practicable. Construction would remove the least amount of vegetation possible to avoid melting permafrost.
- Use silt fences and other construction techniques to prevent siltation during construction. Overburden would not be stored in wetland areas.
- Complete detailed wetland delineations as designs of the proposed BAX and CACTF facility are finalized and the exact locations of targets, trails, buildings and other construction elements are better known for utilization in siting of facilities, where necessary.

4.3.10.12 Vegetation

Quick Look Questions

No	Would the proposed action result in a significant impact to vegetation? *Impacts to vegetation issues of concern would be localized and minor.*
Yes	Does the proposed action involve a new range or maneuver area, or does it extend beyond the existing boundaries of either? *The ranges, while new, would be sited on lands that have previously been used for training of a similar nature.*
Yes	Is the proposed site effectively managed as part of an installation ITAM Program? *Previous actions, over decades, have produced only very minor impacts. The recent institutional implementation of sustainable Army management strategies should insure less impacts and proactive management of the ranges.*
Yes	Does the proposed action increase the level of intensity of military activity at DTA? *While intensity would be increased, it would be accompanied by more proactive management at a holistic or ecosystem level.*
No	Is the site characterized by poor vegetative cover or high erosion?

No	Are there any threatened or endangered species?
Yes	Are there any sensitive plant communities or plant species of concern in the area? *Some plant species of concern exist in the area.*
Yes	***Is additional cumulative effects analysis needed?***
CEA Level: (2) Analysis and Discussion	

Analyses in Chapters 3 and 4 evaluated impacts on vegetative cover, rare plants, forest resources, and invasive species, and no significant impacts were identified. Regardless of the alternative selected, the proposed action would cause moderate impacts on vegetative cover and forest resources.

Geographic Scope, Time Frame, and Impact Criteria

The geographic scope includes impacts within DTA East as well as the keyhole section of private land that borders the Richardson Highway. The region of influence also includes state, federal, and private lands adjoining DTA East. Past, present, and foreseeable future actions date from the 1950s, when Army activities began, through the present, to the expected life of the range (approximately 2035). The significance threshold for cumulative effects is defined as long-term effects to the function and natural cycling of vegetative communities. The qualitative and quantitative criteria are the same as those described for vegetation (i.e., None, Minor, Moderate, Severe, or Beneficial) described in Section 4.3.4, *Vegetation*.

Cause and Effect Relationships

Construction, off-road maneuvers, and weapons training can damage vegetation by breaking and crushing plants resulting in direct mortality or altering plant community composition and structure and vegetation cover. Wildland fires can originate on military lands and alter vegetation age class diversity. Fire frequencies would increase and their impacts could range from beneficial to minor, but moderate or severe if exposed areas were subjected to severe erosion, water accumulation, or loss of permafrost. Invasive plant species may encroach on disturbed sites and invasive insects may produce forest die-offs and changes in vegetative structure and composition.

Past, Present, and Foreseeable Future Impacts

On DTA East, past and present military and non-military construction has removed approximately 4,660 acres of habitat (Table 4.3.10.c). Much of the land between DTA East has been altered (e.g., the Delta Agricultural Project), developed (Delta Junction), and parceled by the communities' inhabitants. No state or federally listed endangered or threatened species occur on USARAK lands.

Other future activities include infrastructure such as upgrades of the Trans-Alaska Pipeline and proposed construction of a natural gas pipeline, the Alaska and Richardson highways, networks of roads in the Delta Junction community, and the proposed Alaska Railroad extension, which would connect Delta Junction and Fort Greely to Eielson Air Force Base and Fairbanks. These projects result in altered or lost habitat and increased human impacts. Additional land management

activities in the area include the Tanana Basin Area Plan, the Delta Agricultural Project, Bison Range, and BLM activities. Wildfires are frequent in the area and will continue to exert a strong influence on the vegetation. In addition, forest health in the region has been impacted by forest pest infestations, such as aspen leaf miner, engraver beetle, and spruce budworm (U.S. Forest Service and State of Alaska 2005).

