CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

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4.1 ORGANIZATION

This section includes a discussion of the environmental impacts associated with the proposed action, any adverse environmental effects that cannot be avoided should transformation be implemented, 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 which would be involved in the proposed action should it be implemented (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 A through F in the textbox below were identified during public scoping as issues of concern (see Section 1.8).

4.1.1 Methodology

A limited number of studies regarding resources on U.S. Army Alaska (USARAK) lands have been conducted by the military or federal and state agencies. In many instances, comparative data were incomplete and/or unavailable. Where data were available, site specific references are included within the individual resource sections. In cases where quantitative data were incomplete and/or unavailable, the information is compared qualitatively. The impact categories “none” and “minor” are considered insignificant impacts and the impact categories “moderate” and “severe” are considered significant. Existing and proposed mitigation measures are explained in detail in the respective resource sections of this chapter.

Comparison of impacts under each alternative is measured against the baseline described in Chapter 3, Affected Environment. Therefore, impacts under the No Action Alternative (Alternative 1) may still indicate some degree of impact from ongoing military activities and projects.

4.1.2 Restatement of Proposed Action

The action proposed by USARAK is to transform the 172nd Infantry Brigade (Separate) (172nd SIB) into a Stryker Brigade Combat Team (SBCT). The SBCT is a step towards the Future

Force. The proposed action also includes the transformation of USARAK to provide a baseline capability and foundation to support interim and future Army transformation requirements.

The proposed action includes changes to force structure and stationing, and modifications of ranges, facilities, and infrastructure designed to meet the objectives of Army transformation in Alaska. Proposed locations for changes in force structure and stationing include Fort Wainwright (FWA) and Fort Richardson (FRA). Proposed activity changes on FWA would occur within the cantonment area, Tanana Flats Training Area (TFTA), Yukon Training Area (YTA), and Donnelly Training Area (DTA) (formerly Fort Greely). The outlying Gerstle River and Black Rapids training areas would also be affected. Proposed activity changes on FRA would occur within the cantonment area and all outlying training areas and ranges.

Table 4.1.a contains a summary matrix comparing the readiness requirements of Alternatives 1, 3 and 4.

Table 4.1.a Comparison of Readiness Requirements for Each Alternative by Activity Group.

Activity Group	Alternatives		
	1 No Action	**3 Transform with New Infrastructure[1]**	**4 Transform with New Infrastructure and Airborne Task Force[1]**
Stationing			
Total Personnel	6,577	7,610	7,912
FWA	4,393	5,407	5,407
FRA	2,184	2,203	2,505
Construction			
Projects	Continue mission-essential projects	Construct five new facilities	Construct five new facilities
Training			
Mission	Continue existing Current Force mission	New SBCT mission	New SBCT and Airborne Task Force mission
Live-Fire Training			
Impact Areas (acres)	281,093	No change	No change
Annual Total Munitions (rounds)	9,420,780	14,304,061	17,204,842
Maneuver Training			
Maneuver Space (km^2 days)	67,092	120,844	138,300
Maneuver Impact Miles	31,600	158,200	161,300
Maneuver Impact Miles Capacity			
Summer	375,284	No change	No change
Winter	8,661,642	No change	No change

Table 4.1.a cont. Comparison of Readiness Requirements for Each Alternative by Activity Group.

Activity Group	Alternatives		
	1 No Action	**3 Transform with New Infrastructure[1]**	**4 Transform with New Infrastructure and Airborne Task Force[1]**
Systems Acquisition			
Weapons			
Small Arms	3,437	6,839	7,978
Artillery	30	97	134
Vehicle	0	293	293
Anti-tank	0	121	121
Demolition	0	7	7
Total Weapons	3,467	7,357	8,533
Vehicles			
Stryker	0	322	322
UAV	0	4	4
SUSV	230	90	125
HMMWV	528	684	790
MTV	268	278	358
Other	151	221	241
Total Vehicles	1,177	1,599	1,840
Deployments			
Platoon			
FWA-YTA	108	144	160
Company			
FWA-DTA	24	40	40
FRA-DTA	4	8	16
Battalion			
FWA-DTA	2	4	4
FRA-DTA	1	1	2
Total Unit Deployment Miles Per Year	437,600	742,000	1,009,600

[1] Numbers indicate end-state totals.

4.2 AIR QUALITY

This section analyzes and compares the air quality impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.2. Additional air quality information is presented in Appendix F.

4.2.1 Background

Ambient air quality refers to the atmospheric concentration of specific pollutants exhibited in a particular geographic location. Many factors influence ambient air quality. Local, regional, and global meteorological patterns influence the movement and dispersion of air contaminants over time and space. As described in Section 3.2, activity rates and the physical attributes of air emission sources influence air quality as well. Air quality was identified as an issue of concern by U.S. Army Alaska (USARAK) and is analyzed in detail. Additionally, carbon monoxide (CO) and particulate matter (PM_{10}) were identified as pollutants of concern for the region and were therefore evaluated in this document.

4.2.2 Review of Impacts to Air Quality

Impacts to air quality from Army activities include emissions from stationary sources such as power plants and heating systems, emissions from mobile sources, dust and possibly hazardous air pollutants from demolition and remodeling of existing facilities, and temporary emissions and dust from construction activities.

4.2.3 Activity Groups That Affect Air Quality

The table below summarizes SBCT transformation activity groups that have the potential to impact ambient air quality on and in the vicinity of USARAK lands. These activity groups were first identified in the Programmatic Environmental Impact Statement for the Army's Transformation (U.S. Army Corps of Engineers 2002) and further defined in Chapter 2, Description of Proposed Action and Alternatives, of this Environmental Impact Statement.

The textbox below lists activity groups that could affect air quality due to transformation.

Activity Groups with Impacts	Activity Groups Without Impacts
• Stationing • Construction • Training • Systems Acquisition • Deployment • Institutional Matters	None

4.2.3.1 Stationing

Transformation would result in additional personnel stationed at Fort Wainwright (FWA) and Fort Richardson (FRA) (Table 4.1.a). Increased stationing of personnel could result in impacts to air quality through increased emissions from personal vehicles and general increased energy consumption.

4.2.3.2 Construction

Proposed construction projects associated with transformation include the company operations facilities at FWA; the unmanned aerial vehicle (UAV) maintenance support facility at Donnelly Training Area (DTA); and the mission support training facility, new barracks facilities, and development of the Port of Anchorage deployment staging area at FRA (Appendix D). These construction activities could affect air quality in the form of short-term, direct impacts. These short-term impacts would be generated from the temporary operation of heavy-duty construction equipment, the installation of temporary heaters, and increased vehicular traffic attributed to construction personnel.

4.2.3.3 Training

The frequency and intensity of maneuver and weapons training could increase if USARAK were to transform (Table 4.1.a). The training mission of USARAK would change as a result of SBCT transformation. The fielding of the new Stryker is the primary training-related, ambient air quality impact associated with transformation. Training would include mock deployments, partial deployments, and actual troop deployments associated with the SBCT. Maneuver training temporarily impacts air quality by adding emissions and creating fugitive dust in the area. Fugitive emissions associated with travel to and from the training areas were evaluated with respect to field maneuvers. These impacts were modeled as area sources using the Industrial Source Complex Short Term Model, which is the EPA's current regulatory model used for a variety of air permitting applications. Fugitive emissions from construction were calculated using emission factors provided in the EPA's Compilation of Air Pollutant Emission Factors, commonly referred to as AP-42.

Any future paving would result in permanent long-term reductions in fugitive emissions from travel on unpaved surfaces, thus ultimately improving air quality.

4.2.3.4 Systems Acquisition

New equipment would be used under transformation, including the eight-wheeled 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) (Table 4.1.a).

4.2.3.5 Deployment

Deployment would occur by air, land, or sea. Transformation would result in increased frequency of out-of-state and overseas deployments. Under current training doctrine, deployment would not increase on a unit basis (e.g., individual platoon unit deployments would remain at four times a year regardless of alternative). However, the number of units, to include platoon, company, and battalion, would increase under the proposed action. Therefore, the total number of unit deployments and miles would increase (Table 4.1.a). This would impact air quality through temporary increases in vehicle emissions.

4.2.3.6 Institutional Matters

Institutional matters include USARAK management activities, land stewardship, policy and program implementation. Transformation is expected to change management processes, which should lead to better data collection and management. This would improve stewardship of USARAK lands and resources.

4.2.4 Comparison of Alternatives

4.2.4.1 Description of Methodology

The following definitions will be used to categorize potential impacts:

- None – No measurable impact is expected to occur.
- Minor – Temporary but measurable impacts are expected.
- Moderate – Noticeable impacts that would have a measurable effect on air quality.
- Severe – Impacts would be obvious with serious consequences to air quality, leading to a violation of air quality standards.
- Beneficial – Impacts would be beneficial to air quality.

The first two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to air quality are presented in 4.2.6, Mitigation.

4.2.4.1.1 Stationary Air Emission Sources

The U.S. Environmental Protection Agency (EPA) guidance document, known as AP-42, was used to calculate emissions from stationary sources, such as heating systems and generators. It also was used to calculate potential emissions from planned activities. Emission factors were organized according to the type of emission sources being evaluated. The potential emissions were then evaluated to assess the regulatory and air quality impacts from SBCT transformation.

4.2.4.1.2 Stationing and Deployment of Mobile Air Emission Sources

Transformation would include the fielding of new vehicles (mobile sources) at both FWA and FRA. These new vehicles include Stryker vehicles and their variants. The Strykers are in the heavy-duty diesel vehicle class. Since tactical vehicles are exempt from emissions testing, emission rates from the operation of Strykers are not readily available. Emission rates from alternative vehicles (similar weight class/fuel) were used to calculate emissions to model the impacts associated with fielding the Stryker. Since the emission factors used in the analysis represent emission rates associated with older vehicles, the emissions presented in this document represent very conservative values for emission rates.

MOBILE6 represents the latest EPA model designed to generate emission rates for a variety of different mobile vehicle classes and was used to calculate annual fleet exhaust emissions during use. Emission rates are reported in grams per vehicle mile traveled (g/VMT). Idling exhaust emissions were calculated using the Emission Facts for Idling Vehicle Emissions. Assumptions used in the MOBILE6 model are included in Appendix F.

The EPA idling emission rates were used to calculate emissions within the Alert Holding Area at FWA to evaluate deployment impacts on air quality. Ambient air concentrations were then calculated.

4.2.4.1.3 Fugitive Dust Emissions from Training and Maneuvers

The fielding of new vehicles associated with SBCT transformation would result in increased vehicular movement to and in the training areas, as well as the use of additional training areas. Increased maneuver activities on unpaved areas would result in particulate emissions. Particulate emissions in these areas, commonly referred to as fugitive dust, were calculated using AP-42

emission factors for unpaved roads (AP-42, Section 13.2.2). Assumptions and input parameters for the fugitive dust model are in Appendix F.

4.2.4.1.4 Mobile Source Idling Emissions

The EPA SCREEN3 Air Dispersion Model was used to calculate ambient air quality impacts of CO emissions from idling vehicles awaiting deployment in the alert holding area. This assessment evaluated the impact of the CO emissions from the alert holding area on the Fairbanks Borough CO non-attainment area. Idling emission rates were input into EPA's SCREEN3 model to determine the maximum 1-hour ambient air concentration for each pollutant. SCREEN3 is a model designed to estimate the worst-case impact based on the meteorological data for use as a conservative screening technique. The model also takes into account the operation of the stationary generators and forklifts in buildings. Assumptions used to calculate the air quality impact of idling emissions are included in Appendix F.

4.2.4.1.5 Fugitive Dust from Unpaved Roads and Construction Activities

The Industrial Source Complex Short Term Model version 3 was used to calculate the ambient air quality impact of fugitive emissions from maneuver activities. Fugitive particulate emissions from deployments over paved roads were not evaluated as they would be relatively minor and produce no impact when spread over the large number of road miles traveled during a deployment. More information about this model is in Appendix F.

4.2.4.1.6 Visibility Impacts

The impact of each alternative on visibility was assessed using the EPA VISCREEN model. The assessment targeted the Denali National Park Class I Area since it receives the highest level of protection. Denali National Park is the closest Class I Area in proximity to both Forts Richardson and Wainwright.

4.2.4.2 Fort Wainwright

4.2.4.2.1 Alternative 1 (No Action)

This alternative would result in temporary minor impacts to air quality (Table 4.2.a). Fewer construction projects would take place if SBCT transformation did not occur. Some construction, however, would still occur. For example, barracks renewals and improvements to the central heating and power plant are planned regardless of transformation.

Table 4.2.a Estimated Emissions Increase at Fort Wainwright Main Post in Tons Per Year Under the No Action Alternative.

Pollutant	Existing Conditions	Heating Plant Upgrade/Bassett Replacement, Hospital/ Restoration, and Activities/ Baghouse Projects	PSD[1] Threshold
Nitrogen Oxides (NO_X)	2,848	23.96	40
Sulfur Dioxides (SO_X)	1,310	4.35	40
Carbon (CO)	2,388	5.51	100
Volatile (VOC)	163	0.69	40
Particulate Matter (PM_{10})	768	-546.2	15

[1] Prevention of Significant Deterioration

The cumulative ambient air impacts associated with Yukon Training Area (YTA) would be negligible for NO_X, SO_X, CO and VOC. Even though fugitive emissions at YTA are not required to be below Prevention of Significant Deterioration (PSD) levels, the cumulative net emissions change from PM_{10} would be below the PSD major source levels.

4.2.4.2.2 Alternative 3 (Transform With New Infrastructure)

Overall impacts to air quality would be minor at FWA under Alternative 3.

Construction to support the SBCT is proposed under Alternative 3. The construction of the company operations facilities (COFs) would not result in any new permanent, stationary air emission sources. A conformity review was conducted for this project and it was determined that the action was below the 100 tons per year CO threshold emission level for that region. A Record of Non-applicability was prepared (Appendix D).

Fielding of new mobile sources would have negligible impacts on the ambient air quality at FWA. In some respects these impacts would be beneficial since the new mobile sources are new vehicles that are expected to have fewer emissions than existing older tactical vehicles.

The deployment of the full SBCT fleet for training or actual deployment missions would result in short-duration increases in vehicular-related emissions. These emissions have been calculated and determined to be negligible. Table 4.2.b presents results from the MOBILE6 modeling exercise. The number of vehicles used as input parameters reflect what would be used at FWA during the end-state of transformation. Impacts to air quality during the interim stage would be less because one SBCT battalion would not yet be stationed at FWA and fewer vehicles would be fielded.

Table 4.2.b MOBILE6 Annual Emission Summary (in tons per year) for All SBCT Fleet Training Activities (Alternatives 3 and 4).[1]

Pollutant	Light Duty Diesel (0-6,600 lbs)	Diesel Vehicles (8,501-10,000 lbs)	Diesel Vehicles (19,501-26,000 lbs)	Diesel Vehicles (33,000-60,000 lbs)	Diesel Vehicles (>60,000 lbs)	Total Emissions
NO_X[2]	4.5	4.0	2.1	20.6	1.4	32.6
CO[3]	7.1	1.0	0.4	4.3	0.3	13.1
VOC[4]	4.2	0.2	0.1	0.8	0.1	5.4

[1]Amounts presented include emissions from off-post travel between bases.

[2]Nitrogen oxides

[3]Carbon monoxide

[4]Volatile organic compounds

Common motorized vehicle pollutants arise from the partial combustion of incompletely oxidized fuel. During periods of extreme cold temperatures, vehicle exhaust produces small, particle-size ice crystals that contribute to the presence of ice fog. Ice fog degrades the atmosphere since it obscures visibility, thus affecting air quality. During temperature inversions, which occur primarily during the winter months, vehicle exhaust can become trapped low to the ground and persist in areas for an extended time period. This phenomenon would be of particular concern during winter deployment exercises. For these reasons, ambient air concentrations of vehicular emissions were modeled for a midwinter deployment scenario.

Impacts to air quality would occur during deployments from FWA for both the interim and end-state stages of transformation. Prior to a full air deployment, approximately 1,000 vehicles could be processed at a pallet processing facility within 72 hours. The potential for impact would exist during periods of peak concentrations of vehicular emissions, particularly CO, emitted during deployment exercises and actual troop deployments. The EPA SCREEN3 Air Dispersion Model was used to calculate ambient air quality impacts of CO emissions from idling vehicles from processing for deployment. SCREEN3 modeling indicates that the ambient air quality impact associated with the end-state fielding of the SBCT fleet at FWA would be well below the National Ambient Air Quality Standards (NAAQS) for specific pollutants. Both the winter and summer analysis contributed to the conclusion that mobile source impacts would not be significant (Table 4.2.c).

Table 4.2.c Full Deployment Mobile Source Emission Concentrations.

Pollutant	Midwinter (µg/m^3)	Summer (µg/m^3)
Nitrogen Oxides (NO_X)	189.9	204.6
Carbon (CO)	317.4	348.9
Volatile (VOC)	49.1	53.4
Particulate Matter (PM_{10})	13.4	14.9

The mobile source emissions shown in Table 4.2.c were found to be less than the Alaska State Department of Environmental Conservation Standards.

Table 4.2.d Comparison of Mobile Source Emission Impacts to the National Ambient Air Quality Standards.

Pollutant	Concentration (µg/m^3)											
	1-hr Maximum		Standard[1]	8-hr Average		Standard	24-hr Average		Standard	Annual Average		Standard
	Winter	Summer		Winter	Summer		Winter	Summer		Winter	Summer	
NO_X[2]	189.9	204.6	---	132.9	143.2	---	76.0	81.8	---	15.2	16.4	100
CO[3]	317.4	348.9	4000	222.2	244.2	1000	127.0	139.6	---	25.4	27.9	---
VOC[4]	49.1	53.4	235	34.4	37.4	---	19.6	21.4	---	3.9	4.3	---
PM[5]	13.4	14.9	---	9.4	10.4	---	5.4	6.0	150	1.1	1.2	50

[1] Standard refers to the Alaska State Department of Environmental Conservation Standards.

[2] Nitrogen oxides

[3] Carbon monoxide

[4] Volatile organic compounds

[5] Particulate matter

Fugitive dust generated during construction of the new company operations facility would be temporary and result in minor air quality impacts. The area of the proposed construction is approximately ⅓ acre (Appendix D), which would result in insignificant ambient air quality impacts.

The impact of fugitive dust generated by maneuver activities at the FWA Main Post and YTA was assessed for comparison with the 24-hour and annual PM_{10} NAAQS. Estimated air

quality impacts from maneuver activities at FWA and YTA were found to be not significant in comparison with the NAAQS.

Visibility Impacts

National parks and wildlife refuges are considered Class I areas and receive the highest level of protection under the Clean Air Act. Denali National Park is the closest Class I area to FWA, so visibility impacts to the park were assessed. This assessment indicates no degradation to visibility due to increased training and maneuver activities under Alternative 3.

4.2.4.2.3 Alternative 4 (Transform With New Infrastructure and Airborne Task Force)

Alternative 4 would have the same impacts associated with transformation activities at FWA as Alternative 3 (see tables 4.2.a, 4.2.b, and 4.2.c). Impacts from construction, mobile sources, deployments, and impacts to visibility would all be the same as under Alternative 3 and would be considered minor. This includes impacts resulting from interim and end-state stages of transformation.

A notable improvement would be the transformation of installation management proposed under Alternative 4. This would involve the full funding and implementation of environmental programs involving air quality and Environmental Management Systems (EMS) programs. See Section 4.2.5.2, Comparison of Alternatives 3 and 4.

4.2.4.3 Donnelly Training Area

4.2.4.3.1 Alternative 1 (No Action)

Fewer construction and training activities on DTA would take place if SBCT transformation did not occur. Some construction, however, would still take place regardless of transformation. These proposed projects would result in the generation of temporary emissions (Stout 2002b). The Environmental Assessment for the projects did not provide quantitative data, but anticipated the emissions would contribute very minor temporary impacts.

4.2.4.3.2 Alternative 3 (Transform With New Infrastructure)

The only SBCT construction project proposed within DTA is the unmanned aerial vehicle (UAV) maintenance facility. This facility would be located within Training Area 57 and would have an oil-fired furnace. Construction of this facility would have temporary impacts to air quality.

The impact of fugitive dust generated by maneuver activities at DTA was assessed for comparison with the 24-hour and annual PM_{10} NAAQS. Since fugitive dust levels were found to be below the standards, this would not be considered significant.

Visibility Impacts

National parks and wildlife refuges are considered Class I areas and receive the highest level of protection under the Clean Air Act. Denali National Park is the closest Class I area to DTA, so visibility impacts to the park were assessed. Preliminary data may suggest that visibility during days with the lowest visibility (days with fog and cloud cover) would not be degraded by dust emissions from DTA. For highest visibility days, preliminary results indicate that visibility would not be impaired inside the Class I area itself, but may impair visibility for observers outside the Class I area looking into the park. This would be due to increased training and maneuver

activities under Alternative 3. Additional data collection and monitoring of visibility conditions are proposed for DTA as listed in Section 4.2.6, Mitigation.

The overall impact of Alternative 3 on air quality is considered minor for DTA. Impacts to air quality would be the same under the interim and end-state stages of transformation.

4.2.4.3.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Construction, fugitive dust, and visibility impacts under Alternative 4 would be similar to those under Alternative 3 for DTA. This includes the potential visibility impact to Denali National Park. See Section 4.2.6, Mitigation, for proposed mitigation options. Impacts to air quality would be minor and the interim and end-state stages of transformation would not differ.

A notable improvement would be the transformation of installation management proposed under Alternative 4. This would involve the full funding and implementation of environmental programs involving air quality and EMS programs. See Section 4.2.5.2, Comparison of Alternatives 3 and 4.

4.2.4.4 Fort Richardson

4.2.4.4.1 Alternative 1 (No Action Alternative)

Several projects would occur regardless of transformation. Like other military installations, USARAK facilities are dynamic and change to support military mission requirements. Overall, less construction would occur under the No Action Alternative. The ammunition supply point and rapid deployment facility are mission-essential construction projects that will have new air emission sources associated with them. The ammunition supply point has two boilers associated with the project. The rapid deployment facility has two back-up emergency generators that would be limited to 250 hours of operation to avoid exceeding PSD significant thresholds. The limit would be documented as part of a pre-approved limit requested from the Alaska Department of Environmental Conservation. The heating plant decentralization project would result in reduced emissions on FRA. Air quality impacts associated with this alternative would not increase (Table 4.2.e), and would remain minor.

Table 4.2.e Estimated Emissions Increase at Fort Richardson in Tons per Year Under the No Action Alternative.

Pollutant	Emissions Baseline	Heating Plant Decentralization Project	Ammunition Supply Point	Rapid Deployment Facility	PSD Thresholds[1]
NO_X	1,871	-156.2	0.40	1.00	40
SO_X	40	-4.7	0.02	0.08	100
CO	181	-29.7	0.70	0.20	100
VOC	25	5.4	0.04	0.03	100
PM_{10}	46	4.3	0.06	0.03	100

[1] PSD levels are representative of annual emission rates each individual pollutant must exceed to trigger a PSD permitting action (construction permit requirement). Thus, if a pollutant baseline emission rate is less than 100 tons/yr (major source level) the PSD level for that pollutant is 100 tons/yr.

4.2.4.4.2 Alternative 3 (Transform With New Infrastructure)

Overall, impacts to air quality under this alternative would be minor during both the interim phase and end state.

Training facilities would be constructed to support increased stationing during the interim stage until 2010, when one SBCT battalion would move to FWA. This action would result in the installation of permanent stationary air emission sources, as well as temporary emission sources associated with the construction of these projects. The following SBCT projects would take place at FRA under Alternative 3.

The FRA mission support training facility (MSTF) would require natural gas fired boilers to provide primary heat to the facility. The Anchorage Port facility would be constructed outside the carbon monoxide (CO) nonattainment area in a northerly direction. No new permanent or temporary emission sources have been identified for this facility. Air emission impacts would be restricted to temporary emissions generated from the operation of heavy-duty construction equipment. The FRA 60-person barracks would require natural gas fired boilers to provide heat to the new facility.

Table 4.2.f New Stationary Emissions in Tons per Year Associated with Fort Richardson Projects (Alternatives 3 and 4).

Pollutant	Ammunition Supply Point (Mission Essential)	Rapid Deployment Facility (Mission Essential)	Barracks	Mission Support Training Facility	Total Emissions	Significant Thresholds
NO_X	0.40	1.00	1.30	0.40	3.10	40
SO_X	0.02	0.08	0.01	0.10	0.20	100
CO	0.70	0.20	1.10	0.40	2.40	100
VOC	0.04	0.03	0.08	0.02	0.20	40
PM_{10}	0.06	0.03	0.01	0.03	0.20	15

New Fugitive Dust Emissions Sources

Fugitive dust generated during construction of the new barracks (approximately ½ acre), the mission support training facility (approximately ½ acre), and the Anchorage Port staging area (1,000 ft^2) would be temporary. The sizes of these construction sites would produce insignificant emissions and little to no ambient impacts.

The impact of fugitive dust generated by maneuver activities at the FRA training areas were assessed for comparison with the 24-hour and annual PM_{10} NAAQS. The estimated impact from maneuver activities during the interim and end-state stages at FRA would not be significant in comparison with the NAAQS.

Visibility Impacts

Visibility impacts were assessed at the Class I areas at which visibility is an important value. Visibility impacts were also calculated in the vicinity of FRA proper. This assessment indicated that visibility would not be impaired due to the proposed activities associated with Alternatives 3.

4.2.4.4.3 Alternative 4 (Transform With New Infrastructure and Airborne Task Force)

Alternative 4 would have similar impacts associated with transformation activities at FRA as Alternative 3 (Table 4.2.f). Impacts would occur from construction emissions, fugitive dust, and visibility. One difference between Alternatives 3 and 4 would be the increased stationing of

approximately 300 personnel under Alternative 4. Increased emissions from maneuver training would be none to minimal. However, additional personal vehicles would be expected with the increase in personnel, which may increase emissions slightly.

An additional difference would be the transformation of installation management proposed under Alternative 4. This would include transformation of environmental programs involving air quality, including EMS programs. Components of EMS include reducing risk and pollution, sustaining compliance, and enhancing mission readiness (USAEC 2002). These programs would focus on implementing programs that would mitigate impacts of transformation no matter what they may ultimately be (Section 4.2.5.2).

Overall impacts to air quality under Alternative 4 would be minor.

4.2.5 Comparison of Alternatives Summary

4.2.5.1 Comparison of All Alternatives

See Table 4.2.g for a summary comparison of impacts to air quality from each alternative. Definitions of the qualitative impact categories are provided in Section 4.2.4.

Table 4.2.g Comparison of Impacts to Air Quality by Alternative at Fort Wainwright, Donnelly Training Area, and Fort Richardson.

Location	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Fort Wainwright					
Main Post	Minor	Minor	Minor	Minor	Minor
Tanana Flats Training Area	Minor	Minor	Minor	Minor	Minor
Yukon Training Area	Minor	Minor	Minor	Minor	Minor
Donnelly Training Area	Minor	Minor	Minor	Minor	Minor
Fort Richardson	Minor	Minor	Minor	Minor	Minor

4.2.5.2 Comparison of Alternatives 3 and 4

Both alternatives would result in transformation from the Current Force to SBCT. In general, Alternative 4 would result in slightly higher numbers of personnel and equipment, but construction projects would remain the same. Training intensities would be slightly higher, but this would not likely result in different air quality impacts.

The primary difference between Alternatives 3 and 4 would result from the institutional matters. The transformation of installation management proposed under Alternative 4 would involve

the full funding and implementation of environmental programs involving air quality and EMS programs. Components of the air quality program are to:

- Identify, inventory, and monitor air pollutant emissions and ambient air quality.
- Reduce pollutants to regulatory levels.
- Procure control equipment that meets regulatory standards.
- Ensure that design and operation of military equipment are in accordance with regulations.

Components of EMS include reducing risk and pollution, sustaining compliance, and enhancing mission readiness (USAEC 2002). These programs would focus on implementing programs that would mitigate impacts of transformation no matter what they may ultimately be (Appendix C). The result would be improved environmental management of USARAK lands to include air resources.

For Alternative 3, institutional matters relating to EMS would remain essentially the same as the No Action Alternative and would be implemented as currently funded.

4.2.6 Mitigation

4.2.6.1 Existing

The following mitigation measures are currently implemented on USARAK lands, and are part of the No Action Alternative.

- Continue to comply with asbestos and lead National Emission Standard for Hazardous Air Pollutants during renovation or demolition activities when friable asbestos materials are present.
- Continue to submit required construction permit applications to the Alaska Department of Environmental Conservation.
- Continue to collect PSD ambient air quality data.
- Continue to monitor air quality.

4.2.6.2 Proposed

The following mitigation measures are proposed to be implemented as funding is available under Alternative 3. Mitigation measures would be fully implemented under Alternative 4.

- Conduct air quality monitoring projects to assess transformation impacts. If transformation activities are found to impact air quality greater then is expected, then alternative mitigation measures would be implemented.
- Collect additional data to determine impacts of fugitive dust generation and investigate need for dust control plans to control fugitive dust generation. Further mitigation measures would be implemented if impacts are shown to be severe.

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4.3 GEOLOGY RESOURCES

This section analyzes and compares the geology impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.3. Geology was evaluated and is not considered an issue of concern in this Environmental Impact Statement (EIS). The related topics of soil and permafrost are assessed and presented in Section 4.4, Soil Resources.

4.3.1 Review of Impacts to Geology

Army impacts to geology were assessed in the U.S. Army Alaska (USARAK) withdrawal renewal EIS. No Army activities were found to impact terrain, bedrock geology, surficial geology, or geologic features (USARAK 1999a). An example of an impact to geology would be an activity that involved the extraction of minerals or the permanent alteration of geologic features. Geologic alterations could result in associated impacts to aesthetics, drainage, groundwater, or habitat loss.

4.3.2 Activity Groups That Affect Geology

The textbox below lists activity groups that could affect geology due to transformation.

Activity Groups With Impacts	Activity Groups Without Impacts
None	• Construction • Training • Systems Acquisition • Institutional Matters • Deployment • Stationing

4.3.3 Comparison of Alternatives

Under all alternatives, USARAK lands would remain closed to mineral location and leasing. There would be no effects on mineral resources except for localized extraction of saleable materials by the Army, such as gravel. However, the Bureau of Land Management (BLM) and the Army may choose, at their discretion, to re-evaluate the status of the mineral closures (BLM and U.S. Army 1994a, b). Mineral exploration or development could be allowed in specified areas. Closures would probably remain in effect for the impact areas and other places where there is a substantial safety risk due to unexploded ordnance and other hazardous materials.

4.3.3.1 Fort Wainwright

4.3.3.1.1 Alternative 1 (No Action)

Under the No Action Alternative, military or public use of USARAK lands would have no impact on the underlying geologic conditions. Continued military activities will have no inherent interaction with bedrock, surficial deposits, or geologic structures.

4.3.3.1.2 Alternative 3 (Transform With New Infrastructure)

Under Alternative 3, military or public use of USARAK lands would have no negative impacts on the underlying geologic conditions. Transformation activities will have no inherent interaction with bedrock, surficial deposits, or geologic structures.

The only difference could be an increase in the localized extraction of gravel for use in Army construction. These would be at existing gravel pits and no impacts would be expected.

4.3.3.1.3 Alternative 4 (Transform With New Infrastructure and Airborne Task Force)

Under Alternative 4, military or public use of USARAK lands would have no negative impacts on the underlying geologic conditions. Continued military activities will have no inherent interaction with bedrock, surficial deposits, or geologic structures.

There may be an increase in the localized extraction of gravel for use in Army construction. These would be at existing gravel pits and no impacts would be expected.

4.3.3.2 Donnelly Training Area

4.3.3.2.1 Alternative 1 (No Action)

Under the No Action Alternative, military or public use of USARAK lands would have no impact on the underlying geologic conditions. Continued military activities will have no inherent interaction with bedrock, surficial deposits, or geologic structures.

4.3.3.2.2 Alternative 3 (Transform With New Infrastructure)

Under Alternative 3, military or public use of USARAK lands would have no negative impacts on the underlying geologic conditions. Continued military activities will have no inherent interaction with bedrock, surficial deposits, or geologic structures.

The only difference could be an increase in the localized extraction of gravel for use in Army construction. These would be at existing gravel pits and no impacts would be expected.

4.3.3.2.3 Alternative 4 (Transform With New Infrastructure and Airborne Task Force)

Under Alternative 4, military or public use of USARAK lands would have no negative impacts on the underlying geologic conditions. Continued military activities will have no inherent interaction with bedrock, surficial deposits, or geologic structures.

The only difference could be an increase in the localized extraction of gravel for use in Army construction. These would be at existing gravel pits and no impacts would be expected.

4.3.3.3 Fort Richardson

4.3.3.3.1 Alternative 1 (No Action)

Under the No Action Alternative, military or public use of USARAK lands would have no impact on the underlying geologic conditions. Continued military activities will have no inherent interaction with bedrock, surficial deposits, or geologic structures.

4.3.3.3.2 Alternative 3 (Transform With New Infrastructure)

Under Alternative 3, military or public use of USARAK lands would have no negative impacts on the underlying geologic conditions. Continued military activities will have no inherent interaction with bedrock, surficial deposits, or geologic structures.

The only difference could be an increase in the localized extraction of gravel for use in Army construction. These would be at existing gravel pits and no impacts would be expected.

4.3.3.3.3 Alternative 4 (Transform With New Infrastructure and Airborne Task Force)

Under Alternative 4, military or public use of USARAK lands would have no negative impacts on the underlying geologic conditions. Continued military activities will have no inherent interaction with bedrock, surficial deposits, or geologic structures.

The only difference could be an increase in the localized extraction of gravel for use in Army construction. These would be at existing gravel pits and no impacts would be expected.

4.3.4 Mitigation

No mitigation measures exist or are proposed for impacts to geology.

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4.4 SOIL RESOURCES

Issue D: Maneuver Impacts. Transformation's impact to soils and permafrost was identified as a relevant issue of concern through scoping meetings and by USARAK. It is therefore evaluated in this EIS (see Section 1.8, Scoping Issues of Concern).

This section analyzes and compares the soil impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.4. Additional soil resources information is presented in Appendix F.

4.4.1 Background

As described in Section 3.4, soils in Alaska are diverse due to the variation in climate, topography, parent material, and the prevalence of permafrost. Soil types, described in Section 3.4, have appropriate land uses based on their defining characteristics. Impacts, therefore, would differ in type and severity according to location.

4.4.2 Review of Impacts to Soils

Possible impacts to soil and permafrost from military activities include compaction, erosion, rutting, reduced soil strength, restricted water movement, contamination, disturbance to vegetation, and subsequent melting of permafrost. Compaction is found to inhibit plant growth and increase water runoff. Soil may be lost through erosion and contribute to increased sedimentation of waterways. Exposed soils are subject to warming and may lead to melting of permafrost. Some contaminants may be persistent in soils, taken up by plants, and entered into the food chain. These impacts that could occur under SBCT transformation were assessed by performing analysis of construction activities, calculating maneuver impact miles, and evaluating military vehicle mobility and impacts.

4.4.3 Activity Groups That Affect Soil Resources

The textbox below lists activity groups that could affect soil resources due to transformation.