Issues Analysis

Vegetative Cover – A large portion of the vegetation within the region of influence has been altered by human and natural factors during the past 50 years. On DTA East, approximately 4,660 acres (4.1 percent) have been developed by various construction projects (Table 4.3.10.c). The alternative construction footprints would remove additional vegetation within DTA East (in addition vegetation to vegetation removal on the private and developed lands within the keyhole). Alternative 2 (Eddy Drop Zone) would remove 350 additional acres (0.3 percent of DTA East), Alternative 3 (Donnelly Drop Zone) 552 acres (0.5 percent), Alternative 4 (North Texas Range) 711 acres (0.7 percent), and Alternative 5 (North Texas Range/Eddy Drop Zone Combination) 730 acres (0.7 percent). Within the larger region of influence, the fraction of vegetation removal would be much smaller. The cumulative impact to vegetative cover would be minor within DTA East as well as the larger-scale lands outside of DTA.

Rare Plants – Impacts to any rare or sensitive plant communities would be localized and minor. DTA East is not a refuge for rare or sensitive plant communities, so impacts on Army lands would not affect the overall status of these plants within the region of influence or interior Alaska.

Forest Resources – State lands within the region of influence include State of Alaska multiple use management areas (Tanana Basin Area Plan and Tanana Valley State Forest). The proposed or No Action Alternatives would have only localized or minor impacts to forest resources. However, the prospect of wildfire within the region exerts a continual moderate cumulative effect. Insect infestations and disease can potentially cause significant effects on forests within the region of influence (USARAK 2004a).

Invasive Species – Invasive plant infestations could threaten the biological diversity and ecosystem health in many areas of Alaska (U.S. Forest Service and State of Alaska 2005). USAG-AK personnel monitor any potential outbreaks. The proposed and No Action Alternative sites would all have minor effects on spread of invasive species. To date, relatively few invasive plants have become established in Alaska, and impacts have been relatively minor. However, with increased infestations, combined with the effects of climate change, the vegetation in areas such as DTA East and surrounding lands could be impacted by invasive species.

Mitigation Measures

Mitigation for impacts to vegetation was discussed in Section 4.3.4.2.

4.3.10.13 Threatened or Endangered Species and Species of Concern

Quick Look Questions

Yes	Has the installation been surveyed for the presence of federally listed threatened or endangered species? *The Integrated Natural Resources Management Plans (INRMPs) require periodic surveys to census potential threatened or endangered species.*
No	Did the survey reveal any presence of any federally listed species? *However, the delisted (in 1999) American peregrine falcon has been observed on and near DTA East in recent years.*
No	Are there any proposed species that may placed in the threatened or endangered species list in the future?
Yes	Has the U.S. Fish and Wildlife Service been consulted? *Consultation letter is located in the appendix.*
Yes	Does the installation have an INRMP? *Threatened and endangered species management is discussed in the INRMP.*
Yes	Does the installation have an endangered species management plan? *Threatened and endangered species management is discussed in the INRMP.*
No	***Is additional cumulative effects analysis needed?***

CEA Level: (1) Quick Look

Although the proposed action could result in moderate impacts to forest-dwelling birds, the effects would be localized. These species are relatively widespread through the region, and any cumulative effect from the proposed action would be negligible to minor. USAG-AK would continue monitoring population indices on DTA East.

4.3.10.14 Socioeconomics

Quick Look Questions

No	Has the local region of influence (ROI) undergone any major changes in economic activity or population in the last 10 years? *While the local region has suffered reduced activity levels as a result of a previous BRAC action, these reductions have been assimilated and a new status quo has emerged.*

No	Will the proposed action contribute to this ongoing trend? *The proposed action, as well as other minor developments in the ROI, are slowly increasing economic activity in the ROI, though it is still less than in the past.*
No	***Is additional cumulative effects analysis needed?***

CEA Level: (1) Quick Look

Socioeconomic trends in the Delta Junction area are essentially stable, though the effects of Fort Greely's closure are still felt. This proposed action as well as some other local trends can temper some of these lingering effects by benefiting the community. As these effects are positive and minor, no further CEA is required for socioeconomic effects.

4.3.10.15 Subsistence

Quick Look Questions

No	Would the proposed action result in a significant impact to the availability of any subsistence resources? *There could be locally moderate impacts to caribou, but the area around DTA East is not considered to be a vital subsistence hunting area. Other adjacent areas would be available.*
No	Is the area considered to be critical for subsistence access or resource sustainability?
Yes	Does the proposed action involve a new range or maneuver area, or does it extend beyond the existing boundaries of either? *However, the ranges, while new, would be sited on lands that have previously been used for training of a similar nature.*
Yes	Does the proposed action increase the level of intensity of military activity at DTA? *While intensity would be increased, it would be accompanied by more proactive management at a holistic or ecosystem level.*
Yes	***Is additional cumulative effects analysis needed?***

CEA Level: (2) Analysis and Discussion

Issues and Concerns

Chapters 3 and 4 analyze the proximity of training lands to traditional subsistence locations, the amount of subsistence harvest known to occur on USARAK managed lands, the availability of resources, the accessibility of USARAK lands for subsistence purposes, and resources outside existing installation boundaries potentially affected by USARAK training activities and management programs.

Geographic Scope, Time Frame, and Impact Criteria

The geographic scope includes impacts within DTA and GMU 20D. Past, present, and foreseeable future actions date from the 1950s when Army activities began, through the present, to the expected life of the range (approximately 2035). The significance threshold for cumulative effects are defined as changes in large scale population trends or harvest objectives (i.e., at the population level). The qualitative and quantitative criteria (i.e., None, Minor, Moderate, Severe, or Beneficial) are the same as those described in Section 4.3.7, *Subsistence*.

Cause and Effect Relationships

Subsistence is affected by access to USARAK lands and by resource availability. Factors affecting resource availability were discussed in Section 4.3.6, *Wildlife and Fisheries,* as well as the Wildlife and Fisheries section of the Cumulative Effects Analysis.

Past, Present, and Foreseeable Future Impacts

On DTA East, past and present military and non-military construction has removed approximately 4,660 acres of habitat (Table 4.3.10.c). Much of the land between DTA East and the Tanana River has been altered (e.g., the Delta Agricultural Project), developed (Delta Junction), and parceled. Some subsistence species such as moose benefit from habitat alteration, but animals such as caribou tend to avoid areas with increased infrastructure development. Nevertheless, populations of most subsistence species have remained stable and sustainable.

Other future activities include infrastructure such as the Trans-Alaska Pipeline, and proposed natural gas pipeline, the Alaska and Richardson highways, networks of roads in the Delta Junction community, and the proposed Alaska Railroad extension, which would connect Delta Junction and Fort Greely to Eielson Air Force Base. These projects result in altered or lost habitat, habitat fragmentation, increased linear corridors, and increased human access. Additional land management activities in the area include the Tanana Basin Area Plan, the Delta Agricultural Project, Bison Range, and BLM activities. Wildfires are frequent in the area and will continue to exert a strong influence on the habitat. In addition, forest health in the region has been impacted by forest pest infestations, such as aspen leaf miner, engraver beetle, and spruce budworm (U.S. Forest Service and AK Department of Natural Resources 2005).

Issues Analysis

Access – Federal subsistence management regulations apply to all of GMU 20D, including lands on DTA East (Appendix, Figure 3.n). The city of Delta Junction and surrounding communities have been designated rural communities under Title VIII of ANILCA and federal subsistence management regulations (50 CFR Part 100 and 36 CFR Part 242).

DTA East encompasses approximately 2.5 percent of GMU 20D and the proposed action would impact a fraction of DTA East's available lands. Moreover, lands on DTA East are not considered critical for subsistence use (USARAK 1999a, 2004a). Development of the ranges at alternative sites will lead to increased training area closures, which would have some impact to local taking of furbearers, small game, upland birds and gathering of important plant products. However, the impacts within GMU 20D would be minor. Increased infrastructure development (e.g., roads and rights of way) will increase access within DTA East and outlying federal lands. The presence of

large tracts of accessible federal land within the region offer the same types of natural resources as are found within DTA East. Access and availability of subsistence resources outside of DTA will remain essentially the same. Within the context of GMU 20D the cumulative impacts to subsistence access would be minor and localized.

Resource Availability – Customary and traditional use in GMU 20D includes subsistence harvest of black and brown bear, moose, caribou, Dall sheep, beaver, coyote, red fox, snowshoe hare, lynx, pine marten, mink and weasel, muskrat, otter, wolf, wolverine, grouse, ptarmigan and a variety of plant materials. Subsistence permits can be obtained for the take of those species within an established open season. At this time, there is no federal subsistence season for moose, caribou, or sheep within GMU 20D. Subsistence regulations, published annually, set restrictions on season, take, and which rural residents are eligible to harvest under subsistence regulations on particular sections of federal land. Anadromous fish stocks are not present on the training areas, but other freshwater fish can be harvested. Opportunity for harvesting non-game resources, such as edible or medicinal plants, is determined by public access (when and where training lands are not closed for training).