Activity Groups With Impacts	Activity Groups Without Impacts
• Construction	• Stationing
• Training	• Deployment
• Systems Acquisition	
• Institutional Matters	

4.4.3.1 Construction

Proposed construction projects associated with transformation include the company operations facilities at Fort Wainwright (FWA); the unmanned aerial vehicle (UAV) maintenance support facility at Donnelly Training Area (DTA); and the mission support training facility, new barracks facilities, and development of the Port of Anchorage deployment staging area at Fort Richardson (FRA) (Appendix D). Construction of new facilities is expected to have direct short-term impacts to soils and permafrost. Impacts from construction would result from the removal of vegetation

and disturbance of soil in the area of immediate construction. Erosion impacts are temporary because buildings, pavement, or lawn would cover the once barren land. If soil is compacted from construction, it is difficult for the soil to support natural vegetation or agricultural uses.

Temporary soil disturbance created during construction activities may also result in indirect, short-term erosion and delivery of sediment to streams and wetlands. Fugitive dust from construction is also an indirect, short-term impact to air quality that is expected under Alternatives 3 and 4. This impact is further assessed in Section 4.2, Air Quality.

4.4.3.2 Training

4.4.3.2.1 Impacts to Soils

The frequency and intensity of maneuver and weapons training could increase if U.S. Army Alaska (USARAK) were to transform (Table 4.1.a). Both maneuver and artillery training are expected to cause direct and long-term impacts to soils and permafrost through SBCT transformation. Maneuver impact miles (MIMs) as well as the maneuver space requirements are expected to increase. Although training events would be periodic, long-term impacts are expected because soil disturbance typically requires much time and effort to amend. The degree of impact would depend on the local soil properties (Appendix A, Figures 3.4.a, 3.4.b, 3.4.c).

The direct impacts from off-road Stryker use include soil compaction, rutting, and erosion. Permafrost may be directly impacted through compaction or indirectly impacted through the disturbance of vegetation.

4.4.3.2.2 Impacts to Permafrost

Permafrost is particularly vulnerable to impact from 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, 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 not reversible, restoration is not possible, and impacted areas often become impassible to vehicle traffic.

The most important means of mitigating impacts to permafrost soils is to prevent disturbance of the vegetation mat and the initiation of thermokarst. This can be done by avoiding permafrost-rich areas altogether or by limiting traffic to periods when sufficient snow depth would prevent damage to vegetation. In order to mitigate impacts, identification of areas where permafrost exists is essential. Discontinuous permafrost is present in all proposed transformation lands except for FRA. In some of the training areas, attempts have been made to map or model the potential location of permafrost based on vegetation, soil type, and topography. These areas include Tanana Flats Training Area (TFTA) and Yukon Training Area (YTA). At DTA, very little is known about permafrost distribution. Complex topography, soils, and vegetation make prediction difficult in this area and further study is necessary.

A final consideration with permafrost is the long-term effects of climatic change on permafrost areas. While causes and effects of climate change are still debated, it is clear that permafrost temperatures in Alaska have risen significantly in the last decade and much of the 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 anthropogenic 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 irreversible melting of ground ice that might have previously recovered after re-vegetation and post-fire succession restored an insulating organic mat (Burns 1998). Significant ecological, hydrologic, and soil changes may occur that could influence both trafficability and mobility on training lands. The long-term effects of future warming, continued permafrost degradation, and the impacts on the soil and hydrology of training areas are essentially unknown. Further study into the impacts of fire, permafrost-influenced water table changes, and widespread thermokarst would be necessary to assess impacts and successfully guide future training lands management and mitigation.

4.4.3.3 Systems Acquisition

New equipment would be used under transformation, including the eight-wheeled 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) (Table 4.1.a). The Stryker vehicle and its impacts are discussed under Training. The UAV is not expected to impact soil or permafrost.

4.4.3.4 Institutional Matters

Institutional matters include USARAK management activities, land stewardship, policy and program implementation. Transformation is expected to change management processes, which should lead to better data collection and management. This would improve stewardship of USARAK lands and resources.

4.4.4 Comparison of Alternatives

4.4.4.1 Description of Methodology

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

- None – No measurable impact is expected to occur.
- Minor – Temporary but measurable impacts are expected.
- Moderate – Noticeable impacts that would have a measurable impact on soil and vegetation.
- Severe – Impacts would be obvious with serious consequences to soil and vegetation that could lead to erosion, degradation to permafrost, and permanent loss of vegetation.
- Beneficial – Impacts would benefit soil resources.

The first two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to soil resources are presented in 4.4.6, Mitigation.

Various studies related to soil impacts were completed and used to assess SBCT's impact on soils and permafrost on USARAK lands. These studies helped to assess SBCT's impact to soils both quantitatively and qualitatively.

4.4.4.1.1 Assessment of Military Vehicle Use

Maneuver Impact Miles

Maneuver impact miles (MIMs) were calculated to estimate the impact of maneuver training on soil erosion for each alternative. One MIM has the equivalent impact on soil erosion as an M1A2 tank driving one mile in an armor battalion field training exercise.

MIMs are calculated Army-wide for each type of exercise that a unit conducts. This process involves identification of military unit type, military training event, types and numbers of vehicles, and the number of miles each vehicle drives in a typical training day for that event. In this study, MIMs were calculated for each alternative as an attempt to compare varying levels of training intensity (Appendix F).

Carrying Capacity of Training Lands

Calculated MIMs for each alternative were then compared to the predicted carrying capacity (also measured in MIMs) for each installation (Table 4.4.b). The training load capacity, which differs seasonally, was defined as the threshold of significance for Army training impacts on USARAK lands. Training load capacity is a measure of the total capacity of a given parcel of land and was determined for summer and winter conditions (Appendix F).

Based on historic practices and the increased maneuver area accessible in winter, a significant portion of the training would take place in winter. Readiness requirements do not specify what time of year the training must be conducted. The operating assumption for the EIS is that half of required training would occur in the summer and half would occur in winter.

Stryker Maneuverability Study

Since maneuver training with the wheeled Strykers has never occurred in Alaska, their impacts to soil are largely unknown. The Stryker was therefore evaluated in a study to model the vehicle's ability to operate off-road and to predict impacts to the terrain. Both trafficability and maneuverability were assessed in the Stryker study (Appendix F).

Trafficability is defined as the ability of soils to physically support military vehicles. Year-round wetlands and slopes over 30% are considered not trafficable.

Mobility describes a vehicle's ability to traverse terrain, which takes into consideration vehicle type, trafficability of soils, obstacles, and access.

Maneuverability describes the vehicle's mobility only on lands that are accessible. For instance, certain areas may be determined to be inaccessible in summer because adequate river crossings are not available. However, during winter when the river is frozen, those areas are accessible and therefore maneuverable. Speed maps were generated from data gathered in this study to show where the vehicle can and cannot maneuver.

Maneuvers on Unfrozen Soils

Since rutting is a concern for unfrozen soils, rut depth potential was calculated for a wide range of soil strengths for four different Army vehicles, including the Stryker (Figure 4.4.d). For the Stryker, minor impacts are expected when soil strength is high (Cone Index > 60). For soil strength between Cone Index 36 to 60 (associated with wet or poorly-drained sand or silts), moderate impact is expected. For very weak soils (associated with saturated or waterlogged

sands, silts, and peats), the Cone Index is less than 36 and severe impacts with ruts greater than 6 inches are possible.

Based on the maneuverability maps (Appendix A, Figures 4.4.a, b, c), Strykers are more limited in summer (soft soil) conditions when compared to vehicles currently used by USARAK. During summer, soil strength and slope are the speed limiting factors for all vehicles except for the small unit support vehicle (SUSV). SUSVs can maneuver in most terrain conditions on USARAK training lands. In winter, frozen ground would enable Strykers and other vehicles to maneuver in many more areas. Site specific descriptions are provided for each installation within Section 4.4.5, Comparison of Alternatives Summary.

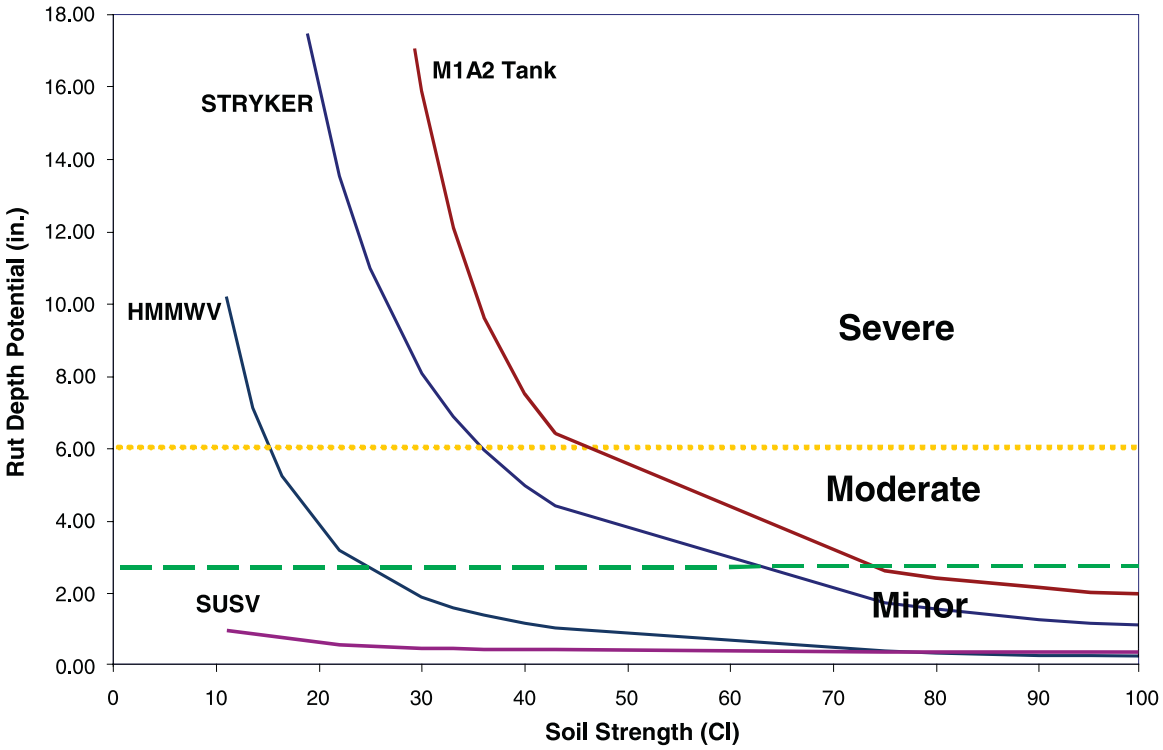

Figure 4.4.d Rut Depth Potential for Various Military Vehicles (Shoop et al. 2002).

Maneuvers on Frozen Soils

Terrain that is normally untrafficable may require a substantial frost layer before vehicle operations are possible. The freezing of rivers and wetlands in winter allows maneuver access into many areas that are inaccessible in the summer (e.g., TFTA, DTA West). Additionally, frozen soil and depth of snow cover act as a protective layer and may prevent the vehicle from creating ruts and causing disturbance to soil and vegetation. Table 4.4.a describes the depth of frozen ground required to support Army vehicles.

Table 4.4.a Frost Depth Required to Support Various Vehicles on Soft Soil (peat).[1]

Conditions	HMMWV	SUSV	Stryker	M1A2
Dry, inches	12.2	16.9	28.3	52.0
Wet, inches	7.8	10.8	18.1	33.2

[1] Results based on vehicle weight not ground pressure.

Source: Shoop 1995

4.4.4.1.2 Assessment of Weapons Training

Weapons training would increase under SBCT transformation. Physical disturbance to existing impact areas is expected due to the higher training intensity. Munitions effects in impact areas include physical disturbances such as increased fire frequency, plant disturbance, and cratering. Munitions cause disturbance to vegetation and soils when the explosives create craters, which could result in larger areas of bare ground. The bare ground is then subject to erosion from wind and water.

Low levels of explosive residues are associated with munitions use. Studies have shown that TNT residues readily biotransform in the environment and the products bind to organic matter. Areas with higher organic matter content appear to bind residues more readily. The explosive residues RDX and HMX do not degrade rapidly and are not very soluble. However, once dissolved, both can be quite mobile in soil. RDX has been found in groundwater at training ranges in Massachusetts and Washington. RDX and HMX are not expected to be easily mobilized in Alaskan soils because of low precipitation and frozen conditions most of the year. Additionally, strong reducing conditions found in the soils of some wetland impact areas in Alaska readily degrade RDX and HMX (Charles Collins, personal communication 2003).

The delivery of sediments containing explosive residue into streams and wetlands has been a concern expressed by the public. This indirect impact to surface water quality is discussed in Section 4.5, Surface Water.

4.4.4.2 Fort Wainwright

4.4.4.2.1 Alternative 1 (No Action)

Temporary impacts would result from the construction projects already scheduled to take place under the No Action Alternative. Best management practices to control erosion, such as the use of silt fences, would be used to ensure soils do not erode from the site or enter waterways.

Since SBCT would not be implemented under the No Action Alternative, no additional impacts are expected from training. The MIMs on FWA would remain at current levels, at approximately 11,500 MIMs (Table 4.4.b). This would be less than 3% of the total summer MIMs capacity at FWA and less than 1% of the total MIMs capacity in winter.

SUSVs and wheeled support vehicles such as HMMWVs would use TFTA in winter. Due to the protective layer of ice and snow in winter and the area's inaccessibility in summer, minimal adverse impacts to soil are expected from vehicle use on TFTA. No Army vehicles are used in summer at TFTA. Army vehicle impacts on TFTA would be insignificant to soil, but permafrost may still be affected.

SUSVs and HMMWVs would use YTA year-round. During periods when the soil is unfrozen, damage to soil is expected, including localized rutting in lowland areas from HMMWVs. Impacts to permafrost would be locally significant if vehicles drive over permafrost during spring, summer, or fall. During winter, when soils are frozen, only limited impacts to soil would be expected due to increased soil strength and protective snow cover. However, winter activities, regardless of frost depth, may damage vegetation (due to low or inadequate snow cover) and thus alter ground surface thermal regimes and cause thermokarst in permafrost areas.

Under the No Action Alternative, the number of munitions expended and the current level of impact to soil would remain at current levels. In 2002 a total of 23,920 munitions were expended at YTA and TFTA. This number includes both small arms and artillery munitions.

Overall, damage to soil and permafrost for FWA are expected to be minor.

4.4.4.2.2 Alternative 3 (Transform With New Infrastructure)

Impacts would be temporary and localized under Alternatives 3 for the proposed construction of the company operations facility and barracks. (Appendix D) These projects are expected to result in a relatively small footprint at FWA.

Long-term adverse impacts from increased vehicle use proposed under Alternative 3 would result in 46,000 MIMs during the interim phase, then approximately 69,000 MIMs for the end-state SBCT. This could cause measurable impacts to soil resources. However, only about 17% of total summer capacity and less than 1% of total winter capacity would be utilized at end state

Total munitions use would increase with transformation. End-state use of high explosive munitions may increase by about 50% compared to today's requirements. No new impact areas would be created where high explosives are detonated. Impacts to soil would not change much from today, with similar amounts of cratering, disturbance of vegetation, and potential disturbance of permafrost in the impact areas. These disturbances would be confined to the dedicated/existing impact areas.

The overall impacts to soil and permafrost on FWA are expected to be moderate.

Tanana Flats Training Area

Stryker maneuverability maps were prepared for TFTA (Appendix A, Figure 4.4.a). For summer conditions, the entire area of TFTA is considered NO GO because of the lack of access to trafficable areas. In winter, ice bridges provide access to Tanana Flats. Frozen ground and snow cover provides soil protection until spring break-up.

There would be no Stryker impacts expected in the summer because the area is inaccessible and not used by military vehicles. On TFTA, Stryker vehicles would have temporary impacts to soil when adequate frost depth occurs (Table 4.4.a). The predicted MIMs would be approximately 23,000 for the end state. Interim MIMs would be slightly less. Due to the expanse of the training areas, overall expected impacts to soil would be moderate.

For permafrost, however, winter activities, regardless of frost depth, may damage vegetation (due to low or inadequate snow cover) and thus alter ground surface thermal regimes and cause

thermokarst in sensitive permafrost areas. Because of this, moderate and possibly severe impacts to permafrost could occur in localized areas from Stryker use at TFTA.

Yukon Training Area

Stryker maneuverability maps were prepared for YTA (Appendix A, Figure 4.4.a). During summer and winter, the limiting factors for vehicle use in mountainous terrain are slope and dense forest. In valley bottoms, soil strength limits Stryker mobility. The westernmost portion of the training area provides the most maneuverable land. Training Areas 2 and 4 would continue to be the most heavily used areas because of their proximity to roads.

Greater soil impacts are expected with Stryker use during periods without frozen soil. Severe soil impact potential exists in localized lowland areas where soils tend to be fine grained and wet. During winter, when soils are frozen, minimal Stryker impacts are expected, due to increased soil strength and protective snow cover. The predicted MIMs would be approximately 31,000 for the end state. Interim state MIMs would be slightly less. Due to the expanse of the training areas overall expected impacts to soils would be moderate.

For permafrost, however, winter activities, regardless of frost depth, may damage vegetation (due to low or inadequate snow cover) and thus alter ground surface thermal regimes and cause thermokarst in sensitive permafrost areas. Because of this, severe impacts to permafrost could occur from Stryker use on north-facing slopes. Due to the expanse of the training areas, overall expected impacts to permafrost would be moderate.

4.4.4.2.3 Alternative 4 (Transform With Infrastructure and Airborne Task Force)

Construction impacts under Alternative 4 would be the same as under Alternative 3. The predicted MIMs are slightly lower than predicted under Alternative 3 and are considered to be a moderate impact. MIMs are expected to reach approximately 67,000, which is 17% of capacity in summer and less than 1% of capacity in winter (Table 4.4.b).

Munitions use at FWA would be the same as under Alternative 3. Total munitions use would increase. High explosive munitions use may increase by about 50% compared to current requirements. No new impact areas would be created where high explosives are detonated. Impacts to soil would not change much from today, with similar amounts of cratering, disturbance of vegetation, and potential disturbance of permafrost in the impact areas. These disturbances would be confined to the dedicated/existing impact areas.

Under Alternative 4, institutional matters would bring beneficial impacts to soil resources through full funding and implementation of the projects described in the Integrated Natural Resources Management Plan (INRMP) and the Training Area Recovery Plan (TARP).

Tanana Flats Training Area

Soil and permafrost impacts would be similar to those under Alternative 3 on TFTA and would be considered moderate to severe in localized areas. These include construction impacts, Stryker maneuverability and impacts, and munitions impacts.

Under Alternative 4, institutional matters would bring beneficial impacts to soil resources through full funding and implementation of natural resource management programs. The soil and water quality monitoring program and the TARP would especially benefit soil resources (Appendix H).

Yukon Training Area

Soil and permafrost impacts would be similar to those under Alternative 3 on YTA and are considered moderate. These include construction impacts, Stryker maneuverability and impacts, and munitions impacts.

4.4.4.3 Donnelly Training Area

4.4.4.3.1 Alternative 1 (No Action)

Temporary, direct impacts would result for soils on DTA from the mission-essential construction projects currently scheduled to take place under the No Action Alternative. Best management practices, such as the use of silt fences, would be used to localize impacts and to ensure soils would not erode from the site or enter waterways.

Under the No Action Alternative, DTA west of the Delta River would be used by only SUSVs and wheeled support vehicles during winter. Due to the increased soil strength in winter and its inaccessibility in summer, minor soil impacts are expected from vehicle use on this area of DTA. The portion east of the Delta River would continue to be used year-round with no soil impacts above current levels. The MIMs at DTA are expected to remain at levels seen today, at approximately 17,000 MIMs (Table 4.4.b). This would be 13% of capacity in summer and less than 1% of capacity in winter.

The number of munitions expended and the current level of impact to soil would remain the same. In 2002 a total of 6,522 munitions were expended at DTA.

Overall, impacts to soils and permafrost would be minor under this alternative.

4.4.4.3.2 Alternative 3 (Transform With New Infrastructure)

Impacts would be temporary and localized for the proposed construction of the unmanned aerial vehicle maintenance facility (Appendix D). This project would result in permanent soil and vegetation in a limited area.

Stryker maneuverability maps were prepared for DTA (Appendix A, Figure 4.4.b). During summer, the portion west of the Delta River is considered NO GO due to lack of access across the Delta River. The area east of the Delta River is more maneuverable, and the NO GO areas are characterized by thick forest and wet areas along the floodplains of Jarvis Creek and Delta River.

There would be no Stryker impacts to the portion west of the Delta River during the summer because the area is inaccessible and not used by military vehicles. Measurable and long-term impacts would occur to unfrozen soils from Stryker use in low-lying areas along Jarvis Creek and Delta River and other areas with poorly-drained soils. However, the majority of DTA East is characterized by well-drained soils capable of supporting Stryker vehicle use year-round.

Alternatives 3 and 4 would result in about 86,000 MIMs annually, which is an increase of approximately 69,000 MIMs over current levels. The MIMs would be the same during the interim and end-state stages and would be 69% capacity in summer and 1.2% capacity in winter.

The number of total munitions expended would increase, including high explosive munitions that could impact soil and permafrost. No new impact areas where high explosives would be detonated would be created under this alternative. There would be similar amounts of cratering, disturbance of vegetation, and potential disturbance of permafrost in the impact areas. These disturbances would be confined to the dedicated/existing impact areas.

Overall impacts are expected to be moderate. The extent of potential permafrost damage is unknown due to unavailability of baseline data; however, impacts to permafrost are expected to be moderate.

4.4.4.3.3 Alternative 4 (Transform With New Infrastructure and Airborne Task Force)

Soil and permafrost impacts would be similar to those under Alternative 3 on DTA. These include construction impacts, Stryker maneuverability and impacts, and munitions impacts. Moderate to severe impacts would occur on unfrozen poorly-drained soils in localized areas, but overall impacts to soil resources would be moderate.

Under Alternative 4, institutional matters would bring beneficial impacts to soil resources through full funding and implementation of the INRMP and the TARP (Appendix H). The soil and water quality monitoring program and the TARP would especially benefit soil resources.

4.4.4.4 Fort Richardson

4.4.4.4.1 Alternative 1 (No Action)

Temporary, direct impacts would result from the mission-essential construction projects scheduled to take place at FRA under the No Action Alternative. Construction impacts would be temporary and localized, and best management practices would be used.

Maneuver impacts would also occur. FRA is accessed by SUSVs and wheeled support vehicles in summer and winter. Most of the current vehicle access is on established roads that permeate the training lands. Under this alternative, no additional impacts would occur. The MIMs at FRA would be expected to remain at current levels, approximately 3,300 MIMs, which is considered minor (Table 4.4.b). MIMs are currently only 1.5% of the total summer capacity and less than 1% of the total winter capacity.

The number of munitions expended and the current level of impact to soil would remain the same as current levels. In 2002 approximately 65,000 munitions were expended at FRA.

Overall, impacts would be minor to soil.

4.4.4.4.2 Alternative 3 (Transform With New Infrastructure)

The proposed construction of the new barracks facilities, Port of Anchorage railroad facility, and the mission support training facility would be constructed in previously developed areas. Impacts would be temporary and localized, and best management practices would be used (Appendix D).

Stryker maneuverability maps were prepared for FRA (Appendix A, Figure 4.4.c). The summer maneuverability maps for FRA show the NO GO areas include lowland areas where soil wetness creates maneuverability problems or in highland areas where steep slopes make vehicle traffic impossible.

For Alternative 3, there would be an initial short-term increase in training due to the temporary stationing of one SBCT battalion at FRA. Increased impacts to soil would be expected. At the end

of the temporary stationing, the training would decrease from interim levels due to the movement of the SBCT battalion to FWA. Impacts would then be considered moderate. There would be about 11,000 MIMs during the interim SBCT stage (3% to 5% of capacity), then 3,500 MIMs at the end-state stage of the SBCT when the battalion moves to FWA (Table 4.4.b).

The majority of FRA is characterized by well-drained soils capable of supporting Stryker vehicle use year-round. Under Alternative 3, measurable and long-term impacts would occur to unfrozen soils from Stryker use in low-lying areas. Current policy states maneuvers are not allowed along Ship Creek, Campbell Creek, Chester Creek, Fossil Creek, Eagle River, Clunie Creek and other areas with poorly-drained soils. When soils are frozen, minimal impacts are expected due to increased soil strength throughout the training areas. Although severe impacts could occur based on soil conditions, the impacts are not expected to be extensive (but higher than current) because most maneuvers would be conducted on established roads and trails. After the temporary stationing, the impacts would decrease, but would still be higher than current levels. Strykers would not be used by the 1-501st Parachute Infantry Regiment (PIR).

For Alternative 3, the total number of munitions expended would initially increase approximately 125% during the interim phase and 65% during the end state (compared to current levels). No new impact areas where high explosives would be detonated would be created under this alternative. There would be an increased amount of cratering and disturbance of vegetation in the impact areas during the initial stationing. The amount of disturbance is expected to increase proportionally to the increase in munitions use. These disturbances, although significant, would be confined to the dedicated/existing impact areas.

Overall, impacts to soil would be severe during the interim phase and moderate at the end state under Alternative 3.

4.4.4.4.3 Alternative 4 (Transform With New Infrastructure and Airborne Task Force)

Soil and permafrost impacts would be similar to those under Alternative 3 on FRA and considered severe to moderate. These include construction impacts, Stryker maneuverability and impacts, and munitions impacts.

There would be an increase in personnel due to stationing of the Airborne Task Force. The impacts are expected to increase from the current level of 3,300 MIMs to approximately 11,000 MIMs during the interim phase, and then to 8,000 MIMs during the end state. However, the impacts are expected to decrease from current levels because the task force would not be using Strykers. There would be approximately 11,000 MIMs during the interim SBCT stage (3 to 5% of capacity), then about 8,000 MIMs during the final SBCT (2 to 4% of capacity), which is an increase of approximately 4,700 MIMs from current levels.

The total level of munitions expended would increase from current levels by 225% during the interim phase and 165% during the end state. This is due to the introduction of the Airborne Task Force.

Under Alternative 4, institutional matters would improve conservation of soil resources through full funding and implementation of natural resources management programs (Appendix H). The soil and water quality monitoring programs and the TARP would especially aid in management of soil resources.

Overall, impacts to soil would be severe during the interim phase and moderate at the end state under Alternative 4.

4.4.5 Comparison of Alternatives Summary

4.4.5.1 Comparison of All Alternatives

See Table 4.4.b for a summary comparison of MIMs predicted under each alternative.

Table 4.4.b Year-Round Maneuver Impact Miles Under Each Alternative Compared to Capacity.

Impact Issue	Alternatives					Capacity	
	1 No Action[2]	3 Transform With New Infrastructure		4 Transform With New Infrastructure and Airborne Task Force			
		Interim[2]	End State[2]	Interim[2]	End State[2]	Summer	Winter
Fort Wainwright							
Maneuver Impact Miles	11,500	46,000	68,344	46,000	67,200	201,692	4,905,872
Donnelly Training Area[1]							
Maneuver Impact Miles	16,800	86,100	86,356	86,100	86,100	62,517	3,552,315
Fort Richardson							
Maneuver Impact Miles	3,300	10,570	3,500	10,570	8,000	109,075	203,455

[1] Donnelly Training Area includes Gerstle River Training Area.

[2] Represents year-round MIMs. It is assumed half of the MIMs would occur in summer and half would occur in winter.

See Table 4.4.c for a summary comparison of impacts to soil resources from each alternative. Definitions of the qualitative impact categories are provided in Section 4.4.4.

Table 4.4.c Comparison of Impacts to Soil Resources on USARAK Lands by Alternative.

Impact Issue	Alternatives				
	1 No Action	3 Transform With New Infrastructure		4 Transform With New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Fort Wainwright					
Main Post					
Soil	Minor	Moderate	Moderate	Moderate	Moderate
Permafrost	Minor	Moderate	Moderate	Moderate	Moderate
Tanana Flats Training Area					
Soil	Minor	Moderate	Moderate	Moderate	Moderate
Permafrost	Minor	Moderate[1]	Moderate[1]	Moderate[1]	Moderate[1]

Table 4.4.c cont. Comparison of Impacts to Soil Resources on USARAK Lands by Alternative.

Impact Issue	Alternatives				
	1 No Action	3 Transform With New Infrastructure		4 Transform With New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Yukon Training Area					
Soil	Minor	Moderate	Moderate	Moderate	Moderate
Permafrost	Minor	Moderate[1]	Moderate[1]	Moderate[1]	Moderate[1]
Donnelly Training Area					
Soil	Minor	Moderate[1]	Moderate[1]	Moderate[1]	Moderate[1]
Permafrost	Minor	Moderate[1]	Moderate[1]	Moderate[1]	Moderate[1]
Fort Richardson					
Soil	Minor	Severe	Moderate	Severe	Moderate
Permafrost	None	None	None	None	None

[1] Impacts could be severe in localized areas with susceptible soil or permafrost characteristics.

4.4.5.2 Comparison of Alternatives 3 and 4

Both alternatives would result in transformation from the Current Force to SBCT. For USARAK as a whole, Alternative 4 would result in slightly higher numbers of personnel and equipment, but construction projects would remain the same. Training intensity would be slightly higher. Under Alternative 4, impacts could potentially increase by 5-10% due to stationing, maneuver and weapons training, and use of additional equipment.

The primary difference between Alternatives 3 and 4 would result from the institutional matters. For Alternative 3, institutional matters relating to range management, Integrated Training Area Management, environmental management, and sustainable range management would remain essentially the same as the No Action Alternative. However, with Alternative 4, these four programs would be fully funded and implemented. Institutional matters for soil resources would involve implementation of INRMPs, ecosystem management, the TARP, and sustainable range management (Appendix H). The result would be improved environmental management of USARAK lands.

4.4.6 Mitigation

4.4.6.1 Existing

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts. These mitigation measures are implemented as funding is available. Funding often only provides for partial implementation.

- Comply with training exercise regulations as stipulated by USARAK Range Regulation 350-2.
- Use environmental limitations maps to determine when and where USARAK units can train effectively while limiting environmental disturbance.

- Apply Integrated Training Area Management program to inventory and monitor, repair, maintain, and enhance training lands.
- Use Land Condition Trend Analysis program and the Land Rehabilitation and Maintenance program to inventory land conditions, monitor vegetation trends, repair damaged areas, and minimize future damage.
- Obtain wetlands permits to conduct military training in wetland areas.
- Implement programs to track munitions usage.
- Use the Range Facilities Management Support System and input range use data.
- Implement recreational vehicle use policy on installation lands.
- Implement a soil and water monitoring program for DTA and YTA in response to mitigation proposed in the Withdrawal EIS.

4.4.6.2 Proposed

Some programs already propose measures that would mitigate many impacts to soil and permafrost. These programs are only partially implemented and funded. The proposed mitigation for Alternative 4 is to fully implement plans and projects that have already been identified by USARAK's INRMPs and other plans. These projects and plans are further described in Appendix H. Additional mitigation measures are also listed below.

Mitigation is proposed to implement future studies needed to successfully mitigate maneuver impacts. Permafrost studies would identify areas sensitive to maneuver damage. Other studies would monitor impacts to compare to preliminary maneuverability modeling results. These results would make future impact modeling more accurate.

- Conduct maneuverability analysis of Strykers and associated military vehicles during seasonal variation of soil conditions to define operational limitations.
- Collect Stryker maneuver data to support and calibrate maneuverability modeling studies (no data currently exist).
- Conduct maneuverability analysis of Tanana Flats.
- Assess ground truth soil conditions for potential high-use maneuver locations.
- Conduct permafrost mapping, sensitivity analysis, and model development.
- Analyze seasonal ground strength for maximizing training land use.
- Study the effects of fire on active layer thickness and permafrost degradation on maneuver lands.
- Conduct real-time analysis of ground conditions to support maneuver land use.
- Expand the planned soil and water monitoring program to include all USARAK lands.

4.5 SURFACE WATER

This section analyzes and compares the surface water impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.5.

4.5.1 Background

Surface waters on U.S. Army Alaska (USARAK) lands are diverse, with major differences stemming from origin and location. Most surface waters on interior Alaska lands are glacial in nature, with the exception of the Chena and Salcha rivers on Yukon Training Area (YTA). Fort Richardson (FRA) waterways are primarily non-glacial, with the exception of Eagle River.

Water quality on all USARAK properties is good. All waters on posts are within state water quality standards. Detailed information on current status of USARAK surface water resources can be found in Section 3.5.

4.5.2 Review of Impacts to Surface Water

Military and non-military activities on USARAK lands can affect surface water in a number of ways. USARAK acts as a steward for waterways on its properties and is responsible for maintaining the quality of the resource. This requires management for both military and non-military activities that affect surface waters on Army lands.

Impacts can occur in the following ways:

- The rate at which surface water flows at a certain point can be altered, as water is redirected or otherwise reduced upstream.
- Bank-side erosion occurs at stream crossing points and can lead to sedimentation and changes in stream shape.
- Channel morphology can be changed with erosion and sedimentation, and changes the shape of the watercourse.
- Sediment loads in surface water can increase with the addition of soils and dust to the water.
- Stream width can be altered due to erosion or sedimentation, such as at crossing points or at sediment settling areas.
- Water temperature can be altered, which affects the aquatic biota community.
- Water chemistry can be impacted with the addition of chemical constituents, minerals, or elements to the waterway.

4.5.3 Activity Groups That Affect Surface Water

The textbox below lists activity groups that could affect surface water due to transformation.

Activity Groups with Impacts	Activity Groups Without Impacts
• Stationing • Construction • Training • Systems Acquisition • Institutional Matters	• Deployment

4.5.3.1 Stationing

Transformation would result in additional personnel stationed at Fort Wainwright (FWA) and FRA (Table 4.1.a). The increase in troops stationed on USARAK properties could affect surface water due to increased water use, non-point source pollution, and increased training impacts in some areas.

4.5.3.2 Construction

Proposed construction projects associated with transformation include the company operations facilities at FWA; the unmanned aerial vehicle (UAV) maintenance support facility at Donnelly Training Area (DTA); and the mission support training facility, new barracks facilities, and development of the Port of Anchorage deployment staging area at FRA (Appendix D). Construction impacts could affect surface water through altered runoff and overland flow patterns, as well as sedimentation.

4.5.3.3 Training

The frequency and intensity of maneuver and weapons training could increase if USARAK were to transform (Table 4.1.a). Increases in training could lead to increased sedimentation and decreased water quality.

4.5.3.4 Systems Acquisition

New equipment would be used under transformation, including the eight-wheeled 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) (Table 4.1.a). The Stryker will have a greater ecological impact during maneuver training than prior USARAK equipment, which could increase overland flow and sedimentation.

4.5.3.5 Institutional Matters

Institutional matters include USARAK management activities, land stewardship, policy and program implementation. Transformation is expected to change management processes, which should lead to better data collection and management. This would improve stewardship of USARAK lands and resources. Management activities included in the Integrated Natural Resources Management Plans and the Integrated Training Area Management program would benefit surface waters.

4.5.4 Comparison of Alternatives

4.5.4.1 Description of Methodology

Analysis of surface water impacts is based on multiple factors from the activity groups associated with transformation. Impacts to water resources may stem from direct impacts to other affected resources, such as soils and vegetation. These have the potential to alter flow dynamics and water quality. Direct impacts to water resources can be expected from increased water use due to increased troop numbers and from chemical constituents that might be inadvertently introduced to the water.

Due to a lack of predictive models or data availability, qualitative analyses are used. Qualitative analyses use historic and scientific data to predict positive or negative change to surface water.