Not all of the above species were analyzed in Section 4.3.6 *Wildlife and Fisheries,* but information on Dall sheep, pine marten, and ptarmigan have been analyzed (USAG-AK NEPA 2005). Dall sheep and ptarmigan would not be affected by the proposed action. Impacts to pine marten would be minor. By inference (through analysis of species analyzed in Section 4.3.6 *Wildlife and Fisheries*), impacts to red fox, snowshoe hare, mink, weasel, muskrat, and otter would be localized and limited to the construction and maneuver footprints.

Impacts to brown bear, black bear, and moose would be minor (Section 4.3.6 *Wildlife and Fisheries*), but overall Army impacts to caribou and gray wolf are moderate, even under the No Action Alternative. Additional moderate impacts could occur to localized portions of caribou habitat from Alternatives 3 (Donnelly Training Area), 4 (North Texas Range), and 5 (North Texas Range BAX and Eddy Drop Zone CACTF). However, these areas are not considered critical. The addition of the BAX and/or CACTF might change the distribution of caribou and result in increased disturbance rates to some members of the herd, but will not likely cause a population level decline. Impacts to fisheries would be localized and minor.

Continued development of infrastructure and habitat alteration in the Delta Junction and DTA area would result in additional minor or moderate impacts to populations of subsistence species. However, these species are managed on a sustained yield basis. At the scale of GMU 20D, the proposed action would not result in significant cumulative impacts to wildlife or fisheries subsistence resources.

Mitigation Measures

The mitigation proposed for impacts to subsistence resources as discussed in Section 4.3.7.2 would serve to minimize cumulative impacts.

4.3.10.16 Public Access and Recreation

Quick Look Questions

Yes	Would the proposed action result in a significant impact to public access and recreation? *Moderate to severe localized impacts within study area footprints, and moderate to severe impacts to fisheries access along Meadows Road area would result.*
Yes	Are any areas within the project's footprint considered to be critical or very important for access and recreation within the region of influence? *The stocked lakes along Meadows Road are important ADF&G management areas.*
Yes	Does the proposed action involve a new range or maneuver area, or does it extend beyond the existing boundaries of either? *The ranges, while new, would be sited on lands that have previously been used for training of a similar nature.*
Yes	Does the proposed action increase the level of intensity of military activity at DTA? *While intensity would increase, it would be accompanied by more proactive management at a holistic or ecosystem level.*
Yes	***Is detailed cumulative effects analysis needed?***

CEA Level: (3) Detailed Analysis

Issues and Concerns

Chapters 3 and 4 evaluate temporal, spatial, and recreational availability of resources. Temporal availability addresses how often (or for how long) lands are available for public access. Spatial availability addresses the spatial extent (i.e., acreage) of certain lands, or areas off-limits to the public. Limits can be temporary or permanent, encompassing dedicated impact areas and some ranges. Recreational availability addresses the types or frequency of recreation allowed on Army lands.

Geographic Scope, Time Frame, and Impact Criteria

The geographic scope includes impacts within DTA East and GMU 20D for wildlife and the Upper Tanana Management Area for fisheries. Past, present, and foreseeable future actions date from the 1950s, when Army activities began, through the present, to the expected life of the range (approximately 2035). The cumulative effects threshold of significance would be those impacts that could cause severe effects to harvest levels or access within GMU 20D for wildlife or the Upper Tanana Management Area for fisheries. The qualitative and quantitative criteria (i.e., None, Minor, Moderate, Severe, or Beneficial) are the same as described in Section 4.3.8, *Public Access and Recreation.*

Cause and Effect Relationships

Access to resources is a function of land use management decisions. To meet its mission goals, protect human health and safety, or protect and sustain Army lands, the Army determines how often (or for how long) Army lands are available for public access. However, when these lands are in use, the Army ensures ecological sustainability as well as public access. Additional training or construction may reduce pubic access and the closures may be temporary, short-term, or permanent. Such closures have economic impacts on some agencies that provide recreational opportunities (e.g., Alaska Department of Fish and Game) as well as community economics and quality of life.

Past, Present, and Foreseeable Future Impacts

On DTA East, past and present military and non-military land use practices have removed recreational access for some areas (Table 4.3.10.c). Much of the land surrounding DTA East has been altered (e.g., the Delta Agricultural Project), developed (Delta Junction), and parceled by the communities' inhabitants. However, access to the public lands will remain open. Other past, present and future projects and activities include infrastructure such as the Trans-Alaska Pipeline, and proposed natural gas pipeline, the Alaska and Richardson highways, networks of roads in the Delta Junction community, and the proposed Alaska Railroad extension, which would connect Delta Junction and Fort Greely to Eielson Air Force Base. The projects lead to loss of access to portions of land but also enable increased human access. Additional land management activities in the area include the Tanana Basin Area Plan, the Delta Agricultural Project, Bison Range, and BLM activities.

Issues Analysis

Temporal Availability – Currently (and as in the No Action Alternative), Army training and land use produces moderate impacts to public access on DTA East. Training and use can limit access to portions of some ranges and training lands for part of the year (between 34 percent and 65 percent of the time). Any of the proposed alternatives would have moderate to severe local impacts on lands and route access on DTA East, and proposed closures (without alternative routes) would limit access to important areas off-post. These closures would not exceed 241 days per year (66 percent of available access days). Alternative 2 (Eddy Drop Zone) would result in closure of some hunting areas along 33-Mile Loop Road, but more importantly it would cause permanent road closures and result in limited access to other portions within (and outside of) DTA East. Alternative 3 (Donnelly Drop Zone) would also result in the closure of hunting areas as well as access along Midas Site Road and 12-Mile Crossing Road, which provides access to southern portions of DTA East as well as off post. Likewise, Alternatives 4 (North Texas Range) and 5 (North Texas Range BAX and Eddy Drop Zone CACTF) would severely impact hunting access at these areas, as well as fishing. These roads provide important access to recreational opportunities on DTA East.

Spatial and Recreational Availability – DTA East encompasses approximately 2.5 percent of GMU 20D and the proposed action would directly impact about 4 percent to 5 percent of DTA East's available lands. However, the lands on DTA East are considered to be important for recreational access, particularly hunting and fishing (Section 4.3.8, *Public Access and Recreation*; USARAK 1999a, 2004a). Future access throughout GMU 20D will probably improve over the next 25 to 30 years as more roads, trails, and access routes are developed on public lands.

Range development at the respective alternative sites would lead to increased training area closures and these would be locally severe for hunting and recreation. The impacts would be moderate to hunting at GMU 20D. Selection of Alternatives 4 (North Texas Range) or 5 (North Texas Range BAX and Eddy Drop Zone CACTF) would result in severe impacts to stocked fishing for DTA East as well as for the Upper Tanana Management Area, as the Meadows Road lake system is the primary area for stocked fisheries in the management area.

DTA East provides important (but not critical) access to moose hunting. Over the past 5 years (2000 to 2004), approximately 800 - 940 permits were issued per year in GMU 20D, and the harvest averaged about 214 animals per year (range 183 - 246) (ADF&G Division of Wildlife Conservation Harvest Reports 2005). The harvest on DTA East averages between 10 percent and 15 percent of the total harvest (only 2-3 percent of the harvest within the Delta Junction Game Management Unit), and most of the moose taken on DTA East were hunted near 33-Mile Loop Road, but outside of the Delta Junction Game Management Area (USARAK 2004a). Overall, the impact from Alternative 2 (Eddy Drop Zone) would contribute to a moderate impact to access and harvest of moose in GMU 20D, not necessarily from closure of the lands for the BAX and CACTF, but from restricted access to 33-Mile Loop Road and eastern portions of DTA East and adjoining lands. The impact from Alternative 3 (Donnelly Drop Zone) would also be moderate due to access and harvest of moose within GMU 20D. The impact from Alternatives 4 (North Texas Range) and 5 (North Texas Range BAX and Eddy Drop Zone CACTF) would be minor.

Caribou harvest at DTA East typically varies between 20 and 40 per year. BAX and CACTF development would result in moderate impacts to hunting area availability. Impacts on bison hunting would be minor, as most bison are off DTA lands by the October hunting season. Although impacts to grouse hunting would be severe at the local level (i.e., within the range footprints), the impact to harvests within GMU 20D would be minor for Alternative 3 (Donnelly Drop Zone), but moderate for Alternatives 2 (Eddy Drop Zone), 4 (North Texas Range) and 5 (North Texas Range BAX and Eddy Drop Zone CACTF).

Hunting access within GMU 20D also includes species such as black and brown bear, Dall sheep, beaver, coyote, red fox, snowshoe hare, lynx, pine marten, mink and weasel, muskrat, otter, wolf, wolverine, and ptarmigan. Impacts to the recreational availability of these species would be minor to moderate.