The following categories would be used in qualitatively assessing impacts to surface waters on USARAK lands:

- None – No measurable impact is expected to occur.
- Minor – Impacts are expected to occur; impacts would be measurable and may have a slight impact to aquatic biota or downstream use.
- Moderate – Impacts are expected to occur; impacts would be noticeable and would have a measurable effect on aquatic biota or downstream use.
- Severe – Impacts are expected to occur; impacts would be obvious and would have serious consequences to aquatic biota or downstream use.
- Beneficial – Impacts are expected to improve water resources.

The first two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to surface water are presented in 4.5.6, Mitigation.

4.5.4.2 Fort Wainwright

4.5.4.2.1 Alternative 1 (No Action)

Impacts to water resources on FWA Main Post are expected to occur (Table 4.5.a). However, these impacts would be minor to nonexistent. Construction activities related to mission-essential projects would occur on Main Post, and these would have some impact. Currently, mission-essential facilities have been proposed for Main Post (Chapter 2, Table 2.2.b). However, these impacts are expected to be short term and minor, due to USARAK's standard operating procedures for construction.

Fugitive dust emissions and direct runoff from disturbed construction areas would increase sedimentation of local waterways such as the Chena River. Construction that does not occur on previously disturbed or paved areas would increase the amount of direct runoff to surface waters and increase surface flow. MIMs on Main Post are expected to remain constant, at 650 (Chapter 2, Table 2.2.f). Impacts would be minor to negligible, due to institutional controls, the secondary nature of the impacts, and the high base sediment levels in the Chena River.

Impacts to water resources on Tanana Flats Training Area (TFTA) would be insignificant under the No Action Alternative. Training on TFTA occurs only in winter, mitigating most impacts. Winter-only training is expected to continue under this alternative. Ice bridge formation would continue, and therefore bank-side erosion at the approaches to ice bridge locations is expected to occur. Bank-side erosion can lead to instability on the streambanks, sedimentation, and changes to channel morphology. However, the small, localized nature of bank-side erosion at ice bridge approaches indicates that impacts should be minor. Sedimentation impacts would also be minor, due to the localized nature of the impacts and the high base levels of sedimentation in many area waterways.

In addition, munitions impacts would continue on Alpha Impact Area, as well as at Blair Lakes Impact Area. USARAK artillery fires into the Alpha Impact Area. This generally occurs during the winter months from firing points located near Alpha Impact Area. This activity is expected to continue in the same format. USARAK would continue to use the training area as it is currently used, with the same resource management programs.

Impacts to water resources on YTA would be minor under this alternative. New mission-essential ranges are currently planned for the training area, and USARAK would continue to use the existing system of trails and roads during training. YTA would be used year-round for maneuver and weapons training, and minor impacts would continue from these activities.

Maneuvers, especially non-winter maneuver training, would lead to soil compaction. This could increase overland flow to surface streams and might prevent percolation and groundwater recharge. In addition, bank-side erosion would occur at stream crossings on the training area. This could lead to increased sedimentation, heat absorption, decreased light penetration, and bank instability.

Munitions impacts would occur under the No Action Alternative. Both USARAK and the U.S. Air Force currently fire into Stuart Creek Impact Area, which might affect sediment loads and water quality. However, studies of munitions impacts in waterways have shown that impacts are minimal, and chemical constituent concentrations decrease rapidly over time and distance from impact (Ferrick et al. 2001; Houston 2002).

In comparison to current levels of disturbance, impacts on YTA under the No Action Alternative are expected to be minor. In addition, USARAK would continue to implement existing mitigation and natural resources management programs (USARAK 2002g).

4.5.4.2.2 Alternative 3 (Transform with New Infrastructure)

Impacts are expected on Main Post, stemming primarily from construction and stationing activities (Table 4.5.a). Construction activities associated with this alternative involve two company operations facilities in addition to the mission-essential projects identified in Chapter 2 (Table 2.2.b). Transformation would involve an end-state net increase of approximately 1,000 personnel at FWA, leading to greater water use on post. In addition, an increase in vehicular use, both military and off-duty, would increase non-point source pollution in the Fairbanks area. Construction activities on Main Post might also increase sediment levels. However, due to existing USARAK institutional controls and standard operating procedures, direct impacts from construction would be both short term and minor.

A relative increase in the frequency of petrochemical spills can be expected to occur with the increase in troops and vehicles. As discussed previously, petrochemical spills can lead to decreased water quality, as these chemicals can migrate to local waterways. Existing USARAK institutional controls would mitigate much of the release risk as well as environmental damage in the event of a petrochemical release.

Impacts to TFTA water resources under this alternative would be minor or negligible. TFTA is composed largely of wetlands and is inaccessible during non-winter months. Training would occur only when the training area is frozen and ice bridges can be constructed across the Tanana River.

Impacts to the training area could include the addition of new maneuver trails for the SBCT. If this occurs, the snow/ice matrix would buffer the soils against compaction. Although some vegetation damage would occur, a vegetative mat would remain, curtailing soil erosion and subsequent sedimentation. Also, more ice bridges could be constructed during winter on the training area. This would lead to bank-side erosion at more locations, which would increase the sediment in those waterways. Such erosion is not expected to have effects on channel morphology. Bank-side erosion impacts would be moderate, and sedimentation would be minor,

due to the localized nature of the impacts and the high base levels of sedimentation in many area waterways.

The use of munitions on Alpha Impact Area would increase under Alternative 3. Most munitions would be identical to those currently in use. The potential for sedimentation would increase, particularly with the addition of 155mm ordnance. This is a larger caliber than the munitions recently used on Alpha Impact Area. However, given the rate of water flow on Alpha Impact Area and the rate of chemical degradation, the impact from increased munitions is considered minor.

Bank-side erosion on YTA would be expected to be moderate while other impacts are expected to be minor to none. No construction impacts are expected to occur, as there are no transformation projects identified or proposed for the training area.

Due to the addition of vehicles and increased personnel, water quality is expected to decline slightly as sediment loads increase from erosion and direct water crossings on YTA. Most maneuver impacts would be located on the existing roads and trails, so sediment load increases would most likely be elevated in those watersheds that already have some slight military impact. Bank-side erosion at stream crossings is expected to increase significantly, due to both all-seasons use of the training area and the increased impact of the Strykers. This is expected to be a moderate impact.

4.5.4.2.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts on FWA under this alternative are expected to closely mirror those under Alternative 3. End-state impacts in some areas may be slightly greater than under Alternative 3, due to the possibility of the Airborne Task Force (ATF) using TFTA or YTA for large-scale training. ATF impacts on FWA surface waters are expected to be minor to none.

4.5.4.3 Donnelly Training Area

4.5.4.3.1 Alternative 1 (No Action)

Impacts under this alternative would be minor to none (Table 4.5.b). USARAK would use DTA as an all-seasons maneuver area, which would have continued 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 levels of sediment in area waterways.

The Army would also continue to use Oklahoma, Delta Creek, Washington, and Mississippi impact areas for munitions training. This would continue to deposit constituents from ordnance on these impact areas, with constituents entering Delta Creek and Delta River. However, studies have shown that concentrations of these constituents degrade rapidly over time and distance (Houston 2002; Ferrick et al. 2001). No downstream effects are expected. One chemical found in some munitions (2,4-DNT) does not degrade rapidly, but it is also much less prevalent and downstream concentrations have been below detectable limits (Houston 2002; Ferrick et al. 2001).

4.5.4.3.2 Alternative 3 (Transform with New Infrastructure)

This alternative would have impacts on DTA (Table 4.5.b). Bank-side erosion impacts would be expected to be moderate while other impacts would be minor to none. The MIMs on DTA are expected to increase by approximately 400% due to increases in vehicles and personnel, and the Strykers' maneuver impact. 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. Creation of new trails would lead to reduced vegetation, which can cause soil erosion and increased windborne sedimentation. Bank-side erosion at stream crossings and ice bridge approaches is expected to increase significantly over historic levels due to the increased frequency and magnitude of disturbance from the SBCT. In addition, increased sedimentation and localized widening of waterways would occur. Most of this is expected to 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. The SBCT would also use 155mm munitions, which would have a larger localized impact and could deposit a greater amount of munition constituent in the impact area. Impacts from the expected increase in sedimentation and effects on water quality are minor due to the rate of chemical decomposition and the slight degree of expected sediment increase.

4.5.4.3.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts on DTA would be slightly greater than those for Alternative 3. It is expected that the transition of the current 1-501st PIR, stationed at FRA, to an ATF would include large-scale training exercises on DTA. The ATF would conduct exercises two to four times a year on DTA.

Maneuver impacts from the ATF would be much smaller than those for the SBCT. The ATF, with a total force of approximately 1,000, would primarily use HMMWVs and MTVs as maneuver vehicles. In addition, some of its maneuvers would likely include airdrops and subsequent airlifts into and out of training areas.

A slight increase in bank-side erosion and sedimentation from the occasional ATF training on DTA is expected. In combination with impacts from the SBCT, bank-side erosion is expected to be moderate. Sedimentation is expected to be minor under this alternative, due to the localized nature of impacts and the high base levels of sediment in area waterways. No other impacts are expected beyond those listed under Alternative 3.

4.5.4.4 Fort Richardson

4.5.4.4.1 Alternative 1 (No Action)

Under this alternative, impacts are expected to be minor or none (Table 4.5.c). Some mission-essential construction is expected to occur, which would increase the amount of overland surface flow and potentially reduce percolation to groundwater. Current training would continue, and associated training impacts are expected to occur. This would result in elevated levels of sedimentation.

Artillery and mortar firing on Eagle River Flats Impact Area are expected to continue at the same frequency and magnitude, leading to localized sediment load increase. This would also deposit munitions constituents into the surface waters of Eagle River Flats. However, studies of munition constituents on the impact area have shown that most of these constituents decompose rapidly and

therefore concentrations degrade quickly over time and distance from impact (Ferrick et al. 2001; Houston 2002). Impacts are expected to be minor.

4.5.4.4.2 Alternative 3 (Transform with New Infrastructure)

Impacts would occur on FRA under this alternative (Table 4.5.c). One of the three battalions of the SBCT would be stationed at FRA for five to seven years and would conduct small-scale maneuver training on FRA and large-scale training on DTA. Increased vehicle use on FRA is expected to have minor impacts on overland surface flow due to increased soil compaction. Transformation would also lead to increased sedimentation due to the frequency and intensity of maneuver training. Given the extensive existing FRA trail system, impacts are expected to be moderate during the interim stage and minor at the end state.

Transformation would also require construction of additional facilities at FRA, as well as the Port of Anchorage staging area. Construction impacts are expected on FRA, including increased overland flow and runoff, decreased percolation to groundwater, and increased sedimentation due to direct runoff and fugitive dust. However, these impacts are expected to be minor. Existing USARAK institutional controls would further limit construction impacts.

Munitions use would increase approximately 70% under this alternative, from about 65,000 rounds to 108,000. Currently, Eagle River Flats Impact Area is utilized by the 1-501st PIR. This activity would continue, and in addition one SBCT infantry battalion would conduct live-fire training using the impact area. This would lead to increased localized sediment loads and concentrations of ordnance constituents in impact area waterways. However, the munition constituents would be identical to those currently in use. Studies have shown that these constituents degrade rapidly over time and distance from point of impact, so environmental effects would be minor (Houston 2002; Ferrick et al. 2001).

Refueling operations and petrochemical releases to the environment are expected to increase proportionally under this alternative. Inadvertent releases would occur at a proportionally higher rate than at present due to the increase in vehicles and personnel. These petrochemicals could affect surface water quality. However, existing USARAK institutional controls would reduce both the risk of inadvertent release and the environmental impact from a release. Impacts are expected to be minor.

Overall water use on FRA would increase under this alternative. Interim personnel numbers would increase significantly with an SBCT battalion stationed at FRA. The personnel increase represents less than 0.5% of the total population in the area. Due to the quantity of water available, the rate of recharge, and the relative increase in population, the increase in water use is expected to have no effect on water availability in the area. No impacts are expected.

4.5.4.4.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts, particularly long-term impacts, to FRA surface waters would increase. Under Alternative 4, the 1-501st PIR would become an ATF based at FRA. In addition, one of the three SBCT infantry battalions would be stationed at FRA for five to seven years. Sedimentation is expected to increase under this alternative due to the increase in MIMs. Impacts under this alternative are expected to range from moderate to none.

Impacts from increased frequency or intensity of munitions use are also expected. Based on training requirements, interim munitions use would increase approximately 225% and end-state munitions use would increase approximately 165% over the No Action Alternative. However,

some of these munitions would be expended on Interior training areas. As described in Section 3.5, Surface Water, munitions use on impact areas does not appear to lead to significant impacts to surface waters. Due to the expected increase in munitions use on Eagle River Flats and the low rates of sedimentation and water quality degradation, interim impacts would be moderate and end-state impacts would be minor.

4.5.5 Comparison of Alternatives Summary

4.5.5.1 Comparison of All Alternatives

Tables 4.5.a, 4.5.b, and 4.5.c present a summary of surface water impacts under each alternative. Definitions of the qualitative impact categories are provided in Section 4.5.4.

Table 4.5.a Surface Water Impacts on Fort Wainwright.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Bank-side Erosion	Minor	Moderate	Moderate	Moderate	Moderate
Surface Flow	Minor	Minor	Minor	Minor	Minor
Channel Morphology	None	Minor	Minor	Minor	Minor
Sedimentation	Minor	Minor	Minor	Minor	Minor
Stream Width	Minor	Minor	Minor	Minor	Minor
Water Temperature	None	None	None	None	None
Water Quality	Minor	Minor	Minor	Minor	Minor

Table 4.5.b Surface Water Impacts on Donnelly Training Area.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Bank-side Erosion	Minor	Moderate	Moderate	Moderate	Moderate
Surface Flow	Minor	Minor	Minor	Minor	Minor
Channel Morphology	None	None	None	None	None
Sedimentation	Minor	Minor	Minor	Minor	Minor
Stream Width	Minor	Minor	Minor	Minor	Minor
Water Temperature	None	None	None	None	None
Water Quality	Minor	Minor	Minor	Minor	Minor

Table 4.5.c Surface Water Impacts on Fort Richardson.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Bank-side Erosion	None	None	None	None	None
Surface Flow	Minor	Minor	Minor	Minor	Minor
Channel Morphology	None	None	None	None	None
Sedimentation	Minor	Moderate	Minor	Moderate	Minor
Stream Width	None	None	None	None	None
Water Temperature	None	None	None	None	None
Water Quality	Minor	Minor	Minor	Minor	Minor

4.5.5.2 Comparison of Alternatives 3 And 4

Both alternatives would result in transformation from the Current Force to SBCT. Alternative 4 would result in slightly higher numbers of personnel and equipment, but construction projects would remain the same. Training intensity would be slightly higher. The implications for surface water resources are that under Alternative 4, impacts could potentially increase by 5-10% due to stationing, maneuver and weapons training, and use of additional equipment. Impacts on FRA from Alternative 4 would be also long-term, as compared to the short-term impacts from the interim occupancy of one SBCT battalion.

The primary difference between Alternatives 3 and 4 involves institutional matters. For Alternative 3, institutional matters relating to range management, Integrated Training Area Management, environmental management, and sustainable range management would remain essentially the same as the No Action Alternative. However, with Alternative 4, these four programs would be fully funded and implemented. Institutional matters affecting surface water resources would also include full implementation of a Training Area Recovery Plan, an environmental management program, and an ecosystem management program, as well as soil and water quality monitoring. Detailed descriptions of these programs may be found in Appendix H. The result would be improved environmental management of USARAK lands.

4.5.6 Mitigation

4.5.6.1 Existing

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts. These mitigation measures are implemented as funding is available. Often funding only provides for partial implementation.

- Monitor USARAK water resources currently within the monitoring program. This would provide a baseline for surface water conditions on USARAK lands against which change could be detected and quantified.

- Continue to implement latest Integrated Natural Resources Management Plans (USARAK 2002e,f,g). These describe specific actions to preserve healthy surface water conditions.
- Maintain protective buffer zones along some waterways to reduce maneuver impacts. Buffer zones would reduce vegetation loss and sediment transport from areas directly adjacent to waterways, and would also reduce the deposition of fugitive dust, petrochemicals, and other chemicals resulting from maneuvers.

4.5.6.2 Proposed

Proposed mitigation for Alternative 4 is to fully implement plans and projects that have already been identified by USARAK's Integrated Natural Resources Management Plans and Integrated Training Area Management program. These projects and plans are further described in Appendix H. Additional mitigation measures are also listed below.

- Expand monitoring to include water resources on USARAK properties that are not currently being monitored. Priority monitoring should be conducted on those water resources for which no current or historic data exists. This would provide for much broader baseline scientific data regarding USARAK surface waters.
- Harden approaches to fords and ice bridges on anadromous creeks and rivers within training areas. Ensure that crossing would occur only at these approaches. Hardened approaches would reduce the amount of bank-side erosion and sedimentation occurring at crossing points.
- Rehabilitate maneuver trails and areas on a rotational basis to allow the freeze and thaw process to eliminate compaction and reduce the chance of channelized flow. Allowing an undisturbed freeze/thaw cycle would alleviate compaction on trails and reduce overland flow into nearby waterways.
- Modify current practices to reduce firing high explosive munitions into active river channels. Firing only into abandoned channels and banks would reduce the direct impact of munitions on waterways, including munition constituents and sedimentation.
- Place new targets further away from open waterways. Providing distance between waterways and targets would reduce the direct impact of munitions on waterways, including munition constituents and sedimentation.
- Promote vegetated buffer zones between small arms range footprints and lakes and streams. Vegetated buffer zones intercept runoff from the ranges, trapping sediment that can contain dissolved and particulate metals.

4.6 GROUNDWATER

This section analyzes and compares the groundwater impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.6.

4.6.1 Background

Groundwater flow varies greatly based on location. Groundwater quality is predominantly very good, although some areas on the Fort Richardson (FRA) and Fort Wainwright (FWA) cantonment areas have degraded groundwater and are currently undergoing remediation.

Complete information on the current state of groundwater resources on U.S. Army Alaska (USARAK) properties is described in Section 3.6.

4.6.2 Review of the Impacts to Groundwater

Impacts to groundwater resources on USARAK properties can occur from a number of activities. As primary steward of its properties, USARAK is responsible for the quality of groundwater resources on its lands. The sources of impacts to groundwater can be generally categorized by the characteristics listed below:

- Groundwater flow can be increased or decreased in an area, either by withdrawing water through wells or by diverting flow to or from other areas.
- Groundwater quality can be affected by changing the concentrations of non-water chemicals. Groundwater quality is generally harder to alter, however, because chemicals must usually filter through the soil to reach the groundwater table or aquifer. Groundwater also serves as a drinking water source in many parts of Alaska, including some areas near USARAK lands. However, studies specific to USARAK ranges demonstrate that many chemicals of concern, particularly those from munitions and ordnance, do not appear to migrate far from their impact location and often degrade in reducing conditions (Ferrick et al. 2001; Houston 2002).
- Alteration of permafrost can lead to changes in groundwater flow as it could connect surface water resources to groundwater or could connect high water tables with lower aquifers.
- Persistence of contaminants indicates the duration for which a groundwater constituent might be expected to remain in the water or how long it is expected to be an impact to the water quality. This is analyzed separately from groundwater quality due to the persistent nature of some contaminants, such as munitions residues.

4.6.3 Activity Groups That Affect Groundwater

The textbox below lists activity groups that could affect groundwater due to transformation.

Activity Groups With Impacts	**Activity Groups Without Impacts**
• Stationing • Construction • Training • Systems Acquisition • Institutional Matters	• Deployment

4.6.3.1 Stationing

Transformation would result in additional personnel stationed at FWA and FRA. The increase in troops stationed on USARAK properties could affect local groundwater resources through withdrawal, flow alteration or degradation.

4.6.3.2 Construction

Proposed construction projects associated with transformation include the company operations facilities at FWA; the unmanned aerial vehicle (UAV) maintenance support facility at Donnelly Training Area (DTA); and the mission support training facility, new barracks facilities, and development of the Port of Anchorage deployment staging area at FRA (Appendix D). Impacts to groundwater could occur due to ground disturbance, as well as permanent alteration of local ground structure. Detailed information on construction activities can be found in Appendix D.

4.6.3.3 Training

The frequency and intensity of maneuver and weapons training could increase if USARAK were to transform (Table 4.1.a). Increases in training could lead to decreased groundwater quality.

4.6.3.4 Systems Acquisition

New equipment would be used under transformation, including the eight-wheeled 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) (Table 4.1.a). Stryker use could lead to locally decreased groundwater recharge.

4.6.3.5 Institutional Matters

Institutional matters include USARAK management activities, land stewardship, policy and program implementation. Transformation is expected to change management processes, which should lead to better data collection and management. This would improve stewardship of USARAK lands and resources. Management activities included in the Integrated Natural Resource Management Plans (INRMP) and Integrated Training Area Management programs could protect and improve groundwater.

4.6.4 Comparison of Alternatives

4.6.4.1 Description of Methodology

Analyses of groundwater impacts are based on multiple factors from the activity groups associated with transformation (Section 4.6.3). Impacts to groundwater resources can be expected from water withdrawal due to increased troop numbers and the introduction of chemical constituents through leaching and percolation. Other groundwater resources are unlikely to be directly affected. Impacts to other resources, such as soils and surface water, could affect groundwater.

Due to a lack of predictive models and data availability, qualitative analyses are used. Qualitative analyses use historic and scientific data to predict positive or negative change to groundwater.

The following categories would be used in qualitatively assessing impacts to groundwater on USARAK lands:

- None – No measurable impact is expected to occur.
- Minor – Measurable impacts are expected to occur but would be limited and should have no secondary effects.
- Moderate – Impacts are expected to occur, would be noticeable and would have a measurable effect on secondary usage of groundwater.
- Severe – 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 two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to groundwater are presented in 4.6.6, Mitigation.

4.6.4.2 Fort Wainwright

4.6.4.2.1 Alternative 1 (No Action)

Construction on FWA Main Post might affect groundwater resources. Construction is planned for mission-essential facilities. Construction that does not occur on previously disturbed or 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.

Ongoing USARAK activities on Main Post have the potential to degrade groundwater quality, primarily through inadvertent release of chemicals, which could leach to 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. Such impacts are therefore considered to be minor.

Munitions impacts would continue on Tanana Flats (TFTA) and Yukon (YTA) training areas. USARAK would continue to utilize Alpha Impact Area, and Army and U.S. Air Force use would continue at Blair Lakes and Stuart Creek impact areas. Munitions impacts are expected to continue apace under this alternative and would affect sediment loads and water quality. However, studies of munitions impacts have shown that such impacts have minimal effects on groundwater, and munition constituent concentrations were below detectable limits (Houston 2002; Ferrick et al. 2001). TNT residue, a common munition constituent, biotransforms readily. Low precipitation and frozen conditions in Alaska prevent transport and mobilization of most munition residues. Reducing conditions present at many USARAK ranges degrade other munition residues such as RDX and HMX. Although 2,4-DNT has demonstrated greater persistence in the environment, its concentration is low. Impacts to groundwater are expected to be minor.

4.6.4.2.2 Alternative 3 (Transform with New Infrastructure)

A higher frequency of petrochemical spills could occur with the increase in troops and vehicles. Petrochemical spills can lead to decreased groundwater quality, as these can leach into the water table. Existing USARAK institutional controls would mitigate much of the release risk as well as

the actual environmental damage in the event of a petrochemical release. Impacts are expected to be minor due to low risk and existing institutional controls.

Stationing of approximately 1,000 additional personnel at FWA would lead to greater withdrawal of groundwater. The Fairbanks area is supplied from groundwater. This is expected to have a minor impact to local groundwater supply.

Construction could potentially affect groundwater resources on FWA Main Post. Transformation would require a company operations facility to be erected on Main Post, which could reduce the amount of water percolating into the local groundwater table. No impacts to groundwater flow from construction are expected.

Maneuver training could potentially impact groundwater resources on both TFTA and YTA. New trails would impact vegetation, which could affect any underlying permafrost. New trails are expected to be more extensive on TFTA where maneuvers only occur during winter. Less vegetation would be removed on these trails, but the potential to impact permafrost remains. This could affect groundwater resources by changing the interaction dynamics between groundwater and surface water, or between different groundwater tables. Impacts would be considered minor.

Munitions use would change under this alternative. A 50% increase in munitions use would occur on FWA (including DTA), from approximately 130,000 to 194,000 rounds per year. This would have the potential to affect groundwater resources on FWA due to leaching of petrochemicals and groundwater quality degradation. However, because of the low rate of dudding and the high rates of decay, this impact is considered minor.

4.6.4.2.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Under Alternative 4, impacts to FWA groundwater resources are expected to be identical to those listed under Alternative 3. The Airborne Task Force (ATF) under this alternative would be stationed at FRA and would probably use DTA for most or all of its large-scale training exercises. Additional impacts to groundwater resources are not expected from ATF training.

4.6.4.3 Donnelly Training Area

4.6.4.3.1 Alternative 1 (No Action)

Under this alternative, impacts would be minor to none. USARAK would continue to use DTA as an all-seasons maneuver area. This would lead to soil compaction, overland surface flow, and may reduce percolation and groundwater recharge.

The Army would also continue to use Oklahoma, Delta Creek, Washington, and Mississippi impact areas for ordnance and munitions training. This would deposit munition constituents from ordnance on these impact areas. Studies of munitions impacts have shown that such impacts have minimal effects on groundwater, and munition constituent concentrations were below detectable limits (Houston 2002; Ferrick et al. 2001). TNT residue, a common munitions constituent, biotransforms readily. Low precipitation and frozen conditions in Alaska prevent transport and mobilization of most munition residues. Reducing conditions present at many USARAK ranges degrade other munition residues such as RDX and HMX. Although 2,4-DNT has demonstrated greater persistence in the environment, its concentration is low. Impacts to groundwater are expected to be minor.

4.6.4.3.2 Alternative 3 (Transform with New Infrastructure)

This alternative would have minor to no impacts on DTA. Conducting all-seasons maneuver training with the Stryker is expected to lead to increased maneuver impacts. The MIMs on DTA are expected to increase by approximately 400% due to increases in vehicles and personnel, and the Strykers' maneuver impact. Soil compaction from increased use of existing trails and the creation of new trails would lead to greater overland flow and may reduce groundwater percolation.

Munitions training is expected to increase due to the number of troops in the SBCT and their training requirements. The SBCT would also use 155mm munitions, which are expected to have a larger localized impact and could deposit a greater amount of chemical constituent in the impact area. However, the chemical constituents involved would be identical to those present in currently used ordnance. Projected munitions impacts to DTA groundwater are minor.

4.6.4.3.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Under this alternative, groundwater on DTA may receive slightly greater impacts than under Alternative 3. It is expected that the Airborne Task Force would use DTA for large-scale exercises. This may also include the use of HMMWVs, MTVs, and artillery fire into impact areas.

Impacts under Alternative 4 could result in altered groundwater flow and chemistry. Munitions use on the training area could leach into the local groundwater. However, as stated in Section 3.6, Groundwater, studies show that most constituents in munitions and ordnance degrade rapidly, thereby posing little environmental risk. Munition impacts to groundwater are expected to be minor.

All other impacts are expected to be similar to those listed under Alternative 3.

4.6.4.4 Fort Richardson

4.6.4.4.1 Alternative 1 (No Action)

Under this alternative, mission-essential construction activities could impact groundwater resources on FRA. There are construction projects planned for FRA that would have the potential to increase overland flow and reduce precipitative contributions to groundwater. Impacts from construction are expected to be minor to none.

Munitions impacts on Eagle River Flats Impact Area are expected to continue. Artillery and mortar firing into the impact area would occur at the same frequency and magnitude. Studies of munitions impacts have shown that such impacts have minimal effects on groundwater, and munition constituent concentrations were below detectable limits (Houston 2002; Ferrick et al. 2001). TNT residue, a common munitions constituent, biotransforms readily. Low precipitation and frozen conditions in Alaska prevent transport and mobilization of most munitions residues. Reducing conditions present at Eagle River Flats degrade other munition residues such as RDX and HMX. Although 2,4-DNT has demonstrated greater persistence in the environment, its concentration is low. Impacts to groundwater are expected to be minor.

4.6.4.4.2 Alternative 3 (Transform with New Infrastructure)

This alternative is expected to have some impacts on FRA groundwater resources. However, all impacts due to transformation are expected to be short term. One of three SBCT infantry battalions would be stationed at FRA during the interim phase, and would conduct small-scale maneuver training on FRA and large-scale training on DTA.

Transformation would require construction of additional facilities at FRA, including a mission support training facility, a 60-person barracks, and the Port of Anchorage staging area. Construction impacts would include increased overland flow and runoff and decreased percolation to groundwater. These impacts are expected to be minor.

Compared to current levels, munitions training during the Alternative 3 interim phase would increase by about 125% and by approximately 65% during the end state. Eagle River Flats Impact Area would be utilized by the 1st Battalion, 501st Parachute Infantry Regiment as well as the SBCT infantry battalion stationed at FRA. However, the munition constituents would be identical to those currently in use. Studies have shown that these constituents degrade rapidly over time and distance from point of impact, so environmental effects on groundwater would be limited (Houston 2002; Ferrick et al. 2001). Impacts are expected to be minor.

Refueling operations and petrochemical releases to the environment are expected to increase under this alternative. Inadvertent releases would occur at a higher rate than at present due to the increase in vehicles and personnel. These petrochemicals could affect groundwater quality. However, existing USARAK institutional controls would reduce both the risk of inadvertent release and the environmental impact from a release. Impacts are expected to be minor.

4.6.4.4.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Under Alternative 4, long-term impacts are expected to revert to near current levels. The 1-501st Parachute Infantry Regiment, currently stationed at FRA, would become an ATF. Stationing at FRA would increase by about 1,000 during the interim and by 300 at the end state. This would lead to a greater long-term impact on FRA than under the No Action Alternative. However, the footprint of the Airborne Task Force is small, and maneuver impacts are not expected to affect groundwater.

The modification to an ATF would increase weapons impacts on groundwater. Given the greater number of troops stationed at FRA, it is expected that artillery and munitions use would increase about 225% during the interim phase and by 165% at end state. However, as described under Alternative 3, impacts to groundwater are expected to be minor due to the rate of constituent degradation.

4.6.5 Comparison of Alternatives Summary

4.6.5.1 Comparison of All Alternatives

Table 4.6.a presents a summary of groundwater impacts under each alternative. Definitions of the qualitative impact categories are provided in Section 4.6.4.

Table 4.6.a Summary of Impacts to Groundwater on USARAK Lands.

Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Fort Wainwright					
Groundwater Flow	Minor	Minor	Minor	Minor	Minor
Groundwater Chemistry	Minor	Minor	Minor	Minor	Minor
Persistence	Minor	Minor	Minor	Minor	Minor
Water Use	Minor	Minor	Minor	Minor	Minor
Donnelly Training Area					
Groundwater Flow	None	Minor	Minor	Minor	Minor
Groundwater Chemistry	Minor	Minor	Minor	Minor	Minor
Persistence	Minor	Minor	Minor	Minor	Minor
Water Use	None	None	None	None	None
Fort Richardson					
Groundwater Flow	Minor	Minor	Minor	Minor	Minor
Groundwater Chemistry	Minor	Minor	Minor	Minor	Minor
Persistence	Minor	Minor	Minor	Minor	Minor
Water Use	None	None	None	None	None

4.6.5.2 Comparison of Alternatives 3 and 4

Both alternatives would result in transformation from the Current Force to SBCT. Alternative 4 would result in higher numbers of personnel and equipment, but construction projects would remain the same. Training intensity would be higher. The implications for groundwater resources are that under Alternative 4 impacts could potentially increase by 5-10% due to stationing, maneuver and weapons training. Impacts on FRA from Alternative 4 would be also long-term, as compared to the short-term impacts from stationing of one SBCT battalion during the interim phase.

The primary difference between Alternatives 3 and 4 involves institutional matters. For Alternative 3, institutional matters relating to range management, Integrated Training Area Management, environmental management, and sustainable range management would remain essentially the same as the No Action Alternative. However, with Alternative 4, these four programs would be fully funded and implemented. Institutional matters affecting groundwater

would also 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 Appendix H. The result would be improved environmental management of USARAK lands.

4.6.6 Mitigation

4.6.6.1 Existing

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts. These mitigation measures are implemented as funding is available. Often funding only provides for partial implementation.

- Continue monitoring groundwater resources currently within the USARAK monitoring program. This would provide an updated baseline for analysis of groundwater changes or impacts.
- Continue to implement INRMPs, including institutional controls and training programs for troops, to reduce or eliminate the risk of inadvertent petrochemical releases that could affect groundwater (USARAK 2002e,f,g). The INRMPs contain specific actions to maintain and improve USARAK groundwater resources.

4.6.6.2 Proposed

Proposed mitigation for Alternative 4 is to fully implement plans and projects that have already been identified by USARAK's INRMPs and Integrated Training Area Management. These projects and plans are further described in Appendix H. Additional mitigation measures are also listed below:

- Expand 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 USARAK groundwater.

4.7 WETLANDS

Issue C: Wildlife and Habitat. Issue D: Maneuver Impacts. During the public scoping process, USARAK and the public identified the impact of the proposed action on wetlands as an issue of concern. It is therefore evaluated in this EIS (see Section 1.8, Scoping Issues of Concern).

This section analyzes and compares the wetland impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.7. Additional wetlands information is presented in Appendix F.

4.7.1. Background

Wetlands are important ecological resources that comprise significant portions of U.S. Army Alaska (USARAK) lands. Approximately 54% of Fort Wainwright (FWA), 68% of Donnelly Training Area (DTA), and 8% of Fort Richardson (FRA) are classified as wetlands, totaling approximately 970,000 acres. Section 3.7 describes the importance and distribution of wetlands at USARAK installations.

Use and management of wetlands on USARAK lands are regulated by the Rivers and Harbors Act of 1899; Section 404 of the Clean Water Act; Executive Order 11990, *Protection of Wetlands;* the Sikes Act, which requires the development and implementation of Integrated Natural Resources Management Plans (INRMPs); and the Military Land Withdrawal Act PL 106-65.

4.7.2 Review of Impacts to Wetlands

Damage to wetlands from military activity occurs from off-road maneuvers and weapons training during summer when the wetlands are unfrozen (Radforth and Burwash 1977). Impacts of military operations to vegetation include breaking and crushing of plants and disturbance to soils or wetland substrate. Unintentional removal of vegetation from clearing with heavy equipment has also resulted in wetland degradation. These off-road impacts are less harmful during winter when wetlands are frozen and snowpack protects vegetation.

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 decrease lag time of water flow during runoff events
- Decreased volume of water flowing during low flow
- Loss of erosion control
- Loss of streambank stability
- Loss of riparian habitats
- Loss of highly productive fish and wildlife habitat
- Increased water temperatures during summer
- Loss of organic matter in water, resulting in lower productivity
- Loss of filtering capacity so sediments and pollutants flow through the system more readily
- Loss of permafrost or creation of thermokarst conditions

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. Maneuver impacts could decrease plant cover and densities of woody vegetation, resulting in reduced wetland function and habitat quality.

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 changes in soil properties. Soil erosion and transport may increase due to a loss in stability from the removal of vegetative cover and the underlying supportive root system.

Damage to wetlands in northern climates such as Alaska can affect the insulating layer that protects permafrost (Section 4.4, 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.

Wetlands can also be lost during construction of roads, buildings, or other structures. Finally, pollutants and hazardous materials associated with military operations have the potential to affect wetlands.