The 14 lakes along Meadows and Windy Ridge roads provide the primary stocked fishing recreational opportunity within the Upper Tanana Management Area for sport fisheries. Selection of Alternatives 4 (North Texas Range) or 5 (North Texas Range BAX and Eddy Drop Zone CACTF) would result in severe cumulative impacts on recreational fishing within and outside of DTA East.

Summary

Army activities and projects have resulted in moderate impacts to public access and recreation on DTA East, and this would continue if the No Action Alternative is selected. On public lands outside of DTA East, multiple use management and access are high priorities. Within the context of GMU 20D for wildlife and the Upper Tanana Management Area for fisheries, the impacts of continued Army actions would be minor. Selection of Alternative 2 (Eddy Drop Zone), 3 (Donnelly Drop Zone), 4 (North Texas Range), or 5 (North Texas Range BAX Eddy Drop Zone CACTF) would result in localized severe impacts within the range footprints at DTA East.

Likewise, access to important hunting areas on other portions of DTA East or off post would be limited. For hunting, within the context of GMU 20D, the impacts would be moderate. However, if Alternative 4 or 5 is selected, impacts would be severe to sport fishing on stocked lakes as the lakes on DTA East are a core area for fish stocking and recreational fishing.

Existing and Proposed Army Mitigation Measures

The following condensed lists of existing and proposed mitigation measures reflect all reasonable and practicable measures to mitigate adverse impacts to public access and recreation. The appendix analyzes the efficacies of these mitigation measures, their ability to eliminate or lessen foreseen impacts, and offers an assessment of their potential success. Selected mitigation measures will be identified in the ROD, following the Final EIS.

Existing Mitigation Measures

The following ongoing mitigation measures are continually reviewed and revised in response to new or increasing impacts

- Continued implementation of recreational vehicle use policies, consistent with the most recent INRMPs (USARAK 2002b,c). The INRMPs outline specific actions to maintain and improve public access and recreation opportunities on USARAK lands.
- Continued implementation of the USARTRAK automated check-in phone system. This will provide information regarding daily closures and should greatly simplify the public access process.
- Continued streamlining of public access to USARAK lands through the Recreational Access Permit (RAP).
- Maintenance of the extended two-year renewal duration on the FWA and DTA RAPs. A two-year permit duration would simplify public access to USARAK lands.
- Continued work with ADF&G to provide hunter education safety courses. Hunter safety courses and educational opportunities would allow USARAK to better and more safely manage its lands for a wide range of public uses.
- Monitoring of recreational usage of each training area through the USARTRAK phone system. This will inform USARAK and ADF&G regarding use patterns, which should improve management for public access and recreation.
- Maintenance of kiosks at all primary entrances to recreational areas on USARAK lands and provision of visitor maps and information. Information kiosks can help users quickly identify areas designated for recreational use, as well as the times and locations of military activities.
- Monitoring of recreational impacts on stocked lakes, and upgrading of access and recreational opportunities when needed. Improved monitoring of (and access to) stocked lakes allows USARAK and ADF&G to better manage the stocked lakes program on Army lands.
- Full commitment and funding of permanent conservation officers by the Garrison Command and PMO to enforce state and federal game laws, and military rules and restrictions.

Proposed Mitigation Measures

The following mitigation measures are essential in addressing impacts associated with the proposed action.

- Provide USARAK long-term training and convoy schedules to the public, allowing regional residents to better plan public access and recreation activities within DTA East.
- Place access gates along Meadows Road, Windy Ridge Road, 12-Mile Crossing and 33-Mile Loop Road, maximizing continued recreational use and public safety.
- Maintain access to ADF&G stocked lakes.
- Allow other recreational activities outside the construction and maneuver footprints, consistent with current USAG-AK policies.
- Work with ADF&G to support stocked lake program brochures, signs, and improvements.
- Upgrade the road access at Fleet Street (under Alternatives 2 or 5 only).
- Upgrade trail from Bolio Lake to Twin Lakes (under Alternatives 4 or 5 only).

4.3.10.17 Environmental Justice

Quick Look Questions

No	Are there distinct communities that are minority or low-income? *The immediate vicinity (where most effects are felt) is generally uniform in terms of minority composition and income distribution.*
No	Are any identified impacts disproportionately felt by any minority populations or low-income populations?
Yes	Are there tribal, Native American, or Alaska Native communities in the affected area or that use installation resources for subsistence or religious needs? *Alaska Native communities are present and some more distant communities use the local resources for subsistence and religious purposes.*
No	Are these resources limited to the confines of the installation? *Resources are generally available throughout the region.*
Yes	Will the proposed action limit access to these sensitive or important resources? *Access will be denied within the small geographic areas of the BAX and CACTF. Some access to other areas will be limited, but other access routes can be used.*
No	***Is additional cumulative effects analysis needed?***

CEA Level: (1) Quick Look

The environmental justice implications are limited to access and availability issues for subsistence and religious purposes. These resources are widespread throughout the area and are generally accessible, regardless of the proposed Army action. As a result, no further CEA for environmental justice will be performed.

4.3.10.18 Summary of Cumulative Effects Analysis

This CEA has addressed 17 resources (or issues) that might be affected by the construction and operation of BAX/CACTF facilities at selected locations on DTA East. The resources (or issues) of concern were identified via public input and professional judgment. Based upon a series of

appropriate "Quick Look Questions" applied to each of the resources, three levels of analysis were utilized. Level 1 reflected resources (or issues) that did not have any potential cumulative effects concerns, thus no further analyses were needed. For the Level 1 analysis, the answers to the questions were included along with a brief summary statement of the findings. Nine resources were addressed via Level 1: soil resources, noise, human health and safety, airspace, air quality, groundwater, threatened or endangered species and species of concern, socioeconomics, and environmental justice.

Level 2 analyses were conducted for those resources that might be subject to potentially significant cumulative effects. These analyses involved considering the direct and indirect effects of the potential actions along with other past, present, and foreseeable future actions and impacts. Specific attention was directed to relevant topics within the given resource. Finally, reference was made to existing and proposed Army mitigation measures included in the pertinent earlier section in Chapter 4. Four resources (or issues) were addressed via Level 2: surface water, cultural resources, vegetation, and subsistence. The presumption for these resources (or issues) was that no significant cumulative effects would occur if the existing and proposed Army mitigation measures are continued or implemented.

Level 3 analyses were conducted for those resources that were identified as having significant cumulative effects resulting from the direct and indirect effects of the potential actions and other past, present, or future actions. Level 3 analyses included a more in-depth review of the combined effects on specific relevant topics within the given resource. Further, specific information was included on existing Army mitigation measures for the direct and indirect effects, as well as proposed mitigation measures related to the cumulative effects concerns. These combined mitigation measures should aid in minimizing cumulative effects on the four resources subjected to the Level 3 analysis: fire management, wildlife and fisheries, wetlands, and public access and recreation.

For the Levels 2 and 3 analyses, specific topics of concern were identified along with the geographic scope, time frame, and impact criteria. The geographic scope was delineated based on the location and spatial extent of each of the nine resources. The time frame was typically from the 1950s, when Army activities were initiated in the area, through to the present and extending throughout the life of the training range to approximately 2035. The qualitative and quantitative impact criteria were the same as used for the direct and indirect effects. While the specific rationale for the criteria differed with the resource, they were typically categorized into None, Minor, Moderate, Severe, or Beneficial.

Important cause and effect relationships were also described for each of the nine resources subjected to the Level 2 or 3 analysis. Obviously, these relationships were specific for each resource. In addition, summary information on past, present, and reasonably foreseeable future actions (both military and non-military) were addressed relative to their contributions to cumulative effects.

It should be noted that the structure of the cumulative effects analyses utilized herein was based on an 11-step process described by CEQ (1997). These steps encompass scoping (establishing boundaries), describing the affected environment, and determining environmental consequences. Table 4.3.10.d specifically delineates the 11 steps and how they were addressed herein.

Based upon the CEQ's 11-step process and the three levels of analyses, the following summarizes the findings of the cumulative effects analysis:

- Based on the systematic application of pertinent Quick Look questions, nine of the 17 resources (or issues) were not found to be subject to cumulative effects concerns. The nine included soil resources, noise, human health and safety, airspace, air quality, groundwater, threatened or endangered species and species of concern, socioeconomics, and environmental justice. Reasons basic to these findings included minimal direct and indirect effects in the spatial and temporal context of the possible actions, the resiliency of the resources, the absence of specific resources (e.g., no threatened or endangered species), and the effectiveness of existing and planned Army mitigation measures.