4.7.3 Activity Groups That Affect Wetlands

The textbox below lists activity groups that could affect wetlands due to transformation.

Activity Groups With Impacts	Activity Groups Without Impacts
• Stationing • Construction • Training • Systems Acquisition • Institutional Matters	• Deployment

4.7.3.1 Stationing

Transformation would result in additional personnel stationed at FWA and FRA (Table 4.1.a). Increased personnel under SBCT transformation would result in increased use of wetlands for training or recreation, which could result in adverse impacts.

4.7.3.2 Construction

Proposed construction projects associated with transformation include the company operations facilities at FWA; the unmanned aerial vehicle (UAV) maintenance support facility at DTA; and the mission support training facility, new barracks facilities, and development of the Port of Anchorage deployment staging area at FRA (Appendix D). Proposed SBCT construction projects would be in cantonment areas where little or no direct impacts to wetlands are expected. However, erosion from construction could occur and result in short-term increases of sedimentation to wetlands. Wetland permitting, which is regulated by the U.S. Army Corps of Engineers, would be required if construction were to impact wetlands.

4.7.3.3 Training

The frequency and intensity of maneuver and weapons training could increase if USARAK were to transform (Table 4.1.a). Increased maneuver and artillery training with the SBCT would cause direct and long-term impacts to wetlands. Maneuvers can directly or indirectly alter the composition of plant communities and vegetative structure. Predicted impacts are measured by maneuver impact miles (MIMs) and results of the Stryker mobility study (Section 4.4, Soil Resources).

If wetlands are disturbed and soils are overturned, small annual plants or invasive species often replace large perennial plants. Maneuver impacts could decrease plant cover and densities of woody vegetation in wetlands, resulting in reduced wetland function and habitat quality. In severe cases, damaged plant communities could be replaced by lower quality plant communities.

Severe adverse impacts would be expected if the Stryker vehicle was used in summer. Use of the Stryker vehicle in wetlands during summer, however, is not likely because the vehicles quickly become stuck. This would also result in wetland degradation (Bagley, unpublished data). 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. Other training impacts to wetlands include clearing bivouac sites and digging artillery and tank trenches.

High explosive munitions requirements are expected to change under SBCT transformation. An increase would result in moderate physical disturbances to wetland areas. Impacts, however, would be limited to existing impact areas.

Finally, pollutants and hazardous materials associated with military training have the potential to affect wetlands.

4.7.3.4 Systems Acquisition

New equipment would be used under transformation, including the eight-wheeled 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) (Table 4.1.a).

4.7.3.5 Institutional Matters

Institutional matters include USARAK management activities, land stewardship, policy and program implementation. Transformation is expected to change management processes, which should lead to better data collection and management. This would improve stewardship of USARAK lands and resources.

4.7.4 Comparison of Alternatives

4.7.4.1 Description of Methodology

The following definitions would be used to categorize potential impacts:

- None – No measurable impact is expected to occur.
- Minor – Impacts would be expected to occur, but these would be slight or temporary and no restoration would be anticipated.
- Moderate – Noticeable impacts would be expected to occur. The effects would be measurable on wetlands, including compaction of wetland soil, disturbance to vegetation, and reduced vegetation.

- Severe – Impacts are expected to occur and would be obvious and have serious consequences to wetlands. This could lead to permanent degradation of wetland vegetation, wetland soils, and permafrost.
- Beneficial – Some impacts may be beneficial to wetlands. Beneficial impacts include actions or policies designed to reduce wetland disturbance or enhance wetland protection.

The first two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to wetlands are presented in 4.7.6, Mitigation.

4.7.4.2 Fort Wainwright

See Appendix A, Figures 3.7.d and 3.7.e for wetland distribution on FWA and Figure 3.7.a for the environmental limitations overlay of FWA.

4.7.4.2.1 Alternative 1 (No Action)

Minor adverse impacts to wetlands are expected to occur from training under the No Action Alternative (USARAK 1999a, 2000). Up to 40 acres per year of wetlands per post can be impacted for military training under USARAK's five-year wetland permit. Monitoring is required under the permit and would continue. Monitoring for 2000 and 2001 indicated that approximately 3.5 acres were damaged each year (Walsh 2001; Mason 2002). Disturbed sites would continue to be monitored and rehabilitated.

Maneuver training would remain at levels similar to today. At Tanana Flats Training Area (TFTA), wetland impacts would be minor because of current environmental limitations, the training area's inaccessibility during summer, and the required presence of adequate frost depth in winter. Minor impacts could occur in some low wetland areas on Yukon Training Area (YTA). In winter, impacts should be minor at YTA when wetlands are frozen.

Currently planned construction activities are located in the cantonment area. While impacts are not expected (Stout 2002a), wetland permits would be obtained if required. Development of the ranges could affect approximately 324 acres of wetlands on Main Post (Stout 2002d).

High explosive munitions use would remain at current levels and be limited to existing impact areas.

4.7.4.2.2 Alternative 3 (Transform with New Infrastructure)

Interim stationing would be similar to current levels, but the end-state stationing (after 2010) would result in approximately 1,000 additional Soldiers at FWA compared to the No Action Alternative (Table 2.3.a). The increased number of personnel, as well as associated increases in civilians, could increase recreational pressures on FWA wetlands at the Main Post, TFTA and YTA.

Construction of the company operations facilities would occur in the cantonment area at a site with previously disturbed soils and vegetation (Appendix D). Although the area is designated as non-wetland, some wetlands exist near the site. A wetlands delineation and permit would be required prior to any construction.

Use of the Stryker vehicle could cause increased damage to wetlands. Although total maneuver space requirements would decrease, training intensity would increase at FWA. Maneuver

impact miles in training areas (Main Post, TFTA and YTA combined) would increase during transformation from about 11,500 MIMs/year to about 69,000 MIMs/year at the end state. This could cause increased damage to wetlands (Table 4.7.a). The changes could require a new Section 404 wetlands permit.

Impacts to wetlands in Main Post, TFTA, and YTA could be moderate. The Stryker mobility maps indicate which areas are most maneuverable for Strykers in summer and winter (Appendix A, Figure 4.4.a). At TFTA, wetland impacts could be moderate, although much of the training area is inaccessible during summer. Additionally, the wetlands permit requires a minimum of 6 inches of snowpack for areas designated as yellow in the environmental limitations overlay (Appendix A, Figure 3.7.a). This would minimize winter damage. The potential for moderate or severe impacts exists with Stryker use in localized lowland areas where wetlands are found on YTA. In winter, impacts should be minor at YTA when wetlands are frozen and in areas designated as yellow in the environmental limitations overlay (Appendix A, Figure 3.7.a).

Compared to the No Action Alternative, required high explosive munitions expenditures would increase by about 20% during the interim phase and by approximately 50% at end state. Note that the use of high explosive munitions in impact areas at FWA and DTA (combined) would increase by approximately the same proportion. Any increase in damage to wetlands from high explosive munitions would be restricted to impact areas.

Due to existing environmental regulations, direct adverse impacts to wetlands would be minimized under Alternative 3. Wetlands would be monitored and any damaged areas would be rehabilitated.

4.7.4.2.2 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

The number of personnel stationed at FWA would be similar to Alternative 3. Construction activities would be identical to those of Alternative 3, and construction of the company operations facilities would require wetland permits. Maneuver impacts would be slightly less than Alternative 3. Under Alternative 4, about 67,000 MIMs/year would be required at end state. Munitions requirements and subsequent impacts would remain similar to Alternative 3. Impacts to wetlands would be moderate.

Improved management of wetlands would occur through full funding and implementation of institutional matters.

4.7.4.3 Donnelly Training Area

See Appendix A, Figure 3.7.f for wetland distribution on DTA and Figure 3.7.b for the environmental limitations overlay of DTA.

4.7.4.3.1 Alternative 1 (No Action)

Minor adverse impacts to wetlands would occur under the No Action Alternative, primarily from maneuver and weapons training (USARAK 1999a, 2000). Impacts of up to 40 acres per year are permissible under USARAK's wetland permit. Affected areas would be monitored and rehabilitated. Updated wetland permits would be required from the U.S. Army Corps of Engineers. High explosive munitions use would remain at current levels. These impacts would be localized and in existing impact areas.

4.7.4.3.2 Alternative 3 (Transform with New Infrastructure)

The proposed construction of the UAV maintenance facility may impact wetlands because ponds and wetlands lie within the projected site location (Appendix D). A wetlands permit would be required from the U.S. Army Corps of Engineers prior to development.

Use of the Stryker vehicle on training lands at DTA would result in increased damage to wetlands (Table 4.7.a). Maneuver impact miles would increase during transformation from under 17,000 to over 86,000 MIMs/year at the end state. Maneuver space requirements would increase from about 15,000 km^2 under the No Action Alternative, to over 65,000 km^2 under Alternative 3. These changes could cause increased impacts to wetlands. Due to existing environmental regulations, direct adverse effects to wetlands would be minimized, but a new permit would be required if wetland damage exceeds 40 acres a year.

The Stryker mobility maps depict DTA West as inaccessible during summer by vehicle, so wetland impacts in DTA West would not be expected (Appendix A, Figure 4.4.b). The frost depth during winter renders most of DTA West as maneuverable during winter. During summer, most the southern portion of DTA East is accessible if vehicles travel slowly, whereas the northern portion is inaccessible. However, the Jarvis Creek area (in DTA East) is not accessible, primarily due to soil and wetland conditions. During winter, most of DTA is maneuverable, but the floodplains along the Delta River and Jarvis Creek are not accessible.

Compared to the No Action Alternative, total required munitions requirements would increase by about 20% during the interim phase and by approximately 50% at the end state. Note that the use of high explosive munitions in impact areas at FWA and DTA (combined) would increase by approximately the same proportion. Any increase in damage to wetlands from high explosive munitions would be restricted to impact areas.

Due to increases in training, impacts to wetlands could be moderate.

4.7.4.3.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Construction activities would be identical to Alternative 3, thus any impacts to wetlands would not differ.

Maneuver training space requirements would be about 7% more under Alternative 4 compared to Alternative 3. Other training requirements, including MIMs, munitions use, and systems acquisition, would remain similar to Alternative 3. Impacts would be moderate.

Improved management of wetlands would occur through full funding and implementation of institutional matters.

4.7.4.4 Fort Richardson

See Appendix A, Figure 3.7.g for wetland distribution on FRA and Figure 3.7.c for the environmental limitations overlay of FRA.

4.7.4.4.1 Alternative 1 (No Action)

Minor impacts to wetlands would occur under the No Action Alternative (USARAK 2002f), but disturbed sites would be monitored and rehabilitated. Construction activities within the cantonment area are not expected to result in wetland damage. Additional wetland permits may be required from the U.S. Army Corps of Engineers.

Training area requirements, MIMs, and high explosive munitions use would remain at current levels. Impacts from munitions would be limited to existing impact areas.

4.7.4.4.2 Alternative 3 (Transform with New Infrastructure)

The proposed construction of the mission support training facility, barracks, and the Port of Anchorage staging area are not expected to affect wetlands because these facilities would be constructed on sites that have been previously developed.

Maneuver impact miles would increase during transformation from 3,300 MIMs/year to approximately 10,600 MIMs/year during the interim phase. End-state maneuver impacts would decrease to approximately 3,500 MIMs/year, which is close to current levels. End-state maneuver space requirements under the Alternative 3 would increase by 77% compared to the No Action Alternative. These changes could contribute moderate impacts to wetlands in the interim phase but would be minor at end state. These impacts could be minimized by ensuring that regulations and restrictions are followed.

Compared to the No Action Alternative, high explosive munitions use on Eagle River Flats is expected to increase by approximately 80,000 rounds (125%) per year during the interim phase of Alternative 3, and by about 43,000 rounds (65%) at end state. This increase is expected to result in moderate physical disturbance to wetland areas at FRA. However, these impacts would remain localized to existing impact areas. Total munitions expenditures would approximate current levels at end state. Overall training impacts at FRA would be moderate during the interim phase but minor during the end state.

Although increased wetland impacts would be expected (Table 4.7.a), compliance with environmental regulations would minimize adverse effects. Wetlands would be monitored, and any damaged areas would be rehabilitated.

Implementation of institutional matters would improve upon current monitoring and management of wetlands.

4.7.4.4.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Due to the addition of the Airborne Task Force, interim phase stationing at FRA would increase by about 60% and by 24% at end state as compared to the No Action Alternative. The influx of personnel could result in increased recreational demands on wetland resources.

Construction activities would be identical to Alternative 3. Training levels would be greater under Alternative 4 compared to Alternative 3. Use of high explosive munitions would increase approximately 225% during the interim phase and 165% at end state. End-state maneuver space requirements would increase by about 170% compared to current requirements. Requirements for MIMs would increase to approximately 10,600 MIMs/year during the interim phase (a more than three-fold increase compared to the No Action Alternative) and to 8,000 MIMs/year at end state (about two-and-a-half times more than the No Action Alternative). These changes could increase impacts to some wetlands. Acquisition of additional weapons systems and vehicles would also be needed under Alternative 4. Overall training impacts at FRA would be moderate during the interim phase but minor at the end state.

Monitoring and management could mitigate any additional wetland damage from increased training demands. Moreover, full funding and implementation of institutional matters would result in improved wetlands management.

4.7.5 Comparison of Alternatives Summary

4.7.5.1 Comparison of All Alternatives

See Table 4.7.a for a summary comparison of impacts to wetlands from each alternative. Definitions of the qualitative impact categories are provided in Section 4.7.4.

Table 4.7.a Comparison of Impacts to Wetlands on USARAK Lands.

Impact Issue	Alternative				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Fort Wainwright					
Main Post					
Impact type	Minor	Moderate	Moderate	Moderate	Moderate
Acres impacted	0-4	20-40+	40+	20-40+	40+
Tanana Flats Training Area					
Impact type	Minor	Moderate	Moderate	Moderate	Moderate
Acres impacted	0-4[1]	20-40+	40+	20-40+	40+
Yukon Training Area					
Impact type	Minor	Moderate	Moderate	Moderate	Moderate
Acres impacted	0-4	20-40+	40+	20-40+	40+
Donnelly Training Area					
Impact type	Minor	Moderate	Moderate	Moderate	Moderate
Acres impacted	0-4	20-40+	40+	20-40+	40+
Fort Richardson					
Impact type	Minor	Moderate	Minor	Moderate	Minor
Acres impacted	0-4	20-40+	0-4	20-40+	0-4

[1] Wetland disturbance from military operations was not detected in study areas of the Tanana Flats Training Area. Evidence of past disturbance was minimal or undetectable from aerial photographs (USARAK 2000).

4.7.5.2 Comparison of Alternatives 3 and 4

Both alternatives would result in transformation from the Current Force to SBCT. In general, Alternative 4 would result in slightly higher numbers of personnel and equipment, but construction projects would remain the same. Training intensities would be slightly higher with Alternative 4. The implications for wetlands management are that under Alternative 4, impacts could potentially increase by 5-15% due to stationing, maneuver and weapons training, and use of additional equipment (Chapter 2, Table 2.3.a).

The primary difference between Alternatives 3 and 4 would result from the institutional matters. For Alternative 3, institutional matters relating to range management, INRMP, environmental management, and sustainable range management would remain essentially the same as the No Action Alternative (Appendix H). However, with Alternative 4, these four programs would be fully funded and implemented. Implementation of institutional matters relating to wetlands would also include soil and water quality monitoring, a Training Area Recovery Plan, and ecosystem management. The result would be improved wetlands management on USARAK lands.

4.7.6 Mitigation

4.7.6.1 Existing

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts. These mitigation measures are implemented as funding is available. Often funding only provides for partial implementation.

- Continue to use and update environmental limitations overlays.
- Conduct planning-level surveys, wetlands management and revegetation plans.
- Continue implementation of INRMPs, with specific actions for management of wetlands (Appendix H).
- Continue to obtain wetland permits.
- Continue damage control measures.
- Continue implementation of recreational vehicle use policy, which places the same limitations on recreational access as those which already apply to military vehicles.

4.7.6.2 Proposed

Some programs already propose measures that would mitigate many impacts to wetlands. These programs are only partially implemented and funded. The proposed mitigation is therefore to fully implement plans and projects under Alternative 4 that have already been identified by USARAK's INRMPs, the Training Area Recovery Plan, and other plans associated with wetlands. These projects and plans are further described in Appendix H. Additional mitigation measures are also listed below.

- Implement additional wetlands mitigation on a case-by-case basis. This would ensure compliance with wetland regulations and conservation of wetland resources.
- Develop and maintain a wetlands database for each USARAK post that includes the spatial distribution of wetland types and historical damage levels. This would provide natural resources managers with information to help monitor and conserve wetland resources.
- Complete a survey of USARAK wetlands, including wetland type and location, to aid military operation coordinators in planning field exercises away from these areas. This would ensure conservation of wetlands.
- Conduct a detailed study to assess impacts of recreational vehicles to wetlands. This study would provide managers with information to be used for future conservation efforts.

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4.8 VEGETATION

This section analyzes and compares the vegetation impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.8.

4.8.1. Background

Alaska's training lands lie within the Subarctic ecoregion, and this area exhibits moderate to low resiliency to disturbance (Doe et al. 1999). Section 3.8 describes the distribution and composition of vegetation resources at U.S. Army Alaska (USARAK) installations.

4.8.2 Review of the Impacts to Vegetation

Damage to vegetation from military activity occurs from construction, off-road maneuvers, and weapons training. Off-road impacts are less harmful during winter when snow pack protects vegetation.

Impacts of military activities 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. Changes from large perennial plants to small annuals, decreases in plant cover, reduced densities of woody vegetation, and increases in introduced plant species have resulted from military maneuvers (Severinghaus et al. 1981; Goran et al. 1983; Shaw and Diersing 1990; Thurow et al. 1995; Jones and Bagley 1997).

Vehicles can indirectly affect plant communities through soil compaction and by altering competitive relationships (Milchunas et al. 1998, 1999). Use of vehicles 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, 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).

Jones (1993) reported that bivouac sites damage vegetation in forested areas by reducing overstory and understory stem density and species richness. Less ground cover resulted in increased bare ground and bulk soil density, with significant soil loss in some areas. Soil compaction occurred, resulting in crown dieback, although canopy cover was not significantly different between bivouac sites and non-bivouac sites. Fire from military activities impacts vegetation by altering age class diversity, which maintains diverse plant community. Fires are relatively frequent on military lands due to incendiary devices (Sections 3.11 and 4.11, Fire Management).

Management of invasive plant species is an issue of concern on USARAK lands. The Land Condition Trend Analysis 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 2002e,f,g).

4.8.3 Activity Groups That Affect Vegetation

The textbox below lists activity groups that could affect vegetation due to transformation.

Activity Groups With Impacts	Activity Groups Without Impacts
• Stationing • Construction • Training • Systems Acquisition • Institutional Matters	• Deployment

4.8.3.1 Stationing

Transformation would result in additional personnel stationed at Fort Wainwright (FWA) and Fort Richardson (FRA) (Table 4.1.a). This influx of personnel could result in increased recreational impacts to vegetation resources.

4.8.3.2 Construction

Proposed construction projects associated with transformation include the company operations facilities at FWA; the unmanned aerial vehicle (UAV) maintenance support facility at Donnelly Training Area (DTA); and the mission support training facility, new barracks facilities, and development of the Port of Anchorage deployment staging area at FRA (Appendix D). Development of the UAV maintenance facility would result in alteration or loss of approximately 0.5 acres of natural vegetation at DTA. Fugitive dust from these construction projects could occur and result in short-term impacts to vegetation. Any impacts to rare ecotypes or species of concern are not expected to occur.

4.8.3.3 Training

The frequency and intensity of maneuver and weapons training could increase if USARAK were to transform (Table 4.1.a). Changes in maneuver and artillery training could cause long-term adverse impacts to vegetation. Use of the Stryker 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 vegetation damage. 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.

Training intensities would increase and result in an increase of approximately 400% in maneuver impact miles (MIMs). Maneuver space requirements would increase by approximately 80-100% (Table 4.1.a).

High explosive weapons training could increase by approximately 50-165%, depending on location, which could cause a proportionate increase to vegetation damage in impact areas. Munitions explode and create craters, resulting in areas of bare ground that are susceptible to erosion from wind and water (Houston 2002). However, the craters accumulate organic matter and vegetation usually recovers.

The frequency of fires may 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.

4.8.3.4 Systems Acquisition

New equipment would be used under transformation, including the eight-wheeled 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) (Table 4.1.a). The Stryker is expected to have a greater maneuver impact on vegetation than prior USARAK training vehicles.

4.8.3.5 Institutional Matters

Institutional matters include USARAK management activities, land stewardship, policy and program implementation. Transformation is expected to change management processes, which should lead to better data collection and management. This would improve stewardship of USARAK lands and resources.

4.8.4 Comparison of Alternatives

4.8.4.1 Description of Methodology

The variables analyzed in this section include vegetation cover and forest resources. Species of concern for each installation are analyzed in Sections 3.10 and 4.10, Threatened or Endangered Species and Species of Concern, and are listed in Appendix E. Vegetation cover for this analysis is defined as natural aerial cover of vegetation (as opposed to bare ground). The composition and resource value of forest resources was described in Section 3.8. The following definitions will be used to categorize potential impacts to vegetation cover and forest resources:

- None – No measurable impact is expected to occur.
- Minor – Impacts would be measurable but would have only a slight or short-term impact on vegetation.
- Moderate – Impacts would be noticeable and would have a measurable effect on soil and vegetation, with possible long-term consequences.
- Severe – Impacts would be obvious with serious consequences to soils and vegetation that could lead to erosion, degradation to permafrost, and permanent loss of vegetation.
- Beneficial – Impacts would benefit vegetative resources.

The first two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to vegetation are presented in 4.8.6, Mitigation.

4.8.4.2 Fort Wainwright

4.8.4.2.1 Alternative 1 (No Action)

Some adverse effects would occur to vegetation under the No Action Alternative (USARAK 1999a). The impacts would result mainly from construction activities, maneuver training, weapons training, and fires.

Damage to vegetation on Main Post would most likely be from construction or land development. Additional development and construction would occur and could result in long-term alteration of vegetation but these projects are on lands that have already been altered (Stout 2002a,d). No impacts to forest resources on Main Post are expected. Impacts to vegetation cover would be minor.

Maneuver impacts to vegetation would not change, and MIMs would remain approximately the same as current levels. Current MIMs are estimated to be 11,500 total for FWA. These are distributed across Main Post (650 MIMs), Tanana Flats Training Area (TFTA) (2,300 MIMs), and Yukon Training Area (YTA) (8,550 MIMs).

Due to seasonal maneuver restrictions, most negative impacts to vegetation at TFTA would result from weapons training. Due to artillery training and possible resulting fires, military training could have minor effects on vegetation cover and minor impacts to forest resources at TFTA. Fires can impact vegetation composition and structure, but fires are also necessary for healthy ecosystem function.

Damage to vegetation cover at YTA would occur at levels similar to present, which are considered minor. Most damage would occur from maneuver training when ice and snow cover are lacking. Impacts to forest resources would be minor due to increased risk of fires. Monitoring, inventory, and rehabilitation would proceed as described in the Integrated Natural Resources Management Plans (INRMPs) (USARAK 2002e,f,g) (Appendix H).

4.8.4.2.2 Alternative 3 (Transform with New Infrastructure)

Some adverse effects would occur to vegetation under Alternative 3. The impacts would result mostly from construction activities, maneuver training, weapons training, and fires.

Increased troop numbers during the end state could result in greater demands on resources, including vegetation. The proposed construction project to build the company operations facilities in the cantonment area on Main Post would affect less than one acre of vegetation on a site with previously disturbed soils and colonizing vegetation. Vegetation consists of cottonwood trees, birch, and white spruce. The understory consists of wild rose, willow, fireweed and grasses. There may be some small wetland sites in low lying areas. A wetland delineation and wetland permit would be required prior to construction on any wetland.

Maneuver and weapons training would increase under Alternatives 3. MIMs on FWA would increase from approximately 11,500 MIMs/year to 46,000 MIMs/year during the interim phase, then about 69,000 MIMs/year at end state. Use of the Stryker vehicle on training lands would cause increased damage to vegetation, although not to forest resources. End-state maneuver space requirements at FWA would increase from approximately 38,000 km^2 days to 41,000 km^2 days.

On Main Post, MIMs would increase from 650 MIMs/year under the No Action Alternative to approximately 15,000 MIMS/year with Alternatives 3. TFTA is mostly wetlands and many parts of the training area are inaccessible during summer, thus maneuver training would be limited. Maneuver training would be conducted during winter, when damage to vegetation or substrate damage would be minimal. At TFTA the MIMs would increase from approximately 2,300 per year to 23,000. The greatest increase in impacts would occur at YTA, where MIMs would increase from about 8,500 per year to 30,000 per year. Implementation of restrictions relating to environmental limitation and maneuverability map descriptions (Section 4.4, Soil Resources) would reduce the impacts to vegetation and soils.

Maneuver training with the Stryker vehicle may result in moderate impacts to localized areas at Main Post, TFTA, and YTA. Training areas would be monitored, and if damage does occur, sites would be rehabilitated (Appendix H).

Use of high explosive weapons in impact areas (FWA and DTA combined) would increase from approximately 130,000 rounds per year to 154,000 rounds per year during the interim phase and 194,000 per year at end state. Under these scenarios, damage rates would increase from about 100 acres per year to 120 acres per year in the interim phase, and about 150 acres at end state. Craters accumulate windblown organic matter and older craters appear to provide favorable conditions for future plant growth. The impacts would be minor and sustainable, although ecological monitoring should be incorporated in management of impact areas.

The majority of fires at FWA result from military training, and higher intensity of training could result in increased frequency of fires (Section 4.11, Fire Management). Although fires are natural and desirable ecological processes, they can have a significant influence on the composition and structure of forest resources. Impacts from fires could be beneficial, or they could be adverse if exposed areas were subjected to severe erosion, water accumulation, or loss of permafrost.

Transformation would involve construction, maneuver training and weapons training. The sum of these would cause some changes to vegetation cover and forest resources at FWA. Impacts at the Main Post would be minor to vegetation cover, but no impacts to forest resources would be expected. Maneuver impacts may increase at Main Post and YTA, but the training areas would be monitored and rehabilitated. Impacts to vegetation cover at TFTA and YTA would be minor because of increased weapons fire. Due to fires, impacts on forest resources at TFTA and YTA would be moderate.

4.8.4.2.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts to vegetation would result from construction activities, maneuver training, weapons training, and fires and would be similar to those of Alternative 3.

Personnel stationing at FWA would be essentially the same as those in Alternative 3, and construction activities would be identical. End-state MIMs would be about 67,000, which is slightly less than Alternative 3. Other training requirements (including maneuver space, weapons use, and equipment needed) would remain essentially the same as those under Alternative 3.

Under Alternative 4, however, full funding and implementation of institutional matters would result in improved management of vegetation since these resources would be monitored and managed more intensively.

4.8.4.3 Donnelly Training Area

4.8.4.3.1 Alternative 1 (No Action)

Some adverse effects would occur to vegetation under the No Action Alternative (USARAK 1999a). The impacts would result mostly from construction activities, maneuver training, weapons training, and fires. Installation-wide, the damage from maneuver training is not widespread (Ellen Clark, personal communication 2002). Weapons training can result in cratering (i.e., loss of vegetation cover) in the impact areas. Fires resulting from training activities are the most important impact to vegetation and forest resources. Overall, impacts would be minor to vegetation cover and moderate to forest resources.

4.8.4.3.2 Alternative 3 (Transform with New Infrastructure)

The proposed construction of the UAV maintenance facility would affect approximately 0.5 acres of vegetation in DTA West (Training Area 57). Most of this area has not been mechanically disturbed, although the area burned in a 1981 fire. There is no salvagable timber. As a result of this 1981 fire, the area is currently dominated by small diameter aspen, young spruce, dwarf birch, and grasses. Other disturbances include roads, observation points, maneuver trails, and a wildlife plot. Considering the size of the post relative to the size of the UAV facility, disturbances caused by construction of the UAV maintenance facility would be localized.

Maneuver and weapons training would have an impact on vegetation. Maneuver impact miles would increase during transformation from approximately 17,000 MIMs/year to 86,000 MIMs/year at end state. Maneuver space requirements would increase from approximately 15,000 km^2 per year to 61,000 km^2 per year. More of DTA could be used for maneuver during winter when susceptible lands (e.g., wetlands) are frozen. During the remainder of the year, maneuvers would be restricted to non-restricted areas with sufficient traction and less than 30% slope.

Use of the Stryker vehicle on training lands at DTA 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% 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.

Use of high explosive weapons in impact areas (FWA and DTA combined) would increase from approximately 130,000 rounds per year to 154,000 rounds per year during the interim phase and to 194,000 per year at end state. Under these scenarios, damage rates would increase from about 100 acres per year to 120 acres per year in the interim phase, and to about 150 acres at end state. Craters accumulate windblown organic matter, and older craters appear to provide favorable conditions for future plant growth. The impacts would be sustainable.

The majority of fires at DTA result from military training (Sections 3.11 and 4.11, Fire Management), and increased intensity of 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.

The sum of the activities and projects related to transformation may result in some impacts to vegetation at DTA. Maneuver impacts at DTA would increase. However, with monitoring and rehabilitation, the effects to vegetation cover would remain minor. No maneuver impacts to forest resources would be expected. Weapons impacts are confined to impact areas, and the extent of damage to vegetation cover is minor. Due to fires, impacts to DTA's forest resources would be moderate.

4.8.4.3.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Construction activities would be identical to Alternative 3, thus any impacts to vegetation would not differ.

Maneuver training space requirements would be about 7% more under Alternative 4 compared to Alternative 3. This could cause slightly higher damage rates to vegetation, but the effects would be highly localized. Other training requirements, including MIMs, munitions use, and systems

acquisition, would remain identical to Alternative 3. Thus, there would be no difference between Alternatives 3 and 4 in terms of damage to vegetative cover and forest resources.

Full funding and implementation of institutional matters would be beneficial to vegetation because there would be improved monitoring and management of resources (Appendix H).

4.8.4.4 Fort Richardson

4.8.4.4.1 Alternative 1 (No Action)

Some adverse effects to vegetation would occur under the No Action Alternative but disturbed sites would be monitored and rehabilitated. Construction activities in the cantonment area would result in minor impacts to vegetation. Development of the new range facilities in the northeast portion of the post would result in some loss of forest resources. Other impacts would result from maneuver and weapons training, as well as recreational impacts. Overall, impacts to vegetation cover and forest resources would be minor.

4.8.4.4.2 Alternative 3 (Transform with New Infrastructure)

The proposed construction of the mission support training facility, barracks, and the Anchorage Port staging area would occur on previously disturbed sites. Current vegetation in the cantonment area consists of primary successional species such as aspen, willow, alder, wild strawberries, fireweed, along with invasive species such as dandelions, pineapple weed, and plantago. The impacts of construction to natural vegetation would be highly localized.

Maneuver and weapons training could affect vegetation at FRA. MIMs would increase during the interim phase of transformation from approximately 3,300 MIMs/year to 10,600 MIMs/year, and then would be 3,500 MIMS/year at end state. End-state maneuver space requirements would not increase compared to current levels. Due to existing environmental regulations, adverse effects to vegetation would be minimized. Vegetation would be monitored and any damaged areas would be rehabilitated. Although some negative effects from maneuver training would occur, the impacts would be localized.

Use of high impact explosives would increase from approximately 65,000 rounds per year to 108,000 rounds per year under Alternative 3. According to estimates from Houston (2002), approximately 0.03% (25 acres) of the Washington Impact Area at DTA was disturbed from about 31,000 rounds of explosives per year. Projected to FRA, the impacted acres could increase from approximately 50-55 acres per year to 85-90 acres under Alternative 3.

The sum of activities and projects related to transformation may result in some impacts to vegetation at FRA. Maneuver training during the interim phase would affect vegetation cover, but the impacts would remain minor. Minor impacts to vegetation would occur at Eagle River Flats due to increased weapons firing during the interim phase. Adverse effects to forest resources would be minor.

4.8.4.4.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Construction activities would be identical to Alternative 3. Training levels would be greater under Alternative 4 compared to Alternative 3. Use of high explosive munitions would increase approximately 225% during the interim phase and 165% at end state. End-state maneuver space requirements would increase by about 170% compared to current requirements. Requirements for MIMs would increase to approximately 10,600 MIMs/year during the interim phase (a more than three-fold increase compared to the No Action Alternative) and to 8,000 MIMs/year at end

state (about two-and-a-half times more than the No Action Alternative). About 213,000 rounds of high explosive munitions would be expended during the interim phase, which would damage about 135-140 acres per year under Alternative 4. End-state munitions would be about 174,000 rounds per year, which potentially could damage about 110-115 acres per year. Overall, impacts to vegetation cover and forest resources would be minor.

These changes could impact some vegetation resources but monitoring and management could mitigate any additional damage from increased training demands. Moreover, full funding and implementation of institutional matters under Alternative 4 would improve vegetation management.

4.8.5 Comparison of Alternatives Summary

4.8.5.1 Comparison of All Alternatives

Table 4.8.a presents a summary of vegetation impacts under each alternative. Definitions of the qualitative impact categories are provided in Section 4.8.4.

Table 4.8.a Summary of Impacts to Vegetation on USARAK Lands.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Fort Wainwright					
Main Post					
Vegetation Cover	Minor	Minor	Minor	Minor	Minor
Forest Resources	None	None	None	None	None
Tanana Flats Training Area					
Vegetation Cover	Minor	Minor	Minor	Minor	Minor
Forest Resources	Minor	Moderate	Moderate	Moderate	Moderate
Yukon Training Area					
Vegetation Cover	Minor	Minor	Minor	Minor	Minor
Forest Resources	Minor	Moderate	Moderate	Moderate	Moderate
Donnelly Training Area					
Vegetation Cover	Minor	Minor	Minor	Minor	Minor
Forest Resources	Moderate	Moderate	Moderate	Moderate	Moderate
Fort Richardson					
Vegetation Cover	Minor	Minor	Minor	Minor	Minor
Forest Resources	Minor	Minor	Minor	Minor	Minor

4.8.5.2 Comparison of Alternatives 3 and 4

Both alternatives would result in transformation from the Current Force to SBCT. In general, Alternative 4 would result in higher numbers of personnel and equipment due to the Airborne Task Force, but construction projects would remain the same. Although training extent would increase the distribution of training, impacts would be approximately the same under both alternatives.

The primary difference between Alternatives 3 and 4 would result from the institutional matters. For Alternative 3, institutional matters relating to range management, Integrated Training Area Management, environmental management, and sustainable range management would remain essentially the same as the No Action Alternative (Chapter 2, Table 2.3.a). However, with Alternative 4, these four programs would be fully funded and implemented. Institutional matters for vegetation management would also involve implementation of the INRMPs, ecosystem management program and the Training Area Recovery Plan. Detailed information on these programs may be found in Appendix H.

4.8.6 Mitigation

4.8.6.1 Existing

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts. These mitigation measures are implemented as funding is available. Often funding only provides for partial implementation.

- Continue to conduct forest resource inventories to aid ecosystem management program.
- Continue use of environmental limitations overlays, indicating areas where maneuver training is and is not allowed.
- Continue implementation of INRMPs, with specific actions for management of vegetation (Appendix H).
- Continue Land Condition Trend Analysis and Land Rehabilitation and Maintenance Program programs to minimize and rehabilitate vegetation damage.
- Continue to implement recreational vehicle use policy at USARAK.

4.8.6.2 Proposed

Proposed mitigation for Alternative for is to fully implement plans and projects that have already been identified by USARAK's INRMPs and ecosystem management. These projects and plans are further described in Appendix H. Additional mitigation measures are also listed below.

- Conduct a detailed study to assess impacts of recreational vehicles to vegetation. This would provide information for natural resources managers to help develop policies to ensure conservation and sustainability of vegetation resources (also see Sections 4.4, Soil Resources; 4.7, Wetlands; and 4.14, Public Access and Recreation).

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4.9 WILDLIFE AND FISHERIES

Issue C: Wildlife and Habitat. During the public scoping process, USARAK and the public identified the impact of the proposed action on wildlife, fisheries, and habitat as an issue of concern. It is therefore evaluated in this EIS (see Section 1.8, Scoping Issues of Concern).

This section analyzes and compares the impacts to wildlife and fisheries associated with each alternative. Baseline data for this comparison was presented in Section 3.9. Additional information on impacts to wildlife and fisheries is presented in Appendix F.

4.9.1 Background

4.9.1.1 Wildlife

No state or federally listed endangered or threatened species occur on U.S. Army Alaska (USARAK) lands, although the American peregrine falcon and Arctic peregrine falcon have been delisted within the past decade. Further discussion of management of threatened or endangered species is presented in Section 4.10. The trumpeter swan and American osprey are also listed as sensitive species by the U.S. Forest Service (USARAK 1999a; Alaska Natural Heritage Program 2002).

4.9.1.2 Fisheries

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 3.9.

4.9.2 Review of Impacts to Wildlife and Fisheries

4.9.2.1 Wildlife

Research evaluating the effects of human disturbance to wildlife has increased in recent decades. Human disturbance can cause behavioral changes, alteration of activity patterns, or abandonment of habitats. Some species respond by underutilizing available habitats near developments while overusing areas away from development, resulting in poor nutrition and survival, and thus lowered 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, population-level declines could occur (e.g., Harrington and Veitch 1992). However, some species, such as moose, have been documented to habituate to human disturbance (Andersen et al. 1996).

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 can possibly serve as refugia for certain species. In maneuver areas, animals may be disturbed from Soldiers on foot or by various types of vehicles, as well as civilian use. Development of training lands, including maneuver areas, firing points, bivouac sites, firing ranges, assault strips, drop zones, may result in alteration of habitats and/or disruption of

behavior. Development of ranges will provide habitat for species that prefer edge habitat, open areas, or early succession. Construction creates noise and may displace some animals from habitat, although some species readily habituate to disturbance. Mortality may occur to individual animals that are small or less mobile.

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

See Appendix F for a more detailed review of human and military impacts to wildlife species and taxonomic groups that are prioritized for conservation on USARAK lands.

4.9.2.2 Fisheries

Military activities that can have negative impacts on fisheries include damage to streambanks resulting in erosion, disturbance to aquatic habitats and riparian areas, or pollution from unexploded weapons or chemical spills. Fires caused by weapons training can also contribute to degraded water quality due to sedimentation and erosion. Recreational fishing is another impact to fisheries resources. In Alaska, construction of ice bridges can also lead to negative impacts to populations of wild fish in streams and rivers by affecting habitat and preventing movements of fish (USARAK 1999a).

4.9.3 Activity Groups that Affect Wildlife and Fisheries

The textboxes below list activity groups that could affect Wildlife and Fisheries due to transformation.

Wildlife

Activity Groups With Impacts	Activity Groups Without Impacts
• Stationing • Construction • Training • Systems Acquisition • Deployment • Institutional Matters	None

Fisheries

Activity Groups With Impacts	Activity Groups Without Impacts
• Stationing • Construction • Training • Systems Acquisition • Institutional Matters	• Deployment

4.9.3.1 Stationing

Transformation would result in additional personnel stationed at Fort Wainwright (FWA) and Fort Richardson (FRA) (Table 4.1.a). This influx of personnel could result in increased recreational impacts to wildlife and fisheries.

4.9.3.2 Construction

Proposed construction projects associated with transformation include the company operations facilities at FWA; the unmanned aerial vehicle (UAV) maintenance support facility at Donnelly Training Area (DTA); and the mission support training facility, 60-personnel barracks, and development of the Anchorage Port support staging area at FRA (Appendix D).

Construction results in long-term or permanent loss of habitat due to loss of vegetation and soils. Mortality may occur to individual animals that are small or less mobile. Construction noise and related human presence would disrupt the normal activities of animals. Building new roads and ranges could increase habitat fragmentation, which could affect large predators (especially wolverine and grizzly bear), caribou, and certain raptors or neotropical migratory birds. Construction and development of ranges would provide habitat for species that prefer edge habitat, open areas, or early succession but forest-dwelling species would be displaced. These activities could affect water quality but any impacts are expected to be short term and minor.

4.9.3.3 Training

The frequency of maneuver and weapons training would increase if USARAK were to transform (Table 4.1.a). Maneuver training may affect wildlife resources by disrupting animals and altering habitat. Maneuver training may affect fisheries resources directly by affecting water quality or by altering habitat. Training intensity and vehicle use would result in an approximate 400% increase in MIMs (Table 4.1.a). Maneuver space requirements would increase by approximately 100% (Table 4.1.a). Weapons training could increase by approximately one-third and may create noise that could disrupt nearby animals. It is not likely to degrade water quality to a level that would affect fish populations.

4.9.3.4 Systems Acquisition

New equipment would be used under transformation, including the eight-wheeled 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) (Table 4.1.a). The increase in MIMs could affect habitats near roadsides, and animals could be temporarily disrupted by maneuver exercises.

4.9.3.5 Deployment

Deployment would occur by air, land, or sea. Transformation would result in increased frequency of out-of-state and overseas deployments. Under current training doctrine, deployment would not increase on a unit basis (e.g., individual platoon unit deployments would remain at four times a year regardless of alternative). However, the number of units, to include platoon, company, and battalion, would increase under the proposed action. Therefore, the total number of unit deployments and miles would increase. Increased activities from deployment could result in short-term impacts to some wildlife species. Deployment miles on Alaska's highways would increase which could result in more localized, short-term noise and disturbance and occasional vehicle-wildlife collisions.

4.9.3.6 Institutional Matters

Institutional matters include USARAK management activities, land stewardship, policy and program implementation. Transformation is expected to change management processes, which should lead to better data collection and management. This would improve stewardship of USARAK lands and resources.

4.9.4 Comparison of Alternatives

4.9.4.1 Description of Methodology

4.9.4.1.1 Wildlife

Selection of Priority Species

Wildlife species at each post were objectively ranked by the USARAK ecosystem management team according to conservation status, sensitivity to disturbance, potential impacts from military activities, concern of decline, rarity, stakeholder concern, and economic importance. From the top-ranked species at each post, several were selected for further analysis in this EIS. Because these species were ranked separately at each post, the level of concern between posts is not necessarily the same. For example, Dall sheep were analyzed for FRA but not for DTA because the herds that frequent FRA are more likely to be affected by disturbance from military or human activities. In addition, migratory neotropical birds, raptors, and waterfowl were selected for analysis because there is broad concern about the conservation of these groups of birds.

Qualitative Impacts to Priority Species Populations

Most research on the impacts of human disturbance to wildlife has focused on evaluating short-term behavioral effects. Relatively little work has been conducted to determine the impacts at the level of wildlife populations. Therefore, considering the current state of knowledge, predicting population-level responses to military activities for many species remains subjective. Nevertheless, developing an understanding of population-level responses is important (Tazik et al.1992). Listed below are five levels of impact resulting from military activity (or other intensive land use programs):

- None – No measurable impacts are expected to occur.
- Minor – Actions could affect individual animals or groups, but the overall abundance and distribution of animals would not change.
- Moderate – Local or regional populations could be reduced in size or displaced in certain portions of their range.
- Severe – Impacts at the population level are expected, or animals would be driven from current range. These impacts would have serious consequences.
- Beneficial – Actions would result in improved management and conservation for wildlife.

Although this approach is more subjective than quantifying impacts to available habitats, it is useful for comparing alternatives. In addition, such analyses will help guide resource managers in planning monitoring programs that include changes in land use into the monitoring design.

The first two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to wildlife are presented in 4.9.6, Mitigation.

Impacts to Priority Wildlife Habitat

Impacted acres were measured by delineating affected zones around land uses or infrastructure that would likely compromise the quality of habitat. These include cantonment areas and firing ranges. Buffers between affected areas and wildlife habitat were based on reports from the scientific literature and from estimates by the USARAK ecosystem management team.

The analysis was completed by subtracting the delineated impacted acreage from the acreage of habitat available for each species, by post and alternative.

4.9.4.1.2 Fisheries

Listed below are five levels of impact to fisheries resulting from military activity (or other intensive land use programs):

- None – No measurable impact is expected to occur.
- Minor – Actions may affect localized populations, but the overall abundance and viability of populations would not likely change.
- Moderate – Local or regional populations may be reduced in size.
- Severe – Impacts may cause reduction of population or displacement of fish from current habitats, resulting in serious consequences for fisheries.
- Beneficial – Actions would result in improved conditions and increased abundance of fisheries resources.

Two categories, fish stocking and wildlife fisheries, were evaluated for each post. Existing and proposed mitigation for impacts to fisheries are presented in 4.9.6, Mitigation.

4.9.4.2 Fort Wainwright

Wolverine, grizzly bear, wolf, moose, and trumpeter swan, as well as general categories of waterfowl and raptors, were selected as priority wildlife species for analysis at FWA. See Appendix F for a review on the human impacts to these species and categories of wildlife. In addition, birds listed as priority species at FWA were analyzed. These species include the gyrfalcon, sharp-tailed grouse, great gray owl, boreal owl, black-backed woodpecker, Hammond's flycatcher, American dipper, varied thrush, Bohemian waxwing, rusty blackbird, and white-winged crossbill. Note that the Alaska Species of Concern are analyzed in Section 4.10, Threatened or Endangered Species and Species of Concern.

4.9.4.2.1 Alternative 1 (No Action)

Wildlife

The mission and training levels would remain essentially the same as current. Impacts to wildlife would be minor for most species at Main Post, Tanana Flats Training Area (TFTA), and Yukon Training Area (YTA). Impacts to the varied thrush could be moderate, due to habitat loss from range construction or fires. Management of wildlife would continue as planned (USARAK 2002g). See Table 4.9.a for a description of impacts to the priority wildlife species at FWA.

Fisheries

Continuation of military activities on lands managed by USARAK would result in minor impacts to fisheries resources. The primary impacts would be from erosion and sedimentation resulting from construction, weapons use in impact areas, and maneuver training. Construction and

training could also result in damage to wetlands, riparian areas, and stream habitats. Spills of petrochemicals could result from military activities. Overall impacts to fisheries would be minor at Main Post, TFTA, and YTA (Table 4.9.d).

Policies described in (USARAK 2002g) have been implemented to reduce the risk and ameliorate the effects of military actions on fisheries and fish habitats. Fish stocking and management of wild fisheries would continue as described in Section 3.9.

4.9.4.2.2 Alternative 3 (Transform With New Infrastructure)

Wildlife

Increased recreational impacts could result from the stationing of additional Soldiers at FWA.

Two company operations facilities would be constructed at FWA Main Post (Appendix D). The proposed site for each facility is in cantonment on an area with disturbed vegetation and soils. Certain wildlife species adapted to urban environments, small mammals (squirrels, snowshoe hares, red-backed voles), and certain birds (pine grosbeak, chickadees) may be able to utilize some of this area. The overall impact to most wildlife species would be minor and localized.

Transformation would also involve training with new equipment (the Stryker, mobile gun system, unmanned aerial vehicle, and 155mm howitzer), and increased maneuver and weapons training. These changes could affect individuals, groups, or localized wildlife populations by disrupting activity cycles or movements. Due to increased training levels at end state, increases of incidental mortality to wildlife could occur. However, such mortality would not cause measurable impacts to wildlife populations. Moose, trumpeter swans, and waterfowl could be affected by increased artillery training in Alpha Impact Area at TFTA. If firing occurred during breeding, calving, or brooding seasons, the impacts from artillery training could be moderate to these species.

Certain animals could be affected by deployments, primarily due to noise from jet aircraft. Some wildlife adjacent to highways could be adversely affected by convoys during land deployments. However, the effects from air or land deployments would be short term and localized.

In summary, transformation could cause moderate impacts to some species of priority wildlife at FWA, including localized populations of moose, waterfowl, sharp-tailed grouse, and swans (Table 4.9.a). Other species of wildlife that could be moderately affected include boreal owl, Hammond's flycatcher, varied thrush, rusty blackbird, and white-winged crossbill. However, the effects would be short term and localized. Animals would be disturbed at times, but the effects would not result in decreased populations.

Fisheries

Transformation could result in increased impacts to fisheries at FWA, although the changes would not likely result in moderate or severe impacts to fish stocking or wild fisheries (Table 4.9.d). Overall, impacts would be minor at interim and end state.

Recreational impacts could increase due to increased personnel stationed at FWA.

Construction of the company operations facilities could result in short-term impacts to water quality, affecting fisheries. However, the project would be at a previously disturbed site in the cantonment area. Any impacts would likely be short term and localized.

The increase in maneuver training could cause increased erosion and petrochemical spills during refueling. Higher training intensity could cause increased frequency of fires and result in more sedimentation of streams, ponds, and waterways. Increased weapons training could result in higher levels of constituents from dudded ordnance (Section 4.4, Soil Resources and Section 4.5, Surface Water). No impacts to fisheries are expected from dudded ordnance.

4.9.4.2.3 Alternative 4 (Transform With New Infrastructure and Airborne Task Force)

Wildlife

Impacts to wildlife would result from construction activities, maneuver training, weapons training, and fires and would be similar to Alternative 3 (Table 4.9.a).

The number of personnel stationed at FWA would be essentially the same as with Alternative 3. Construction activities would be identical, and training requirements (including both maneuvers and weapons training) and systems acquisition (vehicles and weapons) would remain the same.

Full funding and implementation of institutional matters would improve management of wildlife and habitats.

Fisheries

Impacts to fisheries would result from construction activities, maneuver training, weapons training, and fires and would be similar to Alternative 3 (minor).

4.9.4.3 Donnelly Training Area

Wolverine, grizzly bear, caribou, wolf, bison, moose, sandhill crane, waterfowl, and raptors were selected by USARAK as priority wildlife species for analysis at DTA. See Appendix F for a review on the human impacts to these species and categories of wildlife. In addition, birds listed as priority species at DTA were analyzed. These species include the gyrfalcon, white-tailed ptarmigan, sharp-tailed grouse, great gray owl, boreal owl, black-backed woodpecker, American dipper, Hammond's flycatcher, Bohemian waxwing, rusty blackbird, and white-winged crossbill. Note that the Alaska Species of Concern are analyzed in Section 4.10.

4.9.4.3.1 Alternative 1 (No Action)

Wildlife

The mission and training levels would remain essentially the same as current levels. Most impacts to wildlife would continue to be minor. It is possible that Army training exerts a moderate impact on the grizzly bear and bison. Management of wildlife would continue as planned in the Integrated Natural Resources Management Plan (INRMP) for Fort Greely and DTA (USARAK 2002e). See Table 4.9.b for a description of impacts to the priority wildlife species at DTA.

Fisheries

Continuation of military activities on lands managed by USARAK would result in minor impacts to fisheries at DTA (see Table 4.9.d). Fish stocking and management of wild fisheries would continue as described in Section 3.9.

4.9.4.3.2 Alternative 3 (Transform With New Infrastructure)

Wildlife

Stationing would not be an issue at DTA because all Soldiers would be stationed at either FWA or FRA. However, during certain training periods, the training intensity could be higher at DTA because there would be more Soldiers.

Transformation would result in construction of the UAV maintenance support facility within Training Areas 57 in DTA West (Appendix D). The construction of the facility would impact 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, sharp-tailed grouse, bohemian waxwing, and northern shrike. Due to the small size of the site, the impact would be highly localized.

Use of new equipment (the Stryker, mobile gun system, 155mm howitzer, and unmanned aerial vehicle), and increased maneuver and weapons training could affect individuals, groups, or localized wildlife populations by disrupting activity cycles or movements. Due to increased training levels, higher mortality to wildlife could be expected. Direct mortality would be localized and relatively infrequent. Any increases in mortality would not likely result in severe impacts to any wildlife at the population level.

The primary spatial change from transformation would be associated with road upgrades and improvements, which would effectively expand the training area available and result in higher use of roads that currently receive very 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 methodology to analyze the impacts of road construction and use on priority wildlife populations. Grizzly bear, caribou, bison, moose and wolf might be more susceptible to disturbance from road development or training, and the effects to localized populations at DTA could be moderate. See Table 4.9.b for a brief explanation of impacts and Appendix F, Section 4.9 for a literature review of impacts to these species. The paragraphs below summarize potential impacts to these species.

Grizzly bears apparently learn to avoid trails or roads during times of high use by humans (Gibeau et al. 2002). Mattson et al. (1987) and Mace et al. (1996) documented that avoidance of high quality habitats adjacent to roads resulted in 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.

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 reactions to jet aircraft were greatest during the post calving period. Harrington and Veitch (1992) reported decreased woodland calf survival following disturbance 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 would be 20-40 miles off post.

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). 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 negatively affected 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 exceed carrying capacity, resulting in habitat degradation and moderate population decline, or change in distribution that could lead to greater use of agricultural lands.

Due to their economic importance, wildlife managers and the public are concerned about impacts to moose. Few studies have evaluated the effect of human disturbance on moose. 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 compared to various mechanical disturbances, such as snow machines, 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 on USARAK lands after intense training activities (USARAK 1980). 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 was disturbed. Wolf populations could be moderately affected if moose populations declined.

The increased use of ranges, and possible changes to vegetation from training or fires, could cause moderate impacts to some priority bird species, including boreal owl, white-winged crossbill, Bohemian waxwing and Hammond's flycatcher. Use of training lands for training could increase disturbance rates to sharp-tailed grouse and great gray owl, and impacts could be moderate.

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 (Table 4.9.b).

Fisheries

Transformation could result in increased impacts to fisheries resources at DTA, although the effects to fish stocking or wild fisheries would be minor at interim and end state (Table 4.9.d).

Stationing would not be an issue at DTA because troops would be stationed at FRA and FWA. More troops would probably mean higher training intensity at DTA during certain times of the year. Overall, fishing pressure could increase because of increased Army personnel in the region, as well as a cumulative increase from other projects such as the Space Missile Defense System or Pogo Gold Mine (see Section 4.20, Cumulative Impacts).

Construction of the UAV maintenance facility could result in increased erosion and sedimentation. However, the effects would be short-term and localized.

Training could result in some negative impacts to fisheries. The expected increase in MIMs from maneuver training 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 munition constituents from dudded ordnance (see Section 4.4, Soil Resources, and Section 4.5, Surface Water) although no impacts to fisheries would be expected.

4.9.4.3.3 Alternative 4 (Transform With New Infrastructure and Airborne Task Force)

Wildlife

Impacts to wildlife would be similar to Alternative 3. Negative impacts could occur from construction or training. Although the UAV maintenance facility construction, MIMs, and weapons requirements would be the same between Alternatives 3 and 4, maneuver space requirements would be slightly higher (approximately 7%) under Alternative 4. This could result in slightly higher disturbance rates to some species of wildlife. However, no differences between Alternatives 3 and 4 in terms of population-level impacts are expected. Full funding and implementation of institutional matters would improve monitoring and management of wildlife. Overall impacts to wildlife under Alternative 4 would be minor for most species. However, moderate impacts could occur to grizzly bear, moose, caribou, wolf, and bison as well as some priority bird species, including boreal owl, and white-winged crossbill. The sharp-tailed grouse, great gray owl, Bohemian waxwing, and Hammond's flycatcher could be moderately affected due to habitat alteration.

Fisheries

Impacts to fisheries from construction and training would be similar to Alternative 3 and minor. Full funding and implementation of institutional matters associated with Alternative 4 would likely result in improved monitoring and adaptive management of fisheries.

4.9.4.4 Fort Richardson

Wolverine, grizzly bear, black bear, wolf, Dall sheep, moose, beluga whale, and common loon, as well as general categories of waterfowl and raptors, were selected as priority wildlife species for analysis at FRA. See Appendix F for a review on the human impacts to these species and categories of wildlife. In addition, birds listed as priority species by the Partners in Flight Landbird Conservation Plan for lands including FRA were analyzed. These include the western wood-pewee, Steller's jay, American dipper, golden-crowned kinglet, and golden-crowned sparrow. Note that the Alaska Species of Concern are analyzed in Section 4.10.

4.9.4.4.1 Alternative 1 (No Action)

Wildlife

The mission and training levels would remain essentially the same. Most impacts to wildlife would be minor. It is possible that Army training exerts a minor to moderate impact on the wolverine, grizzly bear and black bear (Table 4.9.c). The Steller's jay could be moderately affected by development of new ranges. Management of wildlife would continue as planned in the INRMP for FRA (USARAK 2002f).

Fisheries

Continuation of military activities on lands managed by USARAK would result in minor impacts to fisheries resources at FRA (Table 4.9.d). Fish stocking and management of wild fisheries would continue as described in Section 3.9.

4.9.4.4.2 Alternative 3 (Transform With New Infrastructure)

Wildlife

Under Alternative 3, interim phase stationing would increase at FRA by approximately 700 personnel. End-state levels would be very close to the No Action Alternative.

Transformation would result in additional construction (mission support training facility, 60-personnel barracks, and the Anchorage Port staging area) (Appendix D). Construction of the mission support training facility and barracks would occur in the cantonment area on sites that have been previously disturbed. The original vegetation and soils (including any past wetlands) were bulldozed and filled during the construction of the post in the 1950s. Wildlife use at the proposed sites is minimal.

The Port of Anchorage project would be situated on 80 acres that were previously used as a berthing area for fuels. This site has been leveled by heavy equipment in the past. Wildlife use of this site is minimal but probably includes insects, birds, and mammals adapted to urban settings. This site does not have any docks or extensions into Cook Inlet or Ship Creek and would not affect aquatic species.

Transformation would also involve use of new equipment (the Stryker, mobile gun system, and 155mm howitzer), and increased maneuver and weapons training, especially during the interim phase. These changes would directly affect individual, groups or localized populations of wildlife by disrupting normal activity cycles or movements. Due to increased training levels, some wildlife mortality could occur, but this would not likely affect wildlife at the population level. Species most likely to be affected by increased training levels could be wolverine, grizzly bear, and black bear. In addition, water birds and waterfowl that use Eagle River Flats could be affected by the projected increase in artillery training.

Agencies such as the Alaska Department of Fish and Game are concerned with moose populations near FRA because of the economic value of moose. Increased disturbance rates during training could affect the distribution of moose (e.g., Andersen et al. 1996). However, 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). Increased training from transformation probably would not cause an increase in mortality or decreased productivity of moose on FRA. Certain animals could be affected by deployments, primarily from jet noise. Convoys could cause increased disturbance or vehicle-wildlife collisions en route to other posts. The effects of deployments would be short term and localized. Implementation of institutional matters would improve monitoring and management of populations and habitats of most species.

In summary, transformation under Alternative 3 may cause minor impacts at population levels for most populations at FRA (Table 4.9.c). Although the level of current impacts from Army land use to the wolverine, black bear, grizzly bear, and wolf is not known, increases in intensity of land use

could cause moderate impacts at the population level for these species. Impacts to forest raptors (great horned owl and great grey owl) would be minor to moderate because clearing the proposed ranges would alter local forest habitats. Moderate impacts to waterfowl (including trumpeter swans), Steller's jay, and golden-crowned kinglet are also possible due to training or loss of forest habitat.

Fisheries

Transformation could result in increased impacts to fisheries resources at FRA. The effects to fish stocking or wild fisheries would be localized and minor (Table 4.9.d).

Construction activities of the mission support training facility, 60-personnel barracks, and development of the Anchorage Port support staging area could cause an increase in sedimentation or erosion and subsequent loss of water quality (Appendix D). However, any impacts would be short-term and localized.

The increase in MIMs from maneuver training, especially during the interim phase, could result in increased erosion and sedimentation. Increased use of vehicles could result in a higher possibility of petroleum spills during refueling.

If fire frequency increased substantially, erosion into streams, ponds, and waterways could occur. Weapons training could result in increased levels of munition constituents from dudded ordnance (see Section 4.4, Soil Resources). No impacts to fisheries are expected from dudded ordnance.

4.9.4.4.3 Alternative 4 (Transform With New Infrastructure and Airborne Task Force)

Wildlife

Impacts under Alternative 4 are expected to be similar to those under Alternative 3.

Training intensities would increase at FRA, especially during the interim phase. Compared to the No Action Alternative, high explosive munitions requirements would be approximately 225% higher during the interim phase and 165% higher at end state. The requirements for maneuver space and MIMs would also increase. These increases in training could affect habitats, and disturbance could affect individuals or groups of wildlife. Full funding and implementation of institutional matters would improve monitoring and management of wildlife and habitats at FRA.

Fisheries

Higher training intensities could cause some negative impacts to fisheries resources similar to those discussed under Alternative 3. Moreover, the increased number of troops would mean increased recreational demand for fisheries resources. Full funding and implementation of institutional matters would result in more intensive monitoring and management and would improve management of fisheries resources. Overall impacts to fisheries would be minor.

4.9.5 Comparison of Alternatives Summary

4.9.5.1 Comparison of All Alternatives

The following tables provide summary comparisons of impacts to priority wildlife and fisheries resources. Definitions of the qualitative impact categories are provided in Section 4.9.4.

Table 4.9.a Summary of Impacts to Priority Wildlife Populations on Fort Wainwright[1].

Species	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Wolverine	Range construction and maneuver training could disturb individual wolverine or local populations. *Impacts: Minor*	Increased maneuver and weapons training could disturb individual wolverine or local populations. *Impacts: Minor*	Increased maneuver and weapons training could disturb individual wolverine or local populations. *Impacts: Minor*
Grizzly Bear	Range construction and maneuver training could disturb individual grizzly or local populations. *Impacts: Minor*	Increased maneuver and weapons training could disturb individual grizzlies or local populations. *Impacts: Minor*	Increased maneuver and weapons training could disturb individual grizzlies or local populations. *Impacts: Minor*
Wolf	Range construction and maneuver training could disturb individual wolves or packs. *Impacts: Minor*	Increased maneuver and weapons training could disturb individual wolves or local populations. *Impacts: Minor*	Increased maneuver and weapons training could disturb individual wolves or local populations. *Impacts: Minor*
Moose	Range construction could improve localized moose habitats. Weapons training could disturb individual moose or local populations. *Impacts: Minor*	Maneuver training could disturb individual moose. Greater high-explosive weapons training could cause population-level effects near Alpha Impact Area, especially during calving. *Impacts: Moderate*	Maneuver training could disturb individual moose. Greater high-explosive weapons training could cause population-level effects near Alpha Impact Area, especially during calving. *Impacts: Moderate*
Trumpeter Swan	Weapons training could disturb localized populations of swans. *Impacts: Minor*	Increased maneuver training could disturb swans. Greater high-explosive weapons training could cause population-level effects in localized areas during breeding-brooding seasons. *Impacts: Moderate*	Increased maneuver training could disturb swans. Greater high-explosive weapons training could cause population-level effects in localized areas during breeding-brooding seasons. *Impacts: Moderate*
Waterfowl	Weapons training could disturb localized populations of waterfowl. *Impacts: Minor*	Increased maneuver training could disturb waterfowl. Greater high-explosive weapons training could cause population-level effects in localized areas during breeding-brooding seasons. *Impacts: Moderate*	Increased maneuver training could disturb waterfowl. Greater high-explosive weapons training could cause population-level effects in localized areas during breeding-brooding seasons. *Impacts: Moderate*
Raptors	Localized populations of raptors could be disturbed by maneuvers or weapons training. *Impacts: Minor*	Localized populations of raptors could be disturbed by maneuvers or weapons training. *Impacts: Minor*	Localized populations of raptors could be disturbed by maneuvers or weapons training. *Impacts: Minor*
Gyrfalcon	No construction and minimal training in habitats. *Impacts: None*	No construction and minimal training in habitats. *Impacts: None*	No construction and minimal training in habitats. *Impacts: None*

Table 4.9.a cont. Summary of Impacts to Priority Wildlife Populations on Fort Wainwright[1].

Species	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Sharp-tailed Grouse	Construction of new ranges could increase habitat; grouse are susceptible to disturbance but Alaska data are lacking. *Impacts: Minor*	Increased training at drop zones and ranges during breeding and nesting could impact local populations *Impacts: Moderate*	Increased training at drop zones and ranges during breeding and nesting could impact local populations. Ecosystem management would improve grouse conservation. *Impacts: Moderate*
Great Gray Owl	Construction and use of new ranges could decrease habitat availability *Impacts: Minor*	Increased training at new ranges could cause higher disturbance rates. However, great gray owls are relatively infrequent. *Impacts: Minor*	Increased training at new ranges could cause higher disturbance rates. However, great gray owls are relatively infrequent. *Impacts: Minor*
Boreal Owl	Construction and use of new ranges could decrease habitat availability; habitat susceptible to fires. *Impacts: Minor*	Increased training at new ranges could compromise habitat quality; habitat susceptible to fires. *Impacts: Moderate*	Increased training at new ranges could compromise habitat quality; habitat susceptible to fires. *Impacts: Moderate*
Black-backed Woodpecker	Construction and use of new ranges could decrease habitat availability; fires could improve habitats. *Impacts: Minor*	Increased fire risk could benefit black-backed woodpecker. *Impacts: Minor*	Increased fire risk could benefit black-backed woodpecker; ecosystem management and monitoring would improve. *Impacts: Minor*
Hammond's Flycatcher	Development of new ranges could cause habitat loss. *Impacts: Minor*	Use of ranges could result in loss of aspen. *Impacts: Moderate*	Use of ranges could result in loss of aspen; ecosystem management and monitoring would improve. *Impacts: Moderate*
American Dipper	Habitat loss or impacts could occur from mining, forestry, pollution, water drawdowns. *Impacts: Minor*	Could expect increased impacts to localized riparian habitats due to maneuvers. *Impacts: Minor*	Could expect increased impacts to localized riparian habitats due to maneuvers; habitats could be conserved through ecosystem management. *Impacts: Minor*
Varied Thrush	Habitat loss could occur due to construction of ranges or fires. *Impacts Moderate*	Could be susceptible to habitat loss from use of ranges and from fires. *Impacts: Moderate*	Could be susceptible to habitat loss from use of ranges and from fires. *Impacts: Moderate*
Bohemian Waxwing	Clearing of ranges could impact habitats. *Impacts: Minor*	Could be susceptible to habitat loss from use of ranges and from fires. *Impacts: Minor*	Could be susceptible to habitat loss from use of ranges and from fires; monitoring would improve with ecosystem management. *Impacts: Minor*
Rusty Blackbird	Clearing of forest for ranges could affect habitat availability. *Impacts: Minor*	Could be susceptible to habitat loss from use of ranges and from fires. *Impacts: Moderate*	Could be susceptible to habitat loss from use of ranges and from fires; monitoring would improve. *Impacts: Moderate*

Table 4.9.a cont. Summary of Impacts to Priority Wildlife Populations on Fort Wainwright[1].

Species	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
White-winged Crossbill	Clearing of forest for ranges could affect habitat availability. *Impacts: Minor*	Could be susceptible to habitat loss from use of ranges and from fires. *Impacts: Moderate*	Could be susceptible to habitat loss from use of ranges and from fires; monitoring would improve. *Impacts: Moderate*

[1] Assume interim and end state, with training intensities being higher in end state.

Table 4.9.b Summary of Impacts to Priority Wildlife Populations on Donnelly Training Area[1].

Species	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Wolverine	Range construction and maneuver training could disturb individual wolverine or local populations. *Impacts: Minor*	Increased maneuver and weapons training could disturb individual wolverine or local populations. Development of trails/roads for training could increase trapping access. *Impacts: Minor*	Increased maneuver and weapons training could disturb individual wolverine or local populations. Development of trails/roads for training could increase trapping access. *Impacts: Minor*
Grizzly Bear	Range construction and maneuver training could disturb individual grizzlies or local populations. *Impacts: Minor-Moderate*	Increased maneuver and weapons training could disturb individual grizzlies or local populations. *Impacts: Moderate*	Increased maneuver and weapons training could disturb individual grizzlies or local populations. *Impacts: Moderate*
Caribou	Range construction and maneuver training could disturb individual caribou or local populations. *Impacts: Minor*	Increased development of trails and roads, combined with additional weapons and maneuver training, could fragment caribou habitat and result in increased disturbance rates. *Impacts: Moderate*	Increased development of trails and roads, combined with additional weapons and maneuver training, could fragment caribou habitat and result in increased disturbance rates. *Impacts: Moderate*
Wolf	Range construction and maneuver training could disturb individual wolves or packs. *Impacts: Minor*	Increased maneuver and weapons training could disturb individual wolves or local populations. *Impacts: Moderate*	Increased maneuver and weapons training could disturb individual wolves or local populations. *Impacts: Moderate*

Table 4.9.b cont. Summary of Impacts to Priority Wildlife Populations on Donnelly Training Area[1].

Species	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Bison	Range construction and maneuver training could disturb segments of herd. *Impacts: Minor-Moderate*	Increased maneuver and weapons training could disturb herd. Changes in distribution could cause herd to exceed carrying capacity, and result in habitat degradation and population decline. *Impacts: Moderate*	Increased maneuver and weapons training could disturb herd. Changes in distribution could cause herd to exceed carrying capacity, and result in habitat degradation and population decline. *Impacts: Moderate*
Moose	Range construction could improve localized moose habitats. Weapons training could disturb individual moose or local populations. *Impacts: Minor*	Maneuver and weapons training could disturb moose in some areas. *Impacts: Moderate*	Maneuver and weapons training could disturb moose in some areas. *Impacts: Moderate*
Sandhill Crane	Weapons training could disturb localized populations of Sandhill crane. *Impacts: Minor*	Increased maneuver and weapons training could disturb Sandhill cranes in localized areas. *Impacts: Minor*	Increased maneuver and weapons training could disturb Sandhill cranes in localized areas. *Impacts: Minor*
Waterfowl	Weapons training could disturb localized populations of waterfowl. *Impacts: Minor*	Increased maneuver and weapons training could disturb waterfowl in localized areas. *Impacts: Minor*	Increased maneuver and weapons training could disturb waterfowl in localized areas. *Impacts: Minor*
Raptors	Localized populations of raptors could be disturbed by maneuvers or weapons training. *Impacts: Minor*	Localized populations of raptors could be disturbed by maneuvers or weapons training. *Impacts: Minor*	Localized populations of raptors could be disturbed by maneuvers or weapons training. *Impacts: Minor*
Gyrfalcon	No construction and minimal training in habitats. *Impacts: None*	No construction and minimal training in habitats. *Impacts: None*	No construction and minimal training in habitats. *Impacts: None*
White-tailed Ptarmigan	No construction and minimal training in habitats. *Impacts: None*	No construction and minimal training in habitats. *Impacts: None*	No construction and minimal training in habitats. *Impacts: None*

Table 4.9.b cont. Summary of Impacts to Priority Wildlife Populations on Donnelly Training Area[1].