- Based on the responses to their pertinent Quick Look questions, four resources were identified as having potentially significant cumulative effects concerns. These four resources were surface water, cultural resources, vegetation, and subsistence. Following Level 2 analyses and discussion, it was determined that with proper planning design, continued application of pertinent mitigation measures, and addition of proposed mitigation measures (described Chapter 4), each of these four resources could be managed so that no significant cumulative effects would occur. For example, for surface water, siting and drainage designs for the BAX and CACTF facilities would minimize floodplain impacts, and use of BMPs and access controls would reduce impacts on local lakes and ponds, as well as water quality. For cultural resources, siting of training facilities would be used to avoid archaeological sites, the policies and procedures of the ICRMP would be applied, and consultations with Alaska Native tribes on TCPs would continue. For vegetation, the policies and procedures of the INRMPs would be continued and adapted as necessary. Finally, for subsistence, federal subsistence management regulations relative to access would be applied in relation to current information on resource availability.

- Four resources were subjected to Level 3 in-depth analyses as a result of the responses to their pertinent Quick Look questions. These four resources include fire management, wildlife and fisheries, wetlands, and public access and recreation. They are each expected to be subject to significant cumulative effects. The in-depth analyses examined historical information and multiple military and non-military sources of effects. Further, additional mitigation measures needs were identified in order to minimize, or possibly eliminate, the significant cumulative effects concerns. Key findings from each of these four resources are in the following bulleted items.

  – Fires in DTA East can originate from natural occurrences, non-military activities, and military training. Regardless of origin, such fires pose risks to nearby human communities such as Delta Junction and others. At the same time natural wildfires are essential to healthy functioning ecosystems. The Army's fire management policy is based on preventing training fires (and their spread), while also recognizing the value of fires for ecosystems. Further, the Army has already implemented numerous fire management strategies to prevent or reduce risks and others are planned as described in Sections 4.2.3.2.1 and 4.2.3.2.2. However, a longer-term, regional fire management and mitigation strategy may be necessary. This strategy would need to be developed using a coordinated approach involving military and other governmental agencies and local stakeholders.

- Regarding cumulative effects on wildlife and fisheries, such effects would be most evident at the North Texas Range study area (Alternatives 4 and 5). The effects on bison could be severe, while such effects on other wildlife species would be minor or moderate. Game species at other study area sites could also be subject to minor or moderate cumulative effects. Examples include moose, sharp-tailed grouse, and sandhill cranes at the Eddy Drop Zone site, and moose, bison, caribou, and sharp-tailed grouse at the Donnelly Drop Zone site. These resources have traditionally been shared with nearby hunting and fishing communities, both for recreation and subsistence purposes. Numerous existing mitigation measures are already in place, including continued implementation of INRMPs and pertinent Army regulations, as well as coordination with the Alaska Department of Fish and Game. Implementation of additional proposed mitigation measures would further reduce the cumulative effects to area wildlife and fisheries.

- Higher function wetlands are an important resource in the DTA and surrounding areas. Effects on both higher function wetlands and other wetlands are regulated under the requirements of Section 404 of the Clean Water Act. Historical and current cumulative effects from military activities in the DTA have tended to be in the moderate category, and they would be expected to continue in this category with the BAX and CACTF facilities and training. To mitigate the contribution of the BAX/CACTF facilities and training to cumulative effects on wetlands, these wetland resources will be considered in site selection and designs for facilities and maneuver areas and in planning training activities. Existing mitigation measures include additional wetland surveys and continued implementation of wetland management programs included in the INRMPs. Continued coordination with the U.S. Army Corps of Engineers will also occur relative to renewals and new Section 404 permits.

- Regarding cumulative effects on public access and recreation, Army activities and projects have resulted in moderate cumulative effects on DTA East. Within the context of the nearby GMU 20D for wildlife and the Upper Tanana Management Area for fisheries, the impacts of continued Army actions would be minor. Localized severe cumulative effects on hunting could occur within the range footprints of Alternatives 2 through 5. Such impacts could occur on sport fishing in nearby stocked lakes if Alternatives 4 or 5 were chosen. Numerous ongoing mitigation measures are continually revised or reviewed; examples include recreational vehicle use policies, use of a check-in phone system (USARTRAK), and the use of recreational access permits. Proposed mitigation measures include access gates at key locations and enhanced educational programs. While cumulative effects concerns exist for public access and recreation, such concerns can be reduced via careful planning of access locations and times through the continued use and improvements in mitigation measures.