Species	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Sharp-tailed Grouse	Construction of new ranges could increase habitat; grouse are susceptible to disturbance but Alaska data are lacking. *Impacts: Minor*	Increased training at drop zones and ranges during breeding and nesting could impact local populations *Impacts: Minor-Moderate*	Increased training at drop zones and ranges during breeding and nesting could impact local populations. Ecosystem management would improve grouse conservation. *Impacts: Minor-Moderate*
Great Gray Owl	Construction and use of new ranges could decrease habitat availability. *Impacts: Minor*	Increased training at new ranges could cause higher disturbance rates. However, great gray owls are relatively infrequent. *Impacts: Minor-Moderate*	Increased training at new ranges could cause higher disturbance rates. However, great gray owls are relatively infrequent. *Impacts: Minor-Moderate*
Boreal Owl	Construction and use of new ranges could decrease habitat availability; habitat susceptible to fires. *Impacts: Minor*	Increased training at new ranges could compromise habitat quality; habitat susceptible to fires. *Impacts: Moderate*	Increased training at new ranges could compromise habitat quality; habitat susceptible to fires. *Impacts: Moderate*
Black-backed Woodpecker	Construction and use of new ranges could decrease habitat availability; fires could improve habitats. *Impacts: Minor*	Increased fire risk could benefit black-backed woodpecker. *Impacts: Minor*	Increased fire risk could benefit black-backed woodpecker; ecosystem management and monitoring would improve. *Impacts: Minor*
American Dipper	Habitat loss or impacts could occur from mining, forestry, pollution, water drawdowns. *Impacts: None*	Could expect increased impacts to localized riparian habitats due to maneuvers. *Impacts: None*	Could expect increased impacts to localized riparian habitats due to maneuvers; habitats could be conserved through ecosystem management. *Impacts: None*
Bohemian Waxwing	Clearing of ranges could impact habitats. *Impacts: Minor*	Could be susceptible to habitat loss from development of UAV facilities, use of ranges and from fires. *Impacts: Moderate*	Could be susceptible to habitat loss from development of UAV facilities, use of ranges and from fires. Monitoring would improve with ecosystem management. *Impacts: Moderate*

Table 4.9.b cont. Summary of Impacts to Priority Wildlife Populations on Donnelly Training Area[1].

Species	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Hammond's Flycatcher	Development of new ranges could cause habitat loss. *Impacts: Minor*	Use of ranges could result in loss of aspen. *Impacts: Moderate*	Use of ranges could result in loss of aspen. Ecosystem management and monitoring would improve. *Impacts: Moderate*
Rusty Blackbird	Clearing of forest for ranges could affect habitat availability. *Impacts: Minor*	Could be susceptible to habitat loss from use of ranges and from fires. *Impacts: Minor*	Could be susceptible to habitat loss from use of ranges and from fires; monitoring would improve. *Impacts: Minor*
White-winged Crossbill	Clearing of forest for ranges could affect habitat availability *Impacts: Minor*	Could be susceptible to habitat loss from use of ranges and from fires. *Impacts: Moderate*	Could be susceptible to habitat loss from use of ranges and from fires; monitoring would improve. *Impacts: Moderate*

[1] Assume interim and end state, with training levels relatively similar.

Table 4.9.c Summary of Impacts to Priority Wildlife Populations on Fort Richardson[1].

Species	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Wolverine	Range construction and maneuver training could disturb individual wolverine or local populations. *Impacts: Minor-Moderate*	Increased maneuver and weapons training could disturb individual wolverine or local populations. *Impacts: Moderate*	Increased maneuver and weapons training could disturb individual wolverine or local populations. *Impacts: Moderate*
Grizzly Bear	Range construction and maneuver training could disturb individual grizzly or local populations. *Impacts: Minor-Moderate*	Increased maneuver and weapons training could disturb individual grizzlies or local populations. *Impacts: Moderate*	Increased maneuver and weapons training could disturb individual grizzlies or local populations. *Impacts: Moderate*
Black Bear	Range construction and maneuver or weapons training could disturb some black bears. *Impacts: Minor-Moderate*	Increased maneuver and weapons training could disturb some bears or local populations. *Impacts: Moderate*	Increased maneuver and weapons training could disturb some bears or local populations. *Impacts: Moderate*
Wolf	Range construction and maneuver training could disturb individual wolves or packs. *Impacts: Minor*	Increased maneuver and weapons training could disturb individual wolves or local populations. *Impacts: Moderate*	Increased maneuver and weapons training could disturb individual wolves or local populations. *Impacts: Moderate*

Table 4.9.c cont. Summary of Impacts to Priority Wildlife Populations on Fort Richardson[1].

Species	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Dall Sheep	Minimal impact from maneuvers or weapons training. Dall sheep could be susceptible to disturbance from helicopter training or recreation. *Impacts: Minor*	Minimal impact from maneuvers or weapons training. Dall sheep could be susceptible to disturbance from helicopter training or recreation. *Impacts: Minor*	Minimal impact from maneuvers or weapons training. Dall sheep could be susceptible to disturbance from helicopter training or recreation. *Impacts: Minor*
Moose	Range construction could improve localized moose habitats. Weapons training could disturb individual moose or local populations. *Impacts: Minor*	Maneuver or weapons training could disturb localized moose populations. *Impacts: Minor*	Maneuver or weapons training could disturb localized moose populations. *Impacts: Minor*
Beluga Whale	Effects of disturbance are not well understood, but Belugas could be susceptible to shipping, aircraft overflights, and water quality degradation. *Impacts: Minor*	Disturbance rates could increase during deployments, but impacts would be short-term. *Impacts: Minor*	Disturbance rates could increase during deployments, but impacts would be short-term. *Impacts: Minor*
Common Loon	Susceptible to disturbance during breeding. *Impacts: Minor*	Susceptible to disturbance during breeding. *Impacts: Minor*	Susceptible to disturbance during breeding. *Impacts: Minor*
Waterfowl	Weapons training could disturb or localized populations of waterfowl. *Impacts: Minor*	Increased maneuver training could disturb waterfowl. Greater high-explosive weapons training could cause population-level effects in localized areas during breeding-brooding seasons. *Impacts: Moderate*	Increased maneuver training could disturb waterfowl. Greater high-explosive weapons training could cause population-level effects in localized areas during breeding-brooding seasons. *Impacts: Moderate*
Raptors	Localized populations of raptors could be disturbed by maneuvers or weapons training. *Impacts: Minor*	Localized populations of raptors could be disturbed by maneuvers or weapons training. *Impacts: Minor-Moderate*	Localized populations of raptors could be disturbed by maneuvers or weapons training. *Impacts: Minor-Moderate*
Western Wood-Pewee	Widespread impacts to habitats would not be likely. *Impacts: Minor*	Could expect small increase damage to riparian habitats, but impacts would be localized. *Impacts: Minor*	Could expect small increase damage to riparian habitats, but impacts would be localized. *Impacts: Minor*
Steller's Jay	Development of new ranges could cause habitat loss. *Impacts: Moderate*	Use of ranges could result in loss of forest habitat; Steller's jay's could be susceptible to loss of habitat due to fires. *Impacts: Moderate*	Use of ranges could result in loss of forest habitat; Steller's jay's could be susceptible to loss of habitat due to fires; habitats could be conserved through ecosystem management. *Impacts: Moderate*

Table 4.9.c cont. Summary of Impacts to Priority Wildlife Populations on Fort Richardson[1].

Species	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
American Dipper	Habitat loss or impacts could occur from mining, forestry, pollution, water drawdowns. *Impacts: Minor*	Could expect increased impacts to localized riparian habitats due to maneuvers. *Impacts: Minor*	Could expect increased impacts to localized riparian habitats due to maneuvers; habitats could be conserved through ecosystem management. *Impacts: Minor*
Golden-crowned Kinglet	Clearing of ranges could impact habitats. *Impacts: Minor*	Could be susceptible to habitat loss from use of ranges and from fires. *Impacts: Moderate*	Could be susceptible to habitat loss from use of ranges and from fires. *Impacts: Moderate*
Golden-crowned Sparrow	Minimal disturbance to these birds or their habitats would be expected. *Impacts: None*	Minimal disturbance to these birds or their habitats would be expected. *Impacts: None*	Minimal disturbance to these birds or their habitats would be expected. *Impacts: None*

[1] Assume interim and end state, with training intensities being higher during interim phase.

Table 4.9.d Comparison of Impacts to Fisheries Resources on USARAK Lands.

Location	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Fort Wainwright			
Stocked Fish	Impacts from construction and training could result in erosion or sedimentation, especially on the Main Post. *Impacts: Minor*	Water quality impacts could increase slightly due to construction and training. Increased recreational demand could affect stocking program. *Impacts: Minor*	Water quality impacts could increase slightly due to construction and training. Increased recreational demand could affect stocking program. *Impacts: Minor*
Wild Fisheries	Range construction and maneuver training could cause localized water quality impacts. *Impacts: Minor*	Increased maneuver and weapons training could affect water quality in localized areas. Increased recreational demand could affect some anadromous fisheries. *Impacts: Minor*	Increased maneuver and weapons training could affect water quality in localized areas. Increased recreational demand could affect some anadromous fisheries. *Impacts: Minor*

Table 4.9.d Comparison of Impacts to Fisheries Resources on USARAK Lands.

Location	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Donnelly Training Area			
Stocked Fish	Impacts to stocked fisheries from training or range construction would be highly localized. *Impacts: Minor*	Water quality impacts could increase slightly due to training. Increased recreational demand could affect stocking program. *Impacts: Minor*	Water quality impacts could increase slightly due to training. Increased recreational demand could affect stocking program. *Impacts: Minor*
Wild Fisheries	Maneuver training could cause localized water quality impacts. *Impacts: Minor*	Increased maneuver and weapons training could affect water quality in localized areas. *Impacts: Minor*	Increased maneuver and weapons training could affect water quality in localized areas. *Impacts: Minor*
Fort Richardson			
Stocked Fish	Impacts from construction and training could result in erosion or sedimentation. *Impacts: Minor*	Water quality impacts could increase slightly due to training during interim phase. Increased recreational demand could affect stocking program. *Impacts: Minor*	Water quality impacts could increase slightly due to training during interim phase. Increased recreational demand could affect stocking program. *Impacts: Minor*
Wild Fisheries	Impacts from construction and training could result in erosion or sedimentation. *Impacts: Minor*	Increased maneuver and weapons training could affect water quality in localized areas. Increased recreational demand could affect some anadromous fisheries, especially during interim phase. *Impacts: Minor*	Increased maneuver and weapons training could affect water quality in localized areas. Increased recreational demand could affect some anadromous fisheries, especially during interim phase. *Impacts: Minor*

4.9.5.2 Comparison of Alternatives 3 and 4

4.9.5.2.1 Wildlife

Both alternatives would result in transformation from the Current Force to SBCT. In general, Alternative 4 would result in higher numbers of personnel and equipment, but construction projects would remain the same. Training intensity would be higher. Under Alternative 4 impacts could potentially increase by 5-15% due to stationing, maneuver and weapons training (Table 4.1.a).

The primary difference between Alternatives 3 and 4 would result from the institutional matters. For Alternative 3, institutional matters relating to range management, the Integrated Training Area Management program, environmental management, and sustainable range management would remain essentially the same as the No Action Alternative. However, with Alternative 4, these four programs would be fully funded and implemented. Institutional matters for wildlife resources would also include soil and water quality monitoring, a training area recovery program, ecosystem management, and full implementation of INRMPs. The result would be improved environmental management of USARAK lands to the benefit of wildlife resources.

4.9.5.2.2 Fisheries

Both alternatives would result in transformation from the Current Force to SBCT. In general, Alternative 4 would result in higher numbers of personnel and equipment, but construction projects would remain the same. Training intensity would be higher under Alternative 4. The implications for fisheries are that under Alternative 4 impacts could potentially increase by 5-15% due to stationing, maneuver and weapons training (Table 4.1.a).

The primary difference between Alternatives 3 and 4 would result from the institutional matters. For Alternative 3, institutional matters relating to range management, the Integrated Training Area Management program, environmental management, and sustainable range management would remain essentially the same as the No Action Alternative. However, with Alternative 4, these four programs would be fully funded and implemented. Institutional matters for fisheries resources would also include soil and water quality monitoring, a training area recovery program, ecosystem management, and full implementation of INRMPs. The result would be improved environmental management of USARAK lands to the benefit of fisheries resources.

4.9.6 Mitigation

4.9.6.1 Existing

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts. These mitigation measures are implemented as funding is available. Often funding only provides for partial implementation.

4.9.6.1.1 Wildlife

- Continue implementation of INRMPs. These contain specific actions to inventory, maintain, and improve wildlife habitat.
- Continue to monitor effects of military training on select wildlife species (especially herd animals and waterfowl) during critical seasons such as breeding, rearing of young, and migration. Use knowledge to develop and implement management strategies to minimize disturbance to priority wildlife. This would help natural resources and range managers to coordinate training schedules that minimize impacts to wildlife populations.
- Continue to conduct a detailed study to assess the effects of noise on wildlife. This would help natural resources and range managers to coordinate training schedules that minimize impacts to wildlife populations.

4.9.6.1.2 Fisheries

- Continue implementation of INRMPs. These contain specific actions to inventory, maintain, and improve fisheries resources.

4.9.6.2 Proposed

Proposed mitigation for Alternative 4 is to fully implement plans and projects that have already been identified by USARAK's INRMPs and ecosystem management. These projects and plans are further described in Appendix C. Additional mitigation measures are also listed below.

4.9.6.2.1 Wildlife

- Fully implement USARAK natural resources conservation program, including INRMPs and ecosystem management. This would improve management of wildlife resources.
- Develop and implement an information and education program for personnel using USARAK lands. Emphasize conservation of wildlife and natural resources; develop protocol to reduce wildlife disturbance and negative wildlife-human interactions (e.g., bear or moose attacks). This would enhance the conservation of wildlife resources on USARAK lands.

4.9.6.2.2 Fisheries

- Fully implement natural resources conservation program, INRMPs, and ecosystem management. This would improve management of fisheries resources.
- Develop and implement an information and education program for personnel using USARAK lands. This would enhance the conservation of fisheries resources on USARAK lands.

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4.10 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 for SBCT transformation. Baseline data for this comparison was presented in Section 3.10. Additional information on threatened or endangered species and species of concern is presented in Appendix F.

4.10.1 Background

No federal or state threatened, endangered, proposed, or candidate plant or animal species are found within or near lands used by U.S. Army Alaska (USARAK). The U.S. Fish and Wildlife Service concluded that the Army's activities related to transformation would not likely adversely impact any federally listed species (Appendix F). Several species of concern are found on USARAK lands (Table 3.10.b).

4.10.2 Review of Impacts to Threatened or Endangered Species and Species of Concern

The types of impacts to threatened or endangered species and species of concern would be similar to those described in Sections 4.8, Vegetation and 4.9, Wildlife and Fisheries. The textbox below describes the differences between threatened or endangered species and species of concern. Alaska's species of concern and federally listed threatened or endangered species are presented in Appendix E.

Threatened or Endangered

Jurisdiction – Federal law implemented by the U.S. Fish and Wildlife Service.
Endangered – Danger of extinction throughout all or most of range.
Threatened – Species is likely to become endangered.
Proposed – Species formally proposed for endangered or threatened listing.
Candidate – Information exists to support proposal to list as threatened or endangered.
Delisted – Species has been removed from list of threatened and endangered.

Species of Concern

Jurisdiction – State of Alaska or federal agency programs that are not legally binding; the purpose is to identify and monitor vulnerable species.
Plant species of concern – Species with limited geographic range, small population size, low population density, specialized habitat requirements, loss of habitat or sensitivity to disturbance (Alaska Natural Heritage Program 2002).
Animal species of concern – Species are listed because of rarity or population declines (Boreal Partners in Flight Working Group 1999).

USARAK's policies for management of endangered species are outlined in the Integrated Natural Resources Management Plans for each post (USARAK 2002e,f,g). 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 will conduct

planning for the endangered species program; implement an inventory and monitoring program to identify the location and distribution of any rare, uncommon, or priority species; and protect habitats of these species. There is no endangered species management plan unless a federally listed endangered or threatened species is found on an installation. The USARAK ecosystem management program also monitors species of concern.

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.

4.10.3 Activity Groups That Affect Threatened or Endangered Species and Species of Concern

The textbox below lists activity groups that could affect threatened, endangered, or species of concern due to transformation.

Activity Groups With Impacts	Activity Groups Without Impacts
• Stationing • Construction • Training • Systems Acquisition • Deployment • Institutional Matters	None

4.10.3.1 Stationing

Transformation would result in additional personnel stationed at Fort Wainwright (FWA) and Fort Richardson (FRA) (Table 4.1.a). This increase in personnel could result in additional adverse impacts to some species of concern.

4.10.3.2 Construction

Proposed construction projects associated with transformation include the company operations facilities at FWA; the unmanned aerial vehicle (UAV) maintenance support facility at Donnelly Training Area (DTA); and the mission support training facility, new barracks facilities, and development of the Port of Anchorage deployment staging area at FRA (Appendix D). Construction in cantonment areas would not likely affect any plant or wildlife species of concern. Development of the new UAV maintenance facility could affect approximately 0.5 acres of habitat.

4.10.3.3 Training

The frequency of maneuver and weapons training would increase under SBCT transformation (Table 4.1.a). Maneuver training could affect vegetation through damage to plants or by alteration of habitat. Likewise, maneuver training could affect sensitive wildlife by disrupting animals or altering habitat. Training intensity and vehicle use would increase, resulting in an approximate 400% increase in MIMs. Some plant and animal species of concern could be affected by transformation.

4.10.3.4 Systems Acquisition

New equipment would be used under transformation, including the eight-wheeled 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) (Table 4.1.a). Impacts associated with use of the new equipment is discussed in the Training section.

4.10.3.5 Deployment

Deployment would occur by air, land, or sea. Transformation would result in increased frequency of out-of-state and overseas deployments. Under current training doctrine, deployment would not increase on a unit basis (e.g., individual platoon unit deployments would remain at four times a year regardless of alternative). However, the number of units, to include platoon, company, and battalion, would increase under the proposed action. Therefore, the total number of unit deployments and miles would increase. Increased activities associated with deployments could result in short-term adverse impacts to some animal species of concern.

4.10.3.6 Institutional Matters

Institutional matters include USARAK management activities, land stewardship, policy and program implementation. Transformation is expected to change management processes, which should lead to better data collection and management. This would improve stewardship of USARAK lands and resources.

4.10.4 Comparison of Alternatives

4.10.4.1 Description of Methodology

The following qualitative definitions will be used to categorize potential impacts to threatened or endangered species and species of concern:

- None – No measurable impact is expected to occur.
- Minor – Impacts could affect localized populations, but measurable population-level impacts are not expected to occur.
- Moderate – Impacts could affect a regional population or create measurable short-term population-level effects.
- Severe – Impacts will create serious population-level consequences that could be long-term.
- Beneficial – Impacts will benefit resources.

The first two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to threatened or endangered species and species of concern are presented in 4.10.6, Mitigation.

4.10.4.2 Fort Wainwright

There are no known federally endangered or threatened species on FWA, but there are a number of rare, uncommon, or priority species (USARAK 2002g). Several plant and animal species of concern are found on the post (Table 3.10.b; USARAK 2002g). Activities by USARAK could affect some of these species (Table 4.10.c).

4.10.4.2.1 Alternative 1 (No Action)

Construction impacts to plant or animal species of concern are not likely because the construction projects are at locations where such species are not frequently found. Most impacts would occur from maneuver and weapons training. These were described in Sections 4.8, Vegetation and 4.9, Wildlife and Fisheries. Overall, the impact of USARAK's activities on plant and animal species of concern is minor.

4.10.4.2.2 Alternative 3 (Transform with New Infrastructure)

As described in Sections 4.8, Vegetation and 4.9, Wildlife and Fisheries, transformation would result in increased numbers of troops and higher training intensity at end state. These actions could affect plant and animal sensitive species and species of concern. Compared to the No Action Alternative, Alternative 3 could raise the rates of disturbance to habitats or populations of animals but the effects would be expected to be localized and minor for the olive-sided flycatcher, American osprey, and American peregrine falcon. Moderate impacts are possible for the gray-cheeked thrush, Townsend's warbler, and blackpoll warbler (Table 4.10.a). Minor impacts to vegetative species of concern would be expected.

4.10.4.2.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Although end-state stationing would be higher under Alternative 4, training intensities at FWA and associated lands would be similar to Alternative 3. Impacts would be similar. Monitoring and management of species of concern would likely be enhanced due to the full funding and implementation of institutional matters.

Table 4.10.a Impacts to Sensitive Species and Species of Concern at Fort Wainwright and Donnelly Training Area.

Species	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Olive-sided flycatcher (FWA, DTA)	Clearing of forest for ranges could reduce habitat availability; flycatchers could benefit from fires. *Impacts: Minor*	Habitat availability could improve if fire frequency increased. *Impacts: Minor*	Habitat availability could improve if fire frequency increased; ecosystem management and monitoring would improve. *Impacts: Minor*
Gray-cheeked thrush (FWA)	Local populations could be impacted by clearing of ranges; however, species is more affected by loss of winter range. *Impacts: Minor*	Could be susceptible to habitat loss from fires. *Impacts: Moderate*	Could be susceptible to habitat loss from fires; monitoring would improve. *Impacts: Moderate*
Townsend's warbler (FWA, DTA)	Clearing of forest for ranges could affect habitat availability. *Impacts: Minor*	Could lose habitat due to range use and from fires. *Impacts: Moderate*	Could lose habitat due to range construction and from fires; monitoring would improve. *Impacts: Moderate*

Table 4.10.a cont. Impacts to Sensitive Species and Species of Concern at Fort Wainwright and Donnelly Training Area.

Species	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Blackpoll warbler (FWA, DTA)	Could lose habitat due to range construction. *Impacts: Minor*	Could lose habitat due to range use and from fires. *Impacts: Moderate*	Could lose habitat due to range construction and from fires; monitoring would improve. *Impacts: Moderate*
American osprey (FWA, DTA[1])	Clearing of forest for ranges, particularly in riparian areas, could affect habitat availability. *Impacts: Minor*	Primarily riparian species; habitat loss due to range construction and from fires minimal; susceptible to disturbance from range use during May-June nesting period. *Impacts: Minor*	Primarily riparian species; habitat loss due to range construction and from fires minimal; susceptible to disturbance from range use during May-June nesting period. Monitoring would improve. *Impacts: Minor*
American peregrine falcon (FWA, DTA)	Clearing of forest for ranges could affect habitat availability, but only occasional visitor to FWA. *Impacts: Minor*	Could lose habitat due to range use and from fires, but only occasional visitor to FWA. *Impacts: Minor*	Could lose habitat due to range construction and from fires, but only occasional visitor to FWA. Monitoring would improve. *Impacts: Minor*

[1] The American osprey is migrant and observed only rarely at DTA (Jeff Mason, personal communication 2003).

4.10.4.3 Donnelly Training Area

There are no known federally endangered or threatened species on DTA, but there are a number of rare, uncommon, or priority species (USARAK 2002e). Several plant and animal sensitive species and species of concern are found on or near the post (Table 3.10.b). Activities by USARAK could affect some of these species (Table 4.10.c).

4.10.4.3.1 Alternative 1 (No Action)

Most impacts would occur from maneuver and weapons training. These were described in Sections 4.8, Vegetation, and 4.9, Wildlife and Fisheries. Overall, the impacts of USARAK's activities on plant and animal sensitive species and species of concern are minor (Table 4.10.d). Monitoring of the distribution and abundance of populations would continue under current management guidelines (USARAK 2002e).

4.10.4.3.2 Alternative 3 (Transform with New Infrastructure)

As described in Sections 4.8, Vegetation, and 4.9, Wildlife and Fisheries, transformation would result in increased training intensity, especially at end state. These actions could affect plant and animal species of concern. Compared to the No Action Alternative, transformation could increase disturbance to habitats or wildlife populations, but the effects would still be localized and minor for the olive-sided flycatcher, American osprey, and American peregrine falcon. Moderate impacts are possible for the Townsend's warbler and blackpoll warbler (Table 4.10.b). Impacts to vegetation would be minor.

4.10.4.3.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Due to Airborne Task Force maneuvers at DTA, disturbance to species of concern would occur at slightly higher rates than under Alternative 3. However, additional impacts would be incremental and overall impacts would be similar to those under Alternative 3. Monitoring and management of species of concern would likely be enhanced due to the full funding and implementation of institutional matters.

4.10.4.4 Fort Richardson

There are no known federally endangered or threatened species on Fort Richardson, but there are some rare, uncommon, and/or conservation priority species (USARAK 2002f). Several plant and wildlife sensitive species and species of concern are found on or near the post (Table 3.10.b; Appendix E). Activities by USARAK could affect some of these species (Table 4.10.c).

4.10.4.4.1 Alternative 1 (No Action)

Construction impacts in the cantonment area are not likely because the projects are at locations where species of concern are not frequently found. Development of range facilities on the northeast corner of the post could result in impacts to forest-dwelling species. Most impacts would occur from maneuver and weapons training. These were described in Sections 4.8, Vegetation, and 4.9, Wildlife and Fisheries. Overall, the impact of USARAK's activities on sensitive plant and animal species and species of concern are none to minor.

4.10.4.4.2 Alternative 3 (Transform with New Infrastructure)

Transformation would result in increased numbers of troops and higher training intensity, especially during the interim phase. These actions could affect plant and animal sensitive species and species of concern. Compared to the No Action Alternative, transformation could raise the rates of disturbance to habitats or populations of wildlife, but the effects would be expected to be localized and minor for the olive-sided flycatcher, American osprey, and American peregrine falcon. Moderate impacts are possible for the Townsend's warbler and blackpoll warbler (Table 4.10.b). There would be no difference in impacts between the interim phase and the end state. Impacts to vegetation would be minor.

4.10.4.4.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Disturbance to species of concern could be slightly higher compared to Alternative 3 because of the addition of the Airborne Task Force at FRA. However, overall impacts are expected to be similar to Alternative 3. Monitoring and management of species of concern would likely be enhanced due to the full funding and implementation of institutional matters. Impacts during the interim phase might be somewhat higher, but in the long-term, the difference between end state and interim phase would be negligible.

Table 4.10.b Impacts to Sensitive Species and Species of Concern at Fort Richardson.

Species	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Olive-sided flycatcher	Clearing of forest for ranges could reduce habitat availability; flycatchers could benefit from fires. *Impacts: Minor*	Habitat availability could improve if fire frequency increased. *Impacts: Minor*	Habitat availability could improve if fire frequency increased; ecosystem management and monitoring would improve. *Impacts: Minor*
Townsend's warbler	Clearing of forest for ranges could affect habitat availability. *Impacts: Minor*	Could lose habitat due to range use and from fires. *Impacts: Moderate*	Could lose habitat due to range construction and from fires; monitoring would improve. *Impacts: Moderate*
Blackpoll warbler	Could lose habitat due to range construction. *Impacts: Minor*	Could lose habitat due to range use and from fires. *Impacts: Moderate*	Could lose habitat due to range construction and from fires; monitoring would improve. *Impacts: Moderate*
American osprey	Clearing of forest for ranges, particularly in riparian areas, could affect habitat availability. *Impacts: Minor*	Primarily riparian species; habitat loss due to range construction and from fires minimal; susceptible to disturbance from range use during May-June nesting period. Primarily riparian species. *Impacts: Minor*	Primarily riparian species; habitat loss due to range construction and from fires minimal; susceptible to disturbance from range use during May-June nesting period. Monitoring would improve. *Impacts: Minor*
American peregrine falcon	Clearing of forest for ranges could affect habitat availability. *Impacts: Minor*	Could lose habitat due to range use and from fires. *Impacts: Minor*	Could lose habitat due to range construction and from fires. Monitoring would improve. *Impacts: Minor*

4.10.5 Comparison of Alternatives Summary

4.10.5.1 Comparison of All Alternatives

Table 4.10.d presents a summary of impacts to threatened or endangered species and species of concern from each alternative. Definitions of the qualitative impact categories are provided in Section 4.10.4.

Table 4.10.c Summary of Impacts to Threatened or Endangered Species and Species of Concern on USARAK Lands.

Impact Issue	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Fort Wainwright			
Threatened or Endangered Plants	N/A	N/A	N/A
Threatened or Endangered Wildlife	N/A	N/A	N/A
Plant Species of Concern	Minor	Minor	Minor
Wildlife Sensitive Species and Species of Concern	Minor	Minor-Moderate[1]	Minor-Moderate[1]
Donnelly Training Area			
Threatened or Endangered Plants	N/A	N/A	N/A
Threatened or Endangered Wildlife	N/A	N/A	N/A
Plant Species of Concern	Minor	Minor	Minor
Wildlife Sensitive Species and Species of Concern	Minor	Minor-Moderate[1]	Minor-Moderate[1]
Fort Richardson			
Threatened or Endangered Plants	N/A	N/A	N/A
Threatened or Endangered Wildlife	N/A	N/A	N/A
Plant Species of Concern	Minor	Minor	Minor
Wildlife Sensitive Species and Species of Concern	Minor	Minor-Moderate[2]	Minor-Moderate[2]

N/A = No threatened or endangered plant or wildlife species exist on or near USARAK lands.

[1] Impacts could be moderate to the gray-cheeked thrush, Townsend's warbler, and blackpoll warbler.

[2] Impacts could be moderate to the Townsend's warbler and blackpoll warbler.

4.10.5.2 Comparison of Alternatives 3 and 4

Transformation would not affect any federally listed threatened or endangered species, or candidate, proposed, or delisted species (Appendix F). Both alternatives would result in transformation of the Current Force to SBCT. In general, Alternative 4 would result in higher numbers of personnel and equipment, but construction projects would remain the same. Training intensity would be higher. The implications for plant or wildlife species of concern are that under Alternative 4, impacts could potentially increase by 5-15% due to stationing, maneuver and weapons training (Table 4.1.a).

The primary difference between Alternatives 3 and 4 would result from the institutional matters. For Alternative 3, institutional matters relating to range management, Integrated Training Area Management, environmental management, and sustainable range management would remain essentially the same as the No Action Alternative. However, with Alternative 4, these four programs would be fully funded and implemented. Institutional matters would result in improved management.

4.10.6 Mitigation

4.10.6.1 Existing

The following mitigation measure currently in place is continually revised and reviewed to respond to new or increasing impacts. This mitigation measure is implemented as funding is available. Funding often only provides for partial implementation.

- Continue to extract information regarding threatened or endangered species from other ongoing surveys.

4.10.6.2 Proposed

Proposed mitigation would implement plans and projects that have already been identified by USARAK's Integrated Natural Resources Management Plans and ecosystem management (Appendix H). These plans and projects would only be partially funded under Alternative 3 but fully funded under Alternative 4. Additional mitigation measures are also listed below.

- Develop management guidelines with the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game to address threatened or endangered species, if found on USARAK lands.

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4.11 FIRE MANAGEMENT

Issue E: Fire Management. Transformation's impact to wildland fire management was identified as a relevant issue of concern through scoping meetings and by USARAK. It is therefore evaluated in this EIS (see Section 1.8, Scoping Issues of Concern).

This section analyzes and compares the fire management impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.11.

4.11.1 Background

Due to the important role of fire in Alaskan ecosystems (Section 3.11), wildland fire is not seen as a negative impact to the natural environment. Instead, negative impacts are those that threaten human life and property. Specifically assessed in this section is the risk of unplanned human-caused fires near settlements and the need for increased fire protection resources for new structures under SBCT transformation.

4.11.2 Review of Impacts to Fire Management

The following assumptions about the outcome of transformation were used in order to assess its impact on wildland fire management and risk on U.S. Army Alaska (USARAK) lands:

- Added infrastructure supporting transformation would require protection from wildland fire.
- Increased training activity would increase risk of fire.
- Increased stationing could lead to greater recreational use by Army personnel, thus increasing risk of fire.
- Use of frequently utilized training areas would increase with transformation.
- Training areas that were not used regularly would be used more frequently under transformation.

4.11.3 Activity Groups That Affect Fire Management

The textbox below lists activity groups that could affect fire management due to transformation.

Activity Groups With Impacts	Activity Groups Without Impacts
• Stationing	• Construction
• Training	• Deployment
• Institutional Matters	• Systems Acquisition

4.11.3.1 Stationing

Transformation would result in additional personnel stationed at Fort Wainwright (FWA) and Fort Richardson (FRA) (Table 4.1.a). It is possible that increased stationing at installations would lead to increased recreational use of USARAK lands. As described in Section 3.11, fires from recreational use have been an issue on some installations.

4.11.3.2 Training

The frequency and intensity of maneuver and weapons training could increase if USARAK were to transform (Table 4.1.a). Incendiary devices, field burning, vehicle exhaust, trash burning, and warming fires are potential igniters of wildland fires as identified in the Alaska Army Lands Withdrawal Renewal Environmental Impact Statement (USARAK 1999a). These activities could occur during training exercises.

4.11.3.3 Institutional Matters

Institutional matters include USARAK management activities, land stewardship, policy and program implementation. Transformation is expected to change management processes, which should lead to better data collection and management. This would improve stewardship of USARAK lands and resources.

Any newly constructed buildings for transformation would need wildland fire protection and would require increased resources from the USARAK forest management and the Alaska Fire Service. These structures would require protection despite the fire management option assigned to adjacent lands. Some management areas described in Section 3.11, Fire Management, would require reclassification as a result of these new structures.

Prescribed burns and thinning to restore ecosystem functions of fire and to reduce future fire severity would take place under transformation. This may occur as mitigation for this Environmental Impact Statement, the implementation of Integrated Natural Resources Management Plans (INRMPs), or the implementation of the fire management plans.

4.11.4 Comparison of Alternatives

4.11.4.1 Description of Methodology

The facilities being constructed under transformation (Appendix D) would not pose a wildland fire risk. Since these facilities would not increase wildland fire risk, training was identified as the main SBCT activity capable of increasing the rate of fire to above natural frequencies.

To assess transformation's impact on wildland fire management, a wildland fire risk assessment was completed by identifying training areas expected to receive the greatest training impact and other areas of concern. These areas are shown in Appendix A (Figures 4.11.a, b, c, d). The high use training areas and those close to populated areas are bordered in red to show priority areas for reducing fire risk from increased training intensity. The maps also show fuel types that exist on USARAK lands, which are described in Section 3.11.1.3, Fuels Management.

Other causes of increased fire risk may result from USARAK mission-essential projects such as firing ranges. These projects are assessed under the No Action Alternative and in the Section 4.20, Cumulative Impacts.

The following definitions will be used to categorize potential impacts:

- None – No measurable impact is expected to occur.
- Minor – Wildfire risk would increase in unpopulated areas.
- Moderate – Wildfire risk would increase. These impacts would be in Critical, Full, or Modified management areas (Section 3.11.1).

- Severe – Impacts would be obvious and would have serious consequences to wildfire management and risk.
- Beneficial – Impacts of alternatives would benefit wildfire management.

The first two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to fire management are presented in 4.11.6, Mitigation.

4.11.4.2 Fort Wainwright

4.11.4.2.1 Alternative 1 (No Action)

Due to the currently planned mission-essential projects, including new and upgraded ranges and training facilities, the risk of wildland fire is expected to increase slightly under the No Action Alternative. This would be a minor impact to fire management for Main Post, Tanana Flats Training Area (TFTA), and Yukon Training Area (YTA).

Live-fire training requirements would be near current levels. For example, 61,000 soldier/user user days are required per year for small arms and major weapons ranges at FWA and Donnelly Training Area (DTA). Training intensity and frequency would remain at levels seen today. No additional wildfire risk is expected from training.

Wildland fire management under the No Action Alternative would remain as it is today. Forest management guidance from the INRMP and fire management plans would be beneficial to wildfire management. The fire management option categories described in Section 3.11 would not change due to transformation, but may eventually change as a result of other activities described under Section 4.20, Cumulative Impacts.

Since stationing at FWA would remain at current levels, no increases in recreation from military personnel and their families are expected under the No Action Alternative.

Overall, impacts to fire management would be minor.

4.11.4.2.2 Alternative 3 (Transform With New Infrastructure)

Under Alternative 3 end-state requirements, the number of small arms rounds fired would increase at FWA and DTA by approximately 40%, while high explosive rounds fired would increase by about 50% (Table 4.11.a). This would increase the wildland fire risk on FWA to moderate, especially in areas where boreal spruce category fuels are located (Appendix A, Figures 4.11.a and 4.11.b). Fire management impacts on Main Post would increase to moderate due to proximity to human habitation. YTA would also increase to moderate due to the prevalent spruce forest type. Interim SBCT stages would have slightly less impacts to fire management.

Wildland fire risk caused by recreational use has the potential to increase due to the increased population living at FWA. There would be an expected increase of approximately 1,000 personnel at the end state. While documented recreational use (1996 through 1999) at Main Post indicate that few users are military personnel, overall recreational use may increase. This is expected to be a minor impact.

Reclassification of fire management options may occur as needed after transformation takes place. Prescribed burning resulting from mitigation would create short-term adverse impacts to

air quality and would require a permit from Alaska Department of Environmental Conservation (ADEC) if burning exceeds 40 acres.

Overall, impacts to fire management at FWA would be moderate.

4.11.4.2.3 Alternative 4 (Transform With New Infrastructure and Airborne Task Force)

Under Alternative 4, the impacts to fire management would be similar to Alternative 3. These impacts include increased firing in flammable areas, increased recreational use, and air quality impacts from controlled burns. Alternative 4 would increase the impact on fire management to moderate. Interim and end-state SBCT stages would likely have the same impacts on fire management.

Full funding and implementation of the INRMP and fire management plans would improve wildfire management. Institutional matters under Alternative 4 would also involve range management programs that may benefit fire management on FWA.

4.11.4.3 Donnelly Training Area

4.11.4.3.1 Alternative 1 (No Action)

Due to the currently planned mission-essential projects, including new and upgraded ranges and training facilities, the risk of wildland fire is expected to increase slightly under the No Action Alternative. This is likely to create a minor impact to fire management. The fire management categories described in Section 3.11 would not change due to transformation but may change as a result of cumulative impacts.

Live-fire training requirements would be near current levels. For example, about 61,000 soldier/user user days are required per year for small arms and major weapons ranges at DTA and FWA. Training intensity and frequency would remain at levels seen today. No additional wildfire risk is expected from training.

Personnel would not be stationed at DTA, and the training area is not likely to see increased recreational use from FWA personnel. No additional impact to fire management is expected from recreational use under the No Action Alternative.

Overall, impacts to fire management would be minor at DTA.

4.11.4.3.2 Alternative 3 (Transform With New Infrastructure)

Under Alternative 3 end-state requirements, the number of small arms rounds fired would increase at DTA and FWA by approximately 40%, while high explosive rounds fired would increase by about 50% (Table 4.11.a). This would increase the wildland fire risk on DTA and is an adverse long-term impact, especially in areas where boreal spruce category fuels are located (Appendix A, Figure 4.11.c). This is expected to result in a moderate impact to fire management. Interim and end-state impacts to fire management would be identical.

Reclassification of fire management options may occur as needed after SBCT implementation. Prescribed burning resulting from any alternatives would create short-term adverse impacts to air quality and would require a permit from ADEC.

While no personnel would be stationed at DTA, there may be an increase in recreational use from newly stationed personnel and their families at FWA under Alternative 3. This increase, if any, is

not likely to cause a significant increase in wildland fire risk. Overall, fire risk and impacts would be moderate under Alternative 3.

4.11.4.3.3 Alternative 4 (Transform With New Infrastructure and Airborne Task Force)

Under Alternative 4, the impacts to fire management at DTA would be similar to those under Alternative 3. These impacts include increased firing in flammable areas, increased recreational use, and air quality impacts from controlled burns. Overall impacts are considered to be moderate. Interim and end-state stages would have the same impacts to fire management.

Full funding and implementation of the INRMP and fire management plans would improve wildfire management. Institutional matters under Alternative 4 would also involve range management programs that may benefit fire management on DTA.

4.11.4.4 Fort Richardson

4.11.4.4.1 Alternative 1 (No Action)

The number of required live-fire user days per year at FRA would be near current levels under the No Action Alternative. Approximately 24,000 soldier user days are required per year at small arms ranges, and 5,000 are required at major weapons ranges. Training intensity and frequency would remain at levels seen today. No additional wildfire risk is expected from live-fire training under the No Action Alternative. Impacts would be minor.

Since stationing would remain at current levels, no increase in recreation from military personnel and their families is expected under the No Action Alternative.

Wildland fire management under the No Action Alternative would remain as it is today. The fire management categories described in Section 3.11 would not change due to transformation but may change due to mission-essential projects (i.e., new ranges).

Overall, impacts to fire management at FRA would be minor.

4.11.4.4.2 Alternative 3 (Transform With New Infrastructure)

Under Alternative 3 the number of small arms range user days would be expected to increase at FRA by approximately 15%, while major weapons user days would increase by 55% (Table 4.11.a). This would increase the wildfire risk on FRA and is an adverse long-term impact for areas with flammable grasses. Fires, however, are quickly noticed and extinguished at FRA so no significant impacts to wildfire risk are expected under this alternative.

The number of required rounds fired at FRA would increase from current requirements. Alternative 3 would bring an estimated 115% increase in required small rounds fired, a 125% increase during the interim phase, and a 65% end-state increase in high explosive rounds fired. Increased wildfire risk would be expected. Although fires are often quickly noticed and extinguished at FRA, this is identified as a moderate impact.

Prescribed burning resulting from transformation would create short-term adverse impacts to air quality and require a permit from ADEC if burning is to exceed 40 acres annually.

Under Alternative 3, wildland fires caused by recreational users have the potential to increase due to the higher interim population living at FRA. End-state numbers of personnel stationed at FRA would be similar to those of today. The interim increase could result in greater recreational use of

the installation. As mentioned previously, fires are quickly identified and extinguished on FRA so the increased risk from recreation would be minor.

Overall, impacts to fire management on FRA would be moderate.

4.11.4.4.3 Alternative 4 (Transform With New Infrastructure and Airborne Task Force)

Under Alternative 4, the impacts to fire management at FRA would be similar to those under Alternative 3. Soldier user days for small arms and major weapons training would increase by 135% and 7%, respectively. End-state requirements for small arms rounds fired and high explosive munitions would increase from current levels by approximately 165%. These impacts include increased firing in flammable areas, increased recreational use, and air quality impacts from controlled burns. Impacts to fire management would be moderate.

Full funding and implementation of the INRMP and fire management plans would have long-term beneficial impacts to wildfire management. Institutional matters under Alternative 4 would also involve range management programs that may benefit fire management on FRA.

4.11.5 Comparison of Alternatives Summary

4.11.5.1 Comparison of All Alternatives

Table 4.11.a Minimum Small Arms and Major Weapons Training Requirements Under Each Alternative.

Impact Issue	Alternatives		
	1 No Action	3 Transform With New Infrastructure	4 Transform With New Infrastructure and Airborne Task Force
Fort Wainwright and Donnelly Training Area			
Small Arms Rounds Fired	6,104,075	6,104,075	8,547,774
Small Arms Range Soldier User Days	45,797	56,880	56,880
High Explosive Rounds Fired	130,426	130,426	194,236
Major Weapons Range Soldier User Days	15,110	14,331	14,331
Fort Richardson			
Small Arms Rounds Fired	2,987,710	2,987,710	7,918,647
Small Arms Range Soldier User Days	23,645	27,756	55,513
High Explosive Rounds Fired	65,211	65,211	173,866
Major Weapons Range Soldier User Days	4,935	2,640	5,280

See Table 4.11.b for a summarized comparison of impacts on fire management from each alternative. Definitions of the qualitative impact categories are presented in Section 4.11.4.

Table 4.11.b Fire Management Comparison for Fort Wainwright, Donnelly Training Area, and Fort Richardson.

Impact Issue	Alternatives				
	1 No Action	3 Transform With New Infrastructure		4 Transform With New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Fort Wainwright					
Main Post	Minor	Moderate	Moderate	Moderate	Moderate
Tanana Flats	Minor	Minor	Minor	Minor	Minor
Yukon Training Area	Minor	Moderate	Moderate	Moderate	Moderate
Donnelly Training Area	Minor	Moderate	Moderate	Moderate	Moderate
Fort Richardson	Minor	Moderate	Moderate	Moderate	Moderate

4.11.5.2 Comparison of Alternatives 3 and 4

Both alternatives would result in transformation from the Current Force to SBCT. In general, Alternative 4 would result in higher numbers of personnel and equipment, but construction projects would remain the same. Training intensity would be higher. The implications for wildfire management are that under Alternative 4 impacts could potentially increase USARAK-wide, mostly due to the increase in weapons training.

The primary difference between Alternatives 3 and 4 would result from the institutional matters. For Alternative 3, institutional matters relating to range management, Integrated Training Area Management, environmental management, and sustainable range management would remain essentially the same as the No Action Alternative (Appendix H). However, with Alternative 4, these four programs would be fully funded and implemented. Institutional matters for wildfire management would also involve the full implementation of INRMPs and range management programs. The result would be improved fire management on USARAK lands.

4.11.6 Mitigation

Areas most likely to be affected by wildland fire are adjacent to those areas that are used for training and live-fire training in particular. Since wildfire 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 slow wildfire intensity and speed.

4.11.6.1 Existing

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts. These mitigation measures are implemented as funding is available. Often funding only provides for partial implementation.

- Use the fire index in cooperation with BLM.
- Coordinate live-fire training exercises when fire weather and indices are low to help prevent the spread of wildfire.

- Avoid ordnance use during periods when weather and fuels conditions are conducive to quick fire starts and spreading.
- Continue to update and implement fire management plans written by USARAK and the BLM Alaska Fire Service for each installation. The plans assess current fire hazards and list recommendations to reduce them.
- Maintain existing firebreaks on USARAK lands, including on the northern boundary of Stuart Creek Impact Area on YTA and the southern end of Main Post, from the Richardson Highway to Jarvis Creek on DTA.
- Comply with existing range regulations and restrictions (USARAK Regulation 350-2).
- Follow existing range guidelines to prevent wildfires.
- Remove 60 acres of dead spruce near Stuckagain Heights on FRA.
- Treat Grezelka Range on FRA with a 15-acre prescribed burn.
- Remove 10 acres of dead spruce and thin trees on FRA that are near housing.
- Remove two acres of dead spruce on observation point 6A on DTA.
- Create fuel break on Jarvis North on DTA.
- Treat Texas Range on DTA with a 3,000-acre prescribed fire.

4.11.6.2 Proposed

Some programs already propose measures that would mitigate many impacts to fire management. These programs are only partially implemented and funded. The proposed mitigation is therefore to fully implement plans and projects that have already been identified by USARAK's INRMPs. These projects and plans are further described in Appendix H. Additional mitigation measures are also listed below.

- Review access to firing ranges to enable quick and effective response by initial attack forces in the event of a wildfire.
- Conduct prescribed burning. This would be considered as an option where grass is the primary fuel type. Burning may be done every one to three years depending on fuel load and conditions. This would increase user days for the Army with less risk of wildfire.
- Locate operational areas within hardwood forests (i.e., not in black spruce) to minimize the risk of wildfire.
- Create defensible space around existing and new structures. This would be done by clearing fuels around new structures and facilities to reduce the threat to structures.
- Station an additional USARAK wildland fire crew at FWA. The crew would accompany troops that train at FWA and DTA during high fire danger and would provide immediate wildland fire suppression. During times of low fire risk, the fire crew would conduct needed hazard fuel reduction projects near military structures and on ranges.

4.12 CULTURAL RESOURCES

Issue F: Cultural Resources. Impacts from maneuvers and exploded ordnance on cultural resources were identified as a relevant issue of concern through scoping meetings and by USARAK. It is therefore evaluated in this EIS (see Section 1.8, Scoping Issues of Concern).

This section analyzes and compares the cultural resource impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.12.

4.12.1 Background

Cultural resources on U.S. Army Alaska (USARAK) properties are inclusive of historic structures, archaeological (both prehistoric and historic) sites, and Properties of Traditional, Religious, and Cultural Significance (PTRCSs). Cultural resources are found on almost all major Army lands. Information on the current state of cultural resources within USARAK boundaries can be found in Section 3.12.

The primary impacts to cultural resources under transformation would involve a number of factors, including but not limited to renovation or demolition of historic buildings, ground disturbance at identified archaeological sites, or restricted access to known sacred sites. Specifically, one historic property listed in the National Register of Historic Places (NRHP) is present on Fort Wainwright Main Post: the Ladd Field National Historic Landmark. There is also one historic property determined eligible for listing in the NRHP: the Ladd Air Force Base Historic District. Any additions of buildings adjacent to or in the boundaries of the National Historic Landmark or the historic district, changes to the exteriors of these buildings, or proposed demolition/replacement of these buildings, would have a direct affect on these historic properties and would threaten the historic district and/or National Historic Landmark designation.

4.12.2 Review of Impacts to Cultural Resources

Military and non-military activities on USARAK lands can affect cultural resources in a number of ways. The nature of cultural resources makes any impact potentially irreversible or irretrievable. USARAK acts as steward for cultural resources on its properties and is responsible for maintaining the quality of those resources. This requires management for both military and non-military activities that affect cultural resources on Army lands.

Impacts can occur in the following ways:

- Placement of new buildings adjacent to or in historic districts that are not sympathetic 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.

- 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 cultural significance to Alaskan Tribes.
- Opening archaeologically sensitive areas through development of trails or roads to greater accessibility to activities that may cause ground disturbances.

4.12.3 Activity Groups That Affect Cultural Resources

The textbox below lists activity groups that could affect cultural resources due to transformation.

Activity Groups With Impacts	Activity Groups Without Impacts
• Stationing • Construction • Training • Systems Acquisition • Institutional Matters	• Deployment

4.12.3.1 Stationing

Transformation would result in additional personnel stationed at Fort Wainwright (FWA) and Fort Richardson (FRA) (Table 4.1.a). The increase in overall use and traffic on USARAK lands could lead to increased disturbance and degradation of cultural resources.

4.12.3.2 Construction

Proposed construction projects associated with transformation include the company operations facilities at FWA; the unmanned aerial vehicle (UAV) maintenance support facility at Donnelly Training Area (DTA); and the mission support training facility, new barracks facilities, and development of the Port of Anchorage deployment staging area at FRA (Appendix D). These activities could potentially disturb or damage cultural resources, and could alter historic properties and districts.

4.12.3.3 Training

The frequency and intensity of maneuver and weapons training could increase if USARAK were to transform (Table 4.1.a). Training impacts are expected to be more extensive and more frequent. This could impact cultural resources, particularly undiscovered or unknown prehistoric sites on the training areas.

4.12.3.4 Systems Acquisition

New equipment would be used under transformation, including the eight-wheeled 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) (Table 4.1.a). The Stryker is expected to utilize a greater area during maneuver training, which could threaten undiscovered cultural resource sites.

4.12.3.5 Institutional Matters

Institutional matters include USARAK management activities, land stewardship, policy and program implementation. Transformation is expected to change management processes, which should lead to better data collection and management. This would improve stewardship of USARAK lands and resources. Management activities included in the Integrated Cultural Resource Management Plans (ICRMPs) would protect and enhance cultural and historic resources on USARAK lands.

4.12.4 Comparison of Alternatives

4.12.4.1 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 following categories will be used in assessing potential impacts:

- None – No measurable impacts on cultural resources are expected from this action.
- Minor – Impacts are possible, but are expected to be light due to either very low probability or low extent of probable damage to cultural resources.
- Moderate – Impacts are possible and may have significant or irreversible and irretrievable impacts on cultural resources.
- Severe – Impacts are probable and would have significant irreversible and irretrievable impacts on cultural resources.
- Beneficial – Impacts are expected to support, upgrade, or further protect cultural resources.

The first two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to cultural resources are presented in 4.12.6, Mitigation. The potential to impact cultural resources is anticipated to be higher on the interior Alaska USARAK lands, based on survey results and known cultural sites. Training activities are expected to have the greatest impact. Expected impacts are described below.

4.12.4.2 Fort Wainwright

4.12.4.2.1 Alternative 1 (No Action)

Both the Ladd Air Force Base Historic District and the Ladd Field National Historic Landmark are located within FWA Main Post. Any future undertaking that may require the removal (demolition or renovation) of a building that contributes to the National Historic Landmark would threaten its National Historic Landmark designation. Proposed projects may also affect the historic district's contributing buildings. Several archaeological sites have been identified near Birch Hill. No other cultural resources have been identified within FWA Main Post.

Impacts are probable under this alternative, due primarily to ongoing, mission-essential construction activities. These projects could be located within the historic district or directly adjacent to it. Ongoing maintenance activities and renovation of facilities that contribute to the National Historic Landmark and historic district have the potential to adversely affect the characteristics that make them eligible for inclusion in the NRHP. Renovation or replacement of older buildings threatens the designation of the National Historic Landmark which, if continued,

would impact the cultural resource. In addition, military activities could affect the prehistoric sites near Birch Hill. However, this is not considered likely to occur. Due to the possibility of irreplaceable loss of Ladd Field National Historic Landmark, impacts under this alternative could be severe to historic properties, and minor to prehistoric sites around Birch Hill.

Archaeological sites have been identified near Wood River, Clear Creek Buttes and Blair Lakes. The clustering of these sites, along with the information they may contain for our understanding of the prehistory of the Tanana Valley region, suggest that these geographical features represent three distinct archaeological districts that are eligible for inclusion in the NRHP. It is expected that these geographical features may eventually be identified as PTRCSs. No other cultural resources have been identified or are expected to be found in Tanana Flats Training Area (TFTA).

Impacts to cultural resources on TFTA are possible under the No Action Alternative. Impacts may occur with continued military training on areas with high concentrations of prehistoric sites. Training involving off-road vehicular traffic and live-fire munitions could have an adverse effect on these sites. Impacts are expected to be moderate, due to risk or disturbance to prehistoric sites. There will be no impact to historic resources on TFTA.

To date, six archaeological sites and one historic structure have been identified and evaluated for inclusion in the NRHP at Yukon Training Area (YTA) but none have been determined eligible. Based on the level of existing information, there is a low probability that additional cultural resources would be found in YTA.

Based on existing information, YTA has a low potential for containing cultural resources, and existing levels of training would not impact identified cultural resources. No impacts are expected under this alternative.

4.12.4.2.2 Alternative 3 (Transform with New Infrastructure)

Activities under Alternative 3 could impact cultural resources on Main Post, primarily through SBCT-related construction activities. Additional infrastructure would be required to support the transformation. This would require new buildings along with new uses for some existing buildings. If the planning for the additional infrastructure does not take into consideration effects to the National Historic Landmark and historic district, it may adversely affect the integrity of these two historic properties and threaten eligibility for listing in the NRHP. This would be a significant impact to the cultural resources. There is slightly more risk under this alternative than under the No Action Alternative. Impacts to historic resources are considered to be severe due to probability and degree of potential harm.

Under Alternative 3 the end-state number of personnel stationed at FWA would increase by approximately 1,000. MIMs on Main Post would also increase from approximately 650 to 15,000. This could lead to cultural resources impacts due to increased use of Main Post for military and recreational purposes. Recreation is expected to be concentrated around the Birch Hill area and could impact sites identified at Birch Hill. However, this is not considered likely to occur. Impacts to prehistoric properties on Main Post would be minor.

Under Alternative 3, MIMs on the training area are expected to increase from approximately 2,300 to 23,000. With increased training activity and intensity, the risk of adverse impacts to archaeological resources is moderate due to vehicular traffic, live-fire ammunitions and training facilities.

Activities under Alternative 3 present a low potential for affecting cultural resources on YTA. Alternative 3 would involve higher levels of training activity and intensity. MIMs would increase from approximately 8,600 to 31,000. However, based on existing information, the training area has low potential for containing cultural resources, and it is expected that this alternative would not result in any adverse impacts to identified cultural resources. No impacts are expected on YTA under this alternative.

4.12.4.2.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts on FWA under this alternative are expected to closely mirror those under Alternative 3. Impacts in some areas may be slightly greater than under Alternative 3 due to the possibility of the Airborne Task Force (ATF) using TFTA. Most ATF training impacts would occur at DTA, therefore impacts on FWA cultural resources are expected to be similar to those under Alternative 3.

4.12.4.3 Donnelly Training Area

Archaeological surveys conducted in 2002 have identified a large number of sites near the kettle lakes to the east and west of the Richardson Highway on DTA East. This same kettle lake topography is also present on DTA West, and initial surveys of this area indicate the potential for a large concentration of sites. Collectively, these sites form archaeological districts that are potentially eligible for inclusion in the NHRP. Certain geographical features in these same areas may also be identified as PTRCSs. No other cultural resources have been identified to date.

4.12.4.3.1 Alternative 1 (No Action)

Activities under Alternative 1 have the potential to impact cultural resources. Continued training activities at current levels and the possibility of increased training intensity on the training area may encroach upon areas identified as high potential for containing archaeological sites and PTRCSs.

Current training regimes require use of DTA in all seasons. In addition, the areas utilized most frequently are also in close proximity to the areas identified as having the highest potential for containing cultural sites. Impacts to prehistoric cultural resources are expected to be moderate under this alternative. No impacts are expected to historic properties.

4.12.4.3.2 Alternative 3 (Transform with New Infrastructure)

Under Alternative 3, increased training activities would have a high potential to adversely affect cultural resources at DTA. MIMs on the training area would increase from about 17,000 to 86,000. Increased training could expose wider areas to potential impacts. Maneuver impacts 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 to prehistoric cultural resources. No impacts would occur to historic resources.

Construction activities are also expected to occur on DTA. A 0.5-acre maintenance facility for the UAV would be erected along Meadows Road in Training Area 57. No cultural resources have been located in the proposed project site. No impacts are expected to cultural resources.

The Alaska State Historic Preservation Office has concurred with these findings.

4.12.4.3.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts under Alternative 4 would be higher than those listed under Alternative 3 due to a higher intensity of training and the potential for increased access to training areas. Military use of DTA, in terms of km^2 days, would increase with the addition of the ATF (Table 4.1.a). Increased training could expose additional areas to potential impacts. Many areas appropriate for training activities also have a high probability of containing archaeological sites. However, while military training use would increase to approximately 65,000 km^2 days, MIMs on DTA are expected to remain the same. Impacts to archaeological resources are expected to be moderate, due to risk of disturbance. No impacts would occur to historic resources.

4.12.4.4 Fort Richardson

The Nike Site Summit is the only historic property listed in the NRHP on FRA. Despite probable prehistoric use of FRA, numerous field surveys have not identified any eligible cultural resource sites or archaeological material in areas proposed for use. Development of a Cold War historic context for FRA did reveal a context of "exceptional importance" that would make properties within the cantonment area an unlisted eligible historic district. The Alaska State Historic Preservation Office concurs with this finding.

4.12.4.4.1 Alternative 1 (No Action)

The No Action Alternative has a low potential to affect identified cultural resources. Patterns of vandalism and a lack of repair indicate that current levels of maintenance may not be sufficient to maintain the integrity of the Nike Site Summit historic property, which may threaten its eligibility for listing in the NRHP. However, no additional impacts are anticipated from existing levels of military activity. Impacts to historic resources under this alternative are minor.

Ongoing USARAK training activities have the potential to affect undiscovered cultural resources on FRA. Current maneuver impacts on FRA are estimated to be approximately 3,300 MIMs. Most maneuver training is expected to occur on existing roads, trails, and ranges. Due to the lack of prehistoric sites found thus far on FRA, impacts to prehistoric cultural resources are not expected.

4.12.4.4.2 Alternative 3 (Transform with New Infrastructure)

Based on existing cultural resource studies, Alternative 3 has a low potential to affect cultural resources. Impacts are anticipated to be the same as under the No Action Alternative. SBCT training is not expected to involve the Nike Site Summit historic property. A continued lack of maintenance at Nike Site Summit would have a minor impact on historic properties.

MIMs would increase from approximately 3,300 under the No Action Alternative to 3,500 at end state of Alternative 3. Interim MIMs would be higher, and might be approximately 10,600 MIMs. Maneuver training is limited to those areas with sufficient traction and less than 30% slope, and is largely expected to continue on the existing FRA road and trail system, with little additional trail construction. Other training would occur on those areas and ranges that are currently used. Due to the lack of prehistoric sites found thus far on FRA, impacts to prehistoric cultural resources are not expected.

4.12.4.4.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts under Alternative 4 are expected to be similar to those listed under Alternative 3. Alternative 4 would involve the augmentation of the 1-501st Parachute Infantry Regiment into an Airborne Task Force. This task force would be stationed at and perform most squad and platoon training exercises on FRA. MIMs under Alternative 4 would increase from approximately 3,300 to 10,600 during the interim state, then 8,000 at the end state. The Airborne Task Force would not use Nike Site Summit as a training area. Therefore, impacts to historic cultural resources would be minor.

The Airborne Task Force would not be equipped with Strykers. Impacts are not expected to be as severe as those stemming from SBCT. Due to the lack of prehistoric sites found on FRA thus far, impacts to prehistoric cultural resources are not expected. Overall impacts on FRA would be minor to none.

4.12.5 Comparison of Alternatives Summary

4.12.5.1 Comparison of All Alternatives

Table 4.12.a presents a summary of cultural resource impacts under each alternative. Definitions of the qualitative impact categories are provided in Section 4.12.4.

Table 4.12.a Cultural Resources Impacts on USARAK Properties.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Fort Wainwright					
Prehistoric					
Sites	Moderate	Moderate	Moderate	Moderate	Moderate
Districts	Moderate	Moderate	Moderate	Moderate	Moderate
PTRCSs	None	None	None	None	None
Historic					
Properties	Severe	Severe	Severe	Severe	Severe
Districts	Severe	Severe	Severe	Severe	Severe
Landmarks	Severe	Severe	Severe	Severe	Severe
PTRCSs	None	None	None	None	None
Donnelly Training Area					
Prehistoric					
Sites	Moderate	Moderate	Moderate	Moderate	Moderate
Districts	Moderate	Moderate	Moderate	Moderate	Moderate
PTRCSs	None	None	None	None	None

Table 4.12.a cont. Cultural Resources Impacts on USARAK Properties.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Historic					
Properties	None	None	None	None	None
Districts	None	None	None	None	None
Landmarks	None	None	None	None	None
PTRCSs	None	None	None	None	None
Fort Richardson					
Prehistoric					
Sites	None	None	None	None	None
Districts	None	None	None	None	None
PTRCSs	None	None	None	None	None
Historic					
Properties	Minor	Minor	Minor	Minor	Minor
Districts	None	None	None	None	None
PTRCSs	None	None	None	None	None

4.12.5.2 Comparison of Alternatives 3 and 4

Both alternatives would result in transformation from the Current Force to SBCT. Alternative 4 would result in higher numbers of personnel and equipment, but construction projects would remain the same. Training intensity would be higher. The implications for cultural resources are that impacts under Alternative 4 could increase slightly due to stationing, maneuver and weapons training, and use of additional equipment.

The primary difference between Alternatives 3 and 4 would result from the institutional matters. For Alternative 3, institutional matters relating to range management, Integrated Training Area Management, environmental management, and sustainable range management would remain essentially the same as the No Action Alternative. However, with Alternative 4, these four programs would be fully funded and implemented. Moreover, cultural resources issues would be institutionalized in the development of the Historic Properties Component (HPC) of the ICRMPs as provided for by the Army Alternate Procedures to 36 CFR 800. Detailed descriptions of these programs may be found in Appendix H. The result would be improved cultural resources management of USARAK lands.

4.12.6 Mitigation

The following are specific mitigation measures, to be considered and discussed with the State Historic Preservation Officer, Advisory Council on Historic Preservation, interested tribal governments, and other interested parties if activities are expected to have an adverse effect on cultural resources.

4.12.6.1 Existing

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts. These mitigation measures are implemented as funding is available. Often funding only provides for partial implementation.

- Continue to perform Section 110 cultural resource surveys at USARAK. The identification of historic properties allows for them to be taken into account in management decisions.
- Continue to meet Section 106 obligations at USARAK. Fulfilling obligations under Section 106 of the National Historic Preservation Act (NHPA) ensures that cultural resources are identified and considered in decision-making involving activities impacting cultural resources.
- Continue to implement the ICRMPs. The ICRMPs provide clear guidance on the best methods for compliance with cultural resources management responsibilities.
- Continue to curate artifacts found on USARAK lands with federally-certified museums, per the NHPA.
- Continue to work with Tribes in identifying and transferring graves and associated artifacts found on USARAK lands, per the Native American Graves Protection and Repatriation Act.

4.12.6.2 Proposed

Proposed mitigation for Alternative 4 is to fully implement plans and projects that have already been identified by USARAK's ICRMPs. These projects and plans are further described in Appendix H. Additional mitigation measures are also listed below.

- Develop and implement a Historic Properties Component to the ICRMPs under Army Alternate Procedures to 36 CFR 800. This would streamline cultural resource review processes and institutionalize cultural resources management processes within USARAK.
- Review and update the ICRMP as needed. This would account for any newly identified issues regarding cultural resources management on Army lands, and would ensure internal processes are current with contemporary and local issues.
- Develop a predictive model for identifying areas with high probability for containing archaeological sites, particularly on DTA. Predictive models are an efficient and accurate tool for avoiding damage to archaeological sites by providing information on potential site locations during the planning stages of land use management.
- Perform Section 110 cultural resource surveys based on the predictive model. The predictive model would identify high-potential areas, and subsequently provide better management of cultural resources during decision-making and routine activities.
- Plan proposed undertakings to avoid impacts to cultural resource sites based on survey data and modeling. This would preserve cultural resources from further impacts without additional sub-surface investigation, preserving the site for future interpretation and management.
- Develop avoidance measures to protect identified cultural resources from potential impacts. Avoidance measures can help to ensure that cultural resources are protected from impacts of nearby activities.
- Consult with interested tribal governments regarding cultural resources management and cultural resources identified on USARAK lands on a quarterly basis. Regularly scheduled tribal consultation would provide essential information that can be used in USARAK

land management decision-making and would serve to lessen the chances of unexpected encounters of cultural resources.

- Conduct studies to identify properties of traditional, religious, and cultural significance (PTRCSs). Identification and documentation of PTRCSs would ensure that a broader framework to identify cultural resources is used and would assist in a comprehensive understanding of cultural resources for future management in decision-making and routine activity.
- Recover data as appropriate through excavation of archaeological sites eligible for listing in the NRHP and adversely affected by proposed actions. When avoidance is not feasible, data recovery would document and preserve information from cultural resources that would otherwise be impacted.
- Adaptively re-use historic buildings to meet contemporary needs without compromising historic integrity. Adaptive re-use would provide opportunities for historic preservation while supporting current and future missions.
- Follow Secretary of the Interior's Standards for the Treatment of Historic Properties in rehabilitating historic buildings, adaptively re-using historic buildings and adding new construction to historic districts. Use of the Secretary of Interior's Standards would ensure that architectural characteristics that make properties eligible for listing in the NRHP are maintained.
- Develop a cultural resources interpretive program, available to the public, involving brochures, interpretive panels, internet websites, self-directed tours and historic context documents as appropriate. Awareness of cultural resources can provide both the public and Army personnel with an understanding and connection to the history and cultural resources of the installations.
- Document buildings contributing to the Ladd Field National Historic Landmark and the Ladd Field Air Force Base Historic District in the Historic American Buildings Survey Standards as needed. This would document and preserve the history of Ladd Field.
- Prepare historic structures reports on buildings that contribute to the Ladd Field National Historic Landmark. This would document and provide information required to maintain the architectural characteristics of these buildings that make them eligible for inclusion in the NRHP.

4.13 SOCIOECONOMICS

This section analyzes and compares the socioeconomic impacts associated with proposed alternatives for SBCT transformation. Baseline data for this comparison was presented in Section 3.13. Additional information on socioeconomics is presented in Appendix F.

4.13.1 Background

U.S. Army Alaska (USARAK) has a major beneficial effect on socioeconomic activity and vitality in Alaska, particularly within the Fairbanks and Anchorage areas. Detailed information regarding current socioeconomic characteristics on and around Army lands can be found in Section 3.13, Socioeconomics.

4.13.2 Review of Impacts to Socioeconomics

Socioeconomics can be affected in a number of ways. This includes direct monetary impacts and impacts to other values such as recreation and lifestyle. General socioeconomic impacts are summarized below:

- Monetary impacts – This involves direct alteration of the quantity of money circulating in an area's economy.
- Quality of life – Quality of life indicates values inherent in lifestyle preferences and non-employment activities pursued, such as recreation.
- Housing and public services – Housing and public services are 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 – Socioeconomics includes public safety and crime statistics.

4.13.3 Activity Groups That Affect Socioeconomics

The textbox below lists activity groups that could affect socioeconomics due to transformation.

Activity Groups With Impacts	Activity Groups Without Impacts
• Stationing • Construction • Training • Deployment	• Systems Acquisition • Institutional Matters[1]

[1] Institutional matters may have some impacts to socioeconomics. However, these impacts are indirect and are discussed in Section 4.9, Wildlife and Fisheries and Section 4.14, Public Access and Recreation.

4.13.3.1 Stationing

Transformation would result in additional personnel stationed at Fort Wainwright (FWA) and Fort Richardson (FRA). It would be expected that these changes would also be associated with respective changes in civilian support personnel.

4.13.3.2 Construction

Proposed construction projects associated with transformation include the company operations facilities at FWA; the unmanned aerial vehicle (UAV) maintenance support facility at Donnelly Training Area (DTA); and the mission support training facility, new barracks facilities, and development of the Port of Anchorage deployment staging area at FRA (Appendix D). Projected construction costs are $6.5 million at FWA, $1.5 million at DTA, and $23.3 million at FRA. Total economic activity generated by this construction is estimated at $12.9 million at FWA, $3 million at DTA, and $46.1 million at FRA.

4.13.3.3 Training

The frequency and intensity of maneuver and weapons training would increase under SBCT transformation (Table 4.1.a). This would be expected to result in reduced recreational access on USARAK lands (Section 4.14, Public Access and Recreation). Increased convoy traffic would also be expected (Section 4.17, Human Health and Safety).

4.13.3.4 Deployment

Deployment would occur by air, land, or sea. Transformation would result in increased frequency of out-of-state and overseas deployments. Under current training doctrine, deployment would not increase on a unit basis (e.g., individual platoon unit deployments would remain at four times a year regardless of alternative). However, the number of units, to include platoon, company, and battalion, would increase under the proposed action. Therefore, the total number of unit deployments and miles would increase. The deployment of troops for extended periods may lead to increased demand for family services by affected personnel dependents and may lead to a reduction in expenditures in the post area.

4.13.4 Comparison of Alternatives

4.13.4.1 Description of Methodology

Analysis is based on a number of variables that might be affected by the activity groups identified in Section 4.13.3. The primary variables factored into this analysis include changes to direct monetary and employment benefits from USARAK actions, demographics, housing, public and social services, public schools, public safety, and recreational activities.

Economic modeling and forecasting is possible for socioeconomic effects of USARAK transformation activities, given the survey results discussed in Chapter 3. Modeling provides a method of quantifying certain monetary, employment, and recreational impacts. In addition, when quantitative data is not available, qualitative analysis of impacts is utilized. Table 4.13.c compares the expected socioeconomic impacts under each alternative. The qualitative terms used in the matrix are defined as:

- None – No measurable impact is expected to occur.
- Minor – Impacts are expected to occur; impacts would be measurable and may have slight effects on socioeconomics.
- Moderate – Impacts are expected to occur; impacts would be noticeable and would have measurable effects on socioeconomics.
- Severe – 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 two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant.

4.13.4.2 Fort Wainwright

4.13.4.2.1 Alternative 1 (No Action)

This alternative would be expected to provide a steady-state contribution of economic and social benefits and costs as described in Section 3.13, Socioeconomics. USARAK would continue to be an important economic factor in the Fairbanks area and impacts would be beneficial. As the Fairbanks economy matures and exhibits stable growth, goods and services available and the cost of living approximate those in comparable U.S. cities. No additional impacts to housing, public and social services, public schools, public safety, or recreational activities would be expected. Training and deployment activity would be expected to remain at or close to current levels. Military convoys would continue to transport troops between FWA Main Post and Yukon Training Area (YTA) and DTA (Table 4.1.a). Further discussion concerning traffic impacts and highway wear and tear can be found in Section 4.17, Human Health and Safety.

Construction

Mission-essential construction would occur under this alternative and beneficial economic impacts would be expected in the Fairbanks area. Including ranges and housing, there are several mission-essential construction projects scheduled through 2007 (Appendix D) that would provide contractual employment and material expenditures. The projected program amount for FWA is estimated at $309.6 million.

4.13.4.2.2 Alternative 3 (Transform With New Infrastructure)

Alternative 3 includes transformation of the 172nd SIB to an SBCT. Two of the SBCT infantry battalions would initially be stationed at FWA, with the third infantry battalion moving to FWA at end state. A few beneficial, interim impacts are expected with more substantial positive impacts occurring at end state. Increase in personnel levels at FWA during the interim phase would be about one-third of end-state personnel levels. Thus, impacts are about one-third as much in the interim compared to end state as far as employment and income effects are concerned. See Tables 4.13.a and 4.13.c for a summary of socioeconomic impacts in the Fairbanks area under Alternative 3.

Stationing

Regional Economic Activity

Under Alternative 3, the anticipated population increase in the Fairbanks area as a result of SBCT stationing is approximately 760 in the interim phase and 2,330 at end state. This includes dependents of uniformed military and is based on an historical average of 1.3 dependents per uniformed military at FWA. This does not include historical military retiree statistics at FWA, which indicate a ratio of 0.2 retirees and retiree family members per uniformed military (USARAK Public Affairs Office 1995-2002).

During the interim phase, a direct employment increase of approximately 470 is expected, consisting of about 330 uniformed personnel and 140 non-uniformed personnel. The non-uniformed personnel projection is based on the average ratio of 0.42 non-uniformed personnel per uniformed personnel at FWA. This includes support personnel that may be employed from the local economy or brought in by the Army from other locations, depending on the skills needed.

Using a conservative employment multiplier of two for indirect employment effects (Appendix F), the projected employment increase during the interim phase is then approximately 940 for the Fairbanks area as a result of the increase in military personnel.

Using historical averages (in 2002 dollars) for payroll, the anticipated increase in direct total payroll at FWA would be $17.5 million during the interim phase. An increase of $9.7 million in interim non-personnel expenditures would be expected. This would in turn create approximately 190 additional positions in Fairbanks, based on a conservative estimate of 20 employees per million dollars of non-personnel expenditures. The total economic activity generated by Alternative 3 in the interim would be approximately $54 million for the Fairbanks North Star Borough region (Appendix F). If all employment effects from uniformed military, non-uniformed military, non-personnel expenditures and the multiplier are added, the total increase in employment is then approximately 1,140.

At end state, a direct employment increase of approximately 1,440 is projected for FWA. This includes about 1,010 uniformed and 430 non-uniformed personnel (including support personnel). Indirect employment would lead to a projected employment increase of 2,880 for the Fairbanks area at end state under Alternative 3.

The end-state increase in direct total payroll at FWA would be approximately $53.6 million. Approximately $29.8 million in non-personnel expenditures would be expected. Total economic activity generated by Alternative 3 at end state, including direct payroll expenditures, non-personnel expenditures, and the indirect economic effects from each, would be approximately $165 million in economic activity for the Fairbanks North Star Borough region. Incorporating the employment affects from non-personnel expenditures, the total projected employment increase would be 3,480 people.

Overall impacts to the region's economy would be beneficial.

Housing

With a larger number of USARAK personnel and their dependents, it would be expected that the Fairbanks housing market would be marginally affected during the interim phase and noticeably affected at end state. Personnel increases, including non-uniformed employment, uniformed employment, and dependents, are expected to result in a population increase of about 1% for Fairbanks during the interim phase and 3% at end state.

In the year 2000 the total housing vacancy rate for Fairbanks was 11%. That rate has been declining over the last two years. Although no complete survey has been done for 2002, the rental unit vacancy rate during that year was generally below 5%, with about 300 apartments available. Interim transformation under Alternative 3 would likely lead to very small rental and housing price increases in Fairbanks. This would be partly alleviated by the stationing of the first SBCT battalion in Anchorage during the five to seven year interim phase.

The housing market in the Fairbanks area would expect to be noticeably affected at end state. The end-state increase in personnel would tighten the Fairbanks housing market in an environment that has already seen reduced vacancy rates. Construction of new housing in anticipation of the third infantry battalion moving to FWA would offset impacts. Nonetheless, increases in rents and further reductions in vacancies are anticipated. Army market analysis projections for 2006 estimate that under 5% of FWA families would be homeowners, significantly below Army-wide and comparable civilian ownership figures (USARAK 2002i). It is therefore unlikely that home

purchase statistics in the Fairbanks area would significantly increase due to increased SBCT stationing.

Long-term effects are expected to dissipate as the private sector adjusts to the increased demand. However, a recent survey indicates that the community would not respond with an increased level of investment in new large, multi-unit apartment construction in the absence of actual guarantees (leases) by the Army (Information Insights 2002). The identified barriers to this type of rental housing construction (such as lack of sufficient return on investment, high cost of materials, and greater return in commercial construction) may be overcome if SBCT stationing results in sufficient demand to stimulate an increase in the rate of construction.

Overall expected impacts to housing in the Fairbanks area would be minor.

Public and Social Services

Fairbanks has fully developed public utility services. No crimping of public services would occur during the interim phase or at end state of transformation. Existing power, water, transportation and communications infrastructure would easily adapt to the projected increase in population.

Some social services such as summer road maintenance and off-post parks and recreation could be marginally impacted. Public welfare and unemployment programs would not be affected.

Family services (including counseling, daycare, parenting classes, and investigation/intervention for abuse and neglect) are insufficient to meet current needs. This shortfall might widen with the proposed troop stationing. However, family services are provided by the military on-post and would be expected to increase proportionally with increased military personnel. Overall expected impacts would be minor.

Public Schools

Based on historical data, there would be about 0.5 students per uniformed military personnel at USARAK (USARAK Public Affairs Office 1995-2002; Nick Stayrook, personal communication 2003). Under Alternative 3, this would mean an expected increase of about 170 additional students during the interim phase, or a 1% increase in current enrollments. At end state, enrollment would be expected to increase by approximately 500 students or about 3% compared to present. These increases would be well below previous and significantly higher-enrollment periods (the Fairbanks North Star Borough school enrollments for the 1997-1998 school year were about 10% higher than present.) As discussed in Section 3.13, Socioeconomics, Federal Impact Aid would increase according to enrollment of eligible students and would more than offset the lack of local property tax revenue from students living on post.

The Fairbanks North Star Borough School District has stated it would define the boundaries in a way that maximizes efficiency of facilities use and minimizes impacts (Nick Stayrook, personal communication 2003.) If too much crowding occurs at on-post schools then district boundaries would change so that more students who live on-post would attend off-post schools. According to the Superintendent of the Fairbanks North Star Borough School District, “Current educational facilities in the school district have sufficient space to accommodate the additional students that would result from transformation (Ann Shortt, personal communication 2003).” Projected increases in students are well within the experience of the Fairbanks School District and are not expected to bring about planning or overcrowding problems. Military demographics would also add to the diversity of the student profile. Overall expected impacts would be minor.

Public Safety

Section 3.13, Socioeconomics identified the USARAK community as having a markedly lower propensity for crime than the state or Fairbanks community. Thus, transformation would reduce the relative incidence of crime and could reduce the overall incidence of crime through greater economic opportunity. On the other hand, heavy alcohol and illicit drug use among Army personnel is higher than among their demographic counterparts in the civilian population (Research Triangle Institute 1998).

USARAK fire and emergency services are a benefit to local communities. These services could increase in proportion to the size of the standing force at FWA.

Overall expected impacts would be beneficial.

Recreational Activities

Transformation would be expected to have a minor impact on the relative number of hunters and anglers in interior Alaska during the interim phase and at end state. Increased numbers of personnel would place greater pressure on fish and game. However, the effects of potential restrictions on access (Section 4.14, Public Access and Recreation) are far more important than increases in hunting or fishing pressure from increased military personnel.

Based on current participation rates, it is projected that during the interim phase there would be an increase at FWA of approximately 100 hunters and 220 anglers. At end state, there would be an increase at FWA of approximately 320 hunters and 680 anglers. These increases are less than 1% of the total current licensees in interior Alaska (Appendix F).

Hunting survey results indicated a $25 value per 1% change in the success rate for game. Assuming all projected new licensees hunt in the interior region with fixed game populations, this translates into a maximum net economic loss of approximately $260,000 for existing hunters during the interim phase. At end state, the maximum net economic loss would be approximately $810,000 for existing hunters. However, when out-of-state hunters and anglers are added to the analysis, the maximum combined impact for hunting and fishing as a result of SBCT stationing would be expected to be in the low hundreds of thousands of dollars (Appendix F).

At end state, these increases could result in a maximum 3.7% decrease in success rates for existing hunters. As additional anglers are generally competing for saltwater species, it is again an insignificant addition to the total number of anglers in the interior region. The economic value per 1% change in angler success rate was $9. Assuming new recreational fishing occurred only in interior Alaska, it would represent a loss of approximately $610,000 at end state. The estimated, aggregate hunting and fishing loss due to crowding as a result of SBCT stationing would approach $1 million. Additional state revenue would be expected from additional licensees.

Overall expected impacts to recreational activities would be minor.

Construction

Planned construction activity associated with SBCT transformation (Appendix D) is projected at $6.5 million for FWA. Direct construction impacts combined with the indirect economic effects result in an estimated, transitory total economic benefit of $12.9 million for the Fairbanks economy. This is in addition to the scheduled mission-essential construction projects currently projected for $309.6 million at FWA through 2007.

Training

Increased levels of training exercises under Alternative 3 as a result of transformation would decrease recreational access to USARAK training lands (Section 4.14, Public Access and Recreation). Hypothetically, 100% elimination of hunting and fishing on military lands in the Interior would result in approximately $3.5 million in lost net economic value for hunting and $3.75 million for fishing (Appendix F). This figure can be used to calculate the effects of differing levels of increased restrictions such as 10%, 20% and so forth. Since additional access restrictions are not expected to exceed 20% above current levels, the maximum loss in net economic value is anticipated to be about $750,000.

It is estimated that all fish and game on interior USARAK lands produce a cumulative economic value of approximately $10 million. As additional access restrictions are not expected to exceed 20% above current levels, the greatest potential loss in net economic value is anticipated to be less than $2 million.

Deployment

Deployments to DTA and YTA from FWA for training purposes would be expected to increase in size and frequency under this alternative (Section 4.17, Human Health and Safety). Scheduled deployment would necessitate convoys from FWA to DTA and YTA, and may temporarily cause elevated noise and traffic congestion on the Richardson Highway. 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 by public announcement of scheduled deployments. Further discussion concerning traffic impacts and highway wear and tear can be found in Section 4.17, Human Health and Safety.

Deployment of USARAK forces outside of Alaska during wartime activities is expected to increase in frequency and duration under this alternative. Extended deployments reduce economic activity but to a lesser degree than the positive impact from military presence in the first place. Extended deployments could result in a portion of spouses migrating back to their hometown; others stay in the area, spending a significant portion of the payroll. Results of large scale, long term deployments are mixed with some economic indicators showing little to no effect and others showing decreases (Associated Press 2003; Copeland 2003; Heilman 2003; Huckaby 2003; Schifrin 2003; Settle 2003; Vanderpool 2003). Effects of extended deployments are dependent on their size and duration and therefore cannot be accurately predicted.

Aside from direct economic impacts, extended deployments of personnel may place increased pressures upon social services. The primary services requested from families during deployments are subsidized day care, counseling, financial assistance, legal services, and counseling (Alliance Information and Referral Systems 2003). As discussed in Stationing, an expected increase in military family services resources would help alleviate this increased demand.

4.13.4.2.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

As with Alternative 3, Alternative 4 includes transformation of the 172nd SIB to an SBCT. Alternative 4 also includes the transition of the 1-501st Parachute Infantry Regiment to an Airborne Task Force. As it would be permanently stationed at FRA, it would not be expected to have a measurable impact on FWA or the Fairbanks area. Socioeconomic impacts on Fairbanks during the interim phase and at end state for Alternative 4 are expected to be almost identical to those under Alternative 3. The size of deployments from FWA may be slightly higher under Alternative 4 than under Alternative 3. However, the incremental increase would not be

expected to affect overall socioeconomic impacts. See Tables 4.13.a and 4.13.c for a summary of socioeconomic impacts in the Fairbanks area under Alternative 4.

Table 4.13.a Socioeconomic Effects of SBCT Transformation in the Fairbanks Area Under Each Alternative.[1]

Socioeconomic Factor	Alternative 1: No Action	Alternatives 3 and 4: Transform with New Infrastructure (with or without Airborne Task Force)	
		Interim	End State
Uniformed Personnel Increase	None	330	1,010
Non-uniformed Personnel Employment Increase	None	140	430
Public School Student Increase	None	170	500
Combined Increase of Hunters and Anglers	None	320	1,000
Estimated Annual Total Payroll Increase	None	$17.5 million	$53.6 million
Estimated Annual Non-personnel Expenditure Increase	None	$9.7 million	$29.8 million
Construction Dollars Increase	$309.6 million	$316.1 million[2]	$316.1 million[2]
Total Population Impact (uniformed personnel plus all dependents)	None	760	2,330
Total Annual Employment Impact Including Multiplier	None	1,140	3,480
Total Annual Dollar Impact Including Multiplier	None	$54 million	$165 million

[1] Socioeconomic impacts in the interim and end states are expected to be nearly identical for both alternatives.

[2] Direct construction impacts ($6.5 million), combined with indirect economic effects of construction associated with SBCT transformation, would result in a total, transitory economic benefit of $322.5 million for the Fairbanks area under Alternatives 3 and 4.

4.13.4.3 Donnelly Training Area

4.13.4.3.1 Alternative 1 (No Action)

Under this alternative, USARAK activities would have a slight impact on the Delta Junction area's economy. This alternative would be expected to provide a steady-state contribution of economic and social benefits and costs as described in Section 3.13, Socioeconomics. USARAK would continue to employ about 10 civilian personnel in the Delta Junction area. No additional impacts to housing, public and social services, public schools, or public safety would be expected. Minor impacts to recreational activities would continue to be expected (Section 4.14, Public Access and Recreation). Training and deployment activity would be expected to remain at or close to current levels. Military convoys would continue to transport troops from FRA and FWA to YTA and DTA (Table 4.1.a). Further discussion concerning traffic impacts and highway wear and tear can be found in Section 4.17, Human Health and Safety.

Construction

Beneficial economic impacts are expected from maintenance and construction activities associated with mission-essential projects (Appendix D) that would provide contractual employment and material expenditures. The projected program amount for DTA is estimated at $68 million. These expenditures would provide an incremental benefit to the local economy, but the majority of the impact would be felt in the Fairbanks area.

4.13.4.3.2 Alternative 3 (Transform With New Infrastructure)

SBCT transformation under Alternative 3 would affect DTA only minimally. There would be no new stationing of personnel here, although some additional support personnel are expected. Expected impacts involve training and planned construction. Overall impacts to the region's economy would have a small but beneficial impact. See Table 4.13.c for a summary of socioeconomic impacts in the Delta Junction area under Alternative 3.

Stationing

The potential increase in personnel, if any, is minimal and would not be enough to affect the area's demographics, housing, public and social services, public schools, or public safety.

Construction

Planned construction activity associated with SBCT transformation (Appendix D) is 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 $3 million to the Delta Junction economy. This is in addition to the mission-essential construction projects on DTA valued at $68 million.

Training

Increased levels of training exercises under Alternative 3 would decrease recreational access to USARAK training lands under this alternative (Section 4.14, Public Access and Recreation). Interior USARAK lands include Tanana Flats Training Area (TFTA), YTA, and DTA. Most fishing and hunting impacts listed under FWA are also applicable to DTA and are discussed in 4.13.4.2.2.

Deployment

Deployments to DTA from FRA and FWA for training purposes may incorporate both road and air transport and would be expected to increase in size and frequency under this alternative (Section 4.17, Human Health and Safety). 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. Further discussion concerning traffic impacts and highway wear and tear can be found in Section 4.17, Human Health and Safety.

Deployments for training at DTA are likely to produce a small, stimulating effect on the Delta Junction economy. A few incidental full-time annual employment equivalents may be produced in the Delta area.

4.13.4.3.3 Alternative 4 (Transform With New Infrastructure and Airborne Task Force)

Impacts under Alternative 4 would be approximately the same as those discussed under Alternative 3 (Table 4.13.c). Planned construction would not change. As discussed above, increased training activity could affect public access and recreation for the neighboring community but the expected impact would be minor (Section 4.14, Public Access and Recreation). Under this alternative, the Airborne Task Force would also periodically train at DTA, but due to the nature of its training additional impacts would be expected to be negligible. Size of training deployments to DTA under this alternative would increase in comparison to Alternative 3 (Section 4.17, Human Health and Safety). However, many of these training exercises would involve the Airborne Task Force and would be expected to involve air transport to and from the training area.

4.13.4.4 Fort Richardson

4.13.4.4.1 Alternative 1 (No Action)

The No Action Alternative provides a steady-state contribution of economic and social benefits and costs as described in Section 3.13, Socioeconomics. USARAK's activities on FRA would continue to contribute positive economic impacts to the Anchorage area. No additional impacts to housing, public or social services, public schools, public safety, or recreational activities would be expected. Training and deployment activity would be expected to remain at or close to current levels. Military convoys would continue to transport troops between FRA and YTA and DTA (Table 4.1.a) and affect traffic along the Glenn and Richardson highways. Further discussion concerning traffic impacts and highway wear and tear can be found in Section 4.17, Human Health and Safety.

Construction

Beneficial economic impacts are expected from maintenance and construction activities associated with mission-essential projects (Appendix D) that would provide contractual employment and material expenditures. The projected program amount for FRA is estimated at $54.6 million.

4.13.4.4.2 Alternative 3 (Transform With New Infrastructure)

Alternative 3 includes transformation of the 172nd SIB to an SBCT without the corresponding transition of the 1-501st Parachute Infantry Regiment to an Airborne Task Force. Initially, one of the three SBCT infantry battalions would be stationed at FRA while housing is being constructed in Fairbanks. Interim impacts of SBCT transformation under Alternative 3 would therefore be concentrated in Anchorage. The interim phase would be expected to last five to seven years, after which all three SBCT infantry battalions would be located at FWA. See Tables 4.13.b and 4.13.c for a summary of socioeconomic impacts in the Anchorage area under Alternative 3.

Stationing

Regional Economic Activity

The anticipated population increase in the Anchorage area as a result of SBCT stationing under Alternative 3 is approximately 1,680 in the interim phase and 50 at end state. This includes dependents of uniformed military and is based on a historical average of 1.4 dependents per uniformed military at FRA. This does not include military retiree statistics for FRA which

indicate a ratio of 1.2 retirees and retiree family members per uniformed military (USARAK Public Affairs Office 1995-2002).

A direct employment increase of approximately 1,140 is expected, consisting of about 700 uniformed and 440 non-uniformed personnel during the interim phase. This is based on the average ratio of 0.62 non-uniformed personnel per uniformed personnel at FRA (Appendix F). This includes support personnel that may be employed from the local economy or brought in by the Army from other locations, depending on the skills needed. Including indirect employment, the projected employment increase is then approximately 2,270 for the Anchorage area during the interim phase as a result of the increase in military personnel.

During the interim phase, there would be a payroll increase of approximately $42.6 million at FRA. An increase in $28.1 million in annual average non-personnel expenditures would be expected in the interim phase. When personnel and non-personnel expenditures with their respective indirect economic impacts are combined, economic activity would increase by approximately $140 million in the Anchorage area during the interim phase. Incorporating the employment effects from non-personnel expenditures, the total employment increase for the Anchorage area is then 2,830 people.

Uniformed personnel would return to approximately present levels at end state. A direct employment increase of approximately 30 is expected, consisting of about 20 uniformed and 10 non-uniformed personnel. Including indirect employment, the projected employment increase is then approximately 60 for the Anchorage area at end state as a result of the increase in military personnel.

At end state, there would be an increase in payroll of approximately $1.2 million at FRA. Average annual non-personnel expenditures would increase by approximately $800,000. When personnel and non-personnel expenditures with their respective indirect economic impacts are combined, economic activity in the Anchorage area would be expected to increase by $3.8 million at end state. Incorporating the employment effects from non-personnel expenditures, a final employment increase of 140 would then be expected.

Overall expected impacts to the region’s economy would be beneficial.

Housing

Transformation would have a very small effect on the housing market in Anchorage during the interim phase. In 2000, the housing vacancy rate for Anchorage was 6%. Approximately 1,040 units of housing demand would be added under Alternative 3 in an Anchorage market of 100,368 units – about 1%. This impact would be expected to be insignificant given the availability of housing in the FRA vicinity, and it would not be expected to lead to significant rent or housing price increases for Anchorage during the interim phase.

At end state, there are no projected negative impacts on the Anchorage housing market. The housing market would be expected to return to the present state since FRA would net only about 20 additional uniformed personnel under this alternative. No impacts to housing are expected.

Public and Social Services

Anchorage has fully developed public utility services. Demand would be slightly higher during the interim phase but would return to existing levels at end state. Existing power, water, transportation and communications infrastructure would easily adapt to the projected increase in population and no crimping of public services would occur.

Some social services such as summer road maintenance and off-post parks and recreation could be marginally impacted during the interim phase. Public welfare and unemployment programs would not be affected. Family services (including counseling, daycare, parenting classes, and investigation/intervention for abuse and neglect) are insufficient to meet current needs. This shortfall might widen with the interim-phase stationing. However, these family services are provided by the military on-post and would be expected to increase proportionally with increased military personnel. This would alleviate pressure on public family services. At end state, demand for family services would return to the current level. Overall expected impacts would be minor.

Public Schools

Based on historical data, there would be about 0.5 students per uniformed military personnel at FRA (Ophelia Dargan-Steed, personal communication 2003). In recent years, about 90% of military students have attended on-post schools. Under Alternative 3, this would mean an expected increase of about 350 students during the interim phase, less than 1% of current enrollments. At end state, enrollment is expected to be insignificant in comparison to current enrollments (about 10 students.) As presented in Section 3.13, Socioeconomics, Federal Impact Aid would increase according to enrollment of eligible students and would more than offset the lack of local property tax revenue from students living on post. Overall expected impacts to public schools would be minor.

Public Safety

Section 3.13, Socioeconomics identified the USARAK community as having a markedly lower propensity for crime than the state or Anchorage community. Thus, transformation would reduce the relative incidence of crime and could reduce the overall incidence of crime through greater economic opportunity. On the other hand, heavy alcohol and illicit drug use among Army personnel is higher than among their demographic counterparts in the civilian population (Research Triangle Institute 1998).

USARAK fire and emergency services are a benefit to local communities. These services could increase in proportion to the size of the standing force at FRA.

Overall impacts to public safety would not be noticeable given the proposed stationing under Alternative 3 in relation to Anchorage's population size.

Recreational Activities

Transformation would be expected to have a minor impact on the relative number of hunters and anglers during the interim phase and at end state. Increased numbers of personnel would place greater pressure on fish and game. However, the effects of potential restrictions on access (Section 4.14, Public Access and Recreation) are far more important than increases in hunting or fishing pressure from increased military personnel.

Under this alternative, approximately 150 hunters and 510 additional anglers would be expected during the interim phase and 50 hunters and 160 anglers at end state. Additional state revenue would be expected from additional licensees. Due to FRA's relative size in proportion to the non-Army population and the projected changes in uniformed personnel, the slight change in numbers of hunters and anglers (less than 1%) would have an insignificant impact on success rates of hunting and fishing.

Construction

Planned construction activity associated with SBCT transformation (Appendix D) is projected at $23.3 million for FRA. This amount combined with the associated indirect economic effects result in an estimated, transitory total economic benefit of $46.1 million for the Anchorage area economy. This is in addition to the scheduled mission-essential construction projects currently projected for $54.6 million at FRA.

Training

Increased levels of training exercises under Alternative 4 would decrease recreational access to USARAK training lands (Section 4.14, Public Access and Recreation). Any access closures at FRA would have little effect on Anchorage area game harvests. Between 1992 and 2002, an average of 56 moose have been taken per year. Due to both the low relative increases in personnel and the low game harvest, access restrictions would result in insignificant impacts. There would be no impacts at end state once the third 172nd SBCT is moved to Fairbanks. Training levels would be expected to return to current levels.

Deployment

Deployments from FRA to DTA for training purposes may incorporate both road and air transport and would be expected to increase in frequency and decrease in size under this alternative (Section 4.17, Human Health and Safety). These deployments would require convoys from FRA to DTA in addition to possible transport by rail and air. This may temporarily cause elevated noise and traffic congestion on the Richardson and Glenn highways. 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. Further discussion concerning traffic impacts and highway wear and tear can be found in Section 4.17, Human Health and Safety. Size of training deployments from FRA would be expected to recede after the five to seven year interim phase.

Deployment of USARAK forces outside of Alaska during wartime activities is expected to increase in frequency and duration under transformation. As described in 4.13.4.2.2, the effects of extended deployments are dependent on their size and duration and are difficult to predict.

Table 4.13.b Socioeconomic Effects of SBCT Transformation in the Anchorage Area Under Each Alternative.

Socioeconomic Factor	Alternative 1: No Action	Alternative 3: Transform with New Infrastructure		Alternative 4: Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Uniformed Personnel Increase	None	700	20	1,000	320
Non-uniformed Personnel Increase	None	440	10	620	200
Public School Student Increase	None	350	10	500	160
Combined Increase of Hunters and Anglers	None	660	210	1190	380

Table 4.13.b cont. Socioeconomic Effects of SBCT Transformation in the Anchorage Area Under Each Alternative.

Socioeconomic Factor	Alternative 1: No Action	Alternative 3: Transform with New Infrastructure		Alternative 4: Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Estimated Annual Total Payroll Increase	None	$42.6 million	$1.2 million	$61 million	$19.5 million
Estimated Annual Non-personnel Expenditure Increase	None	$28.1 million	$.8 million	$40.3 million	$12.9 million
Construction Dollars Increase	$54.6 million	$77.9 million[2]	$77.9 million[2]	$77.9 million[2]	$77.9 million[2]
Total Population Impact (uniformed personnel plus all dependents) [1]	None	1,680	50	2,400	770
Total Annual Employment Impact Including Multiplier	None	2,830	140	4,060	1,300
Total Annual Dollar Impact Including Multiplier	None	$140 million	$3.8 million	$200.4 million	$64.1 million

[1] USARAK Public Affairs Office 1995-2002.

[2] Direct construction impacts ($23.3 million), combined with indirect economic effects of construction associated with SBCT transformation, would result in a total, transitory economic benefit of $100.7 million for the Anchorage area under Alternatives 3 and 4.

4.13.4.4.3 Alternative 4 (Transform With New Infrastructure and Airborne Task Force)

As with Alternative 3, Alternative 4 includes transformation of the 172nd SIB to an SBCT. Alternative 4 also includes the transition of the 1-501st Parachute Infantry Regiment to an Airborne Task Force, which would be permanently stationed at FRA. Impacts of this transition would be long-term, as opposed to the short-term impacts from the interim stationing at FRA of one SBCT infantry battalion. SBCT construction activity would be the same as under Alternative 3 (Appendix D). Training and deployment activity would increase under Alternative 4 but expected impacts would be similar to those discussed under Alternative 3. See Tables 4.13.b and 4.13.c for a summary of socioeconomic impacts in the Anchorage area under Alternative 4.

Stationing

Regional Economic Activity

Under this alternative, the anticipated population increase in the Anchorage area as a result of SBCT stationing would be approximately 2,400 during the interim phase and 770 at end state. This includes dependents of uniformed military and is based on a historical average of 1.4 dependents per uniformed military at FRA. This does not include military retiree statistics at FRA which indicate a ratio of 1.2 retirees and retiree family members per uniformed military (USARAK Public Affairs Office 1995-2002).

During the interim phase, direct employment would be expected to increase by approximately 1,620, consisting of about 1,000 uniformed personnel and 620 non-uniformed personnel. This includes support personnel that may be employed from the local economy or brought in by the Army from other locations, depending on the skills needed. Including indirect employment, the projected employment increase during the interim phase is then approximately 3,250 for the Anchorage area as a result of the increase in military personnel.

During the interim phase, there would be an increase in payroll of approximately $61 million at FRA. An increase of about $40.3 million in average non-personnel expenditures would be expected. When personnel and non-personnel expenditures with their respective indirect economic impacts are combined, economic activity could increase by $200.4 million in the Anchorage area during the interim phase. Total employment is then projected to increase by 4,060 once all indirect employment and multipliers are considered.

At end state, direct employment would increase by approximately 520, consisting of 320 uniformed personnel and 200 non-uniformed personnel at FRA (including personnel that may be employed from the local economy or brought in by the Army, depending on the skills needed.) Including indirect employment, the projected employment increase at end state is then approximately 1,040 for the Anchorage area as a result of the increase in military personnel. Roughly speaking, the long-term impacts are about one-third the interim impacts.

At end state, direct payroll would contribute approximately $19.5 million to the Anchorage economy. An increase of about $12.9 million in average non-personnel expenditures would be expected. When personnel and non-personnel expenditures with their respective indirect economic impacts are combined, economic activity would be expected to increase by approximately $64.1 million in the Anchorage area at end state. Total employment is then projected to increase by 1,300 once all indirect employment and multipliers are considered.

Overall beneficial impacts to the region's economy would be expected.

Housing

Demand for housing in the Anchorage area during the interim phase of Alternative 4 would be expected to be slightly larger than under Alternative 3 but still insignificant given the availability of housing in the FRA vicinity. Further, it would not be expected to lead to significant rent or housing price increases in Anchorage.

Rental housing demand would be expected to increase by approximately 300 units as a result of end-state stationing under Alternative 4. This would easily be absorbed by the Anchorage rental market as it represents an increase of a fraction of 1%. Based on military homeownership rates in 2001 and assuming that these homeownership patterns continue through the completion of SBCT transformation, military homeownership in the Anchorage area would increase by 20 units (USARAK 2002h).

Public and Social Services

Demand for public and social services during the interim phase and at end state of this alternative would be marginally higher than under Alternative 3. Overall expected impacts would be minor.

Public Schools

The Anchorage School District would expect about 500 additional students (1% increase) during the interim phase and 160 students (0.3% increase) at end state of Alternative 4. The Anchorage

School District has seen steady increases in enrollments of about 0.5% per year since 1998-99. As presented in Section 3.13, Socioeconomics, Federal Impact Aid would offset any additional education costs. The projected increase in students is well within the experience of the Anchorage School District. Overall expected impacts would be minor.

Public Safety

Impacts to public safety would be similar to those under Alternative 3.

Recreational Activities

Under this alternative, an increase of approximately 890 additional anglers and 300 hunters is projected for the Anchorage area and south-central Alaska during the interim phase. At end state, an increase of approximately 290 additional anglers and 90 hunters is projected. These increases would have a negligible impact on the success rates for sport fishing or hunting during both the interim phase and at end state as they represent increases of a fraction of 1%. Additional state revenue would be expected from additional licensees. Overall impacts to recreational activities would be minor.

4.13.5 Comparison of Alternatives Summary

4.13.5.1 Comparison of All Alternatives

Table 4.13.c presents a summary of socioeconomic impacts under each alternative. Definitions of the qualitative impact categories are provided in Section 4.13.4.

Table 4.13.c Additional Socioeconomic Impacts for Fairbanks, Delta Junction, and Anchorage.[1]

Socioeconomic Impact	Alternatives		
	1 No Action	**3 Transform With New Infrastructure**	**4 Transform With New Infrastructure and Airborne Task Force**
Fairbanks (FWA)			
Regional Economic Activity	Beneficial	Beneficial	Beneficial
Housing	None	Minor	Minor
Public and Social Services	None	Minor	Minor
Public Schools	None	Minor	Minor
Public Safety	None	Beneficial	Beneficial
Recreational Activities	None	Minor	Minor
Delta Junction (DTA)			
Regional Economic Activity	None	Beneficial	Beneficial
Housing	None	None	None
Public and Social Services	None	None	None
Public Schools	None	None	None
Public Safety	None	None	None
Recreational Activities	Minor	Minor	Minor

Table 4.13.c cont. Additional Socioeconomic Impacts for Fairbanks, Delta Junction, and Anchorage.[1]

Socioeconomic Impact	Alternatives		
	1 No Action	**3 Transform With New Infrastructure**	**4 Transform With New Infrastructure and Airborne Task Force**
Anchorage (FRA)			
Regional Economic Activity	Beneficial	Beneficial	Beneficial
Housing	None	None	None
Public and Social Services	None	Minor	Minor
Public Schools	None	Minor	Minor
Public Safety	None	None	None
Recreational Activities	None	None	Minor

[1] End-state impacts are listed.

4.13.6 Mitigation

No mitigation measures exist or are proposed for impacts to socioeconomic resources. USARAK provides overall positive socioeconomic effects to the state of Alaska and the communities near USARAK properties.

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4.14 PUBLIC ACCESS AND RECREATION

Issue A: Access. Issue C: Wildlife and Habitat. Citizens voiced concern over increased competition for recreational sport fishing and loss of access to lakes with stocked sport fish populations. It is therefore evaluated in this EIS (see Section 1.8, Scoping Issues of Concern).

This section analyzes and compares the public access and recreation impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.14.

4.14.1 Background

Public access to and recreation on Army lands in Alaska is an important part of many residents' lifestyles. In accordance with the Sikes Act, U.S. Army Alaska (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.

In 1999, USARAK obtained a five-year Section 404 Clean Water Act wetlands permit from the Corps of Engineers that restricts military vehicular maneuvers in certain wetlands while the ground is unfrozen. Through the permitting process, the Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service were instrumental in helping the Corps of Engineers develop the criteria for defining these wetlands. As part of its land stewardship responsibilities, USARAK is proposing to impose the same limitations on recreational use in sensitive wetlands that USARAK already has imposed on military use for all USARAK lands (USARAK 2002g).

Complete information regarding access methods (ground, off-road recreational vehicles (ORRVs), air, and boat) and current use of USARAK lands for public access and recreation can be found in Section 3.14.

4.14.2 Review of Impacts to Public Access and Recreation

Military impact to public access and recreation may occur in a number of ways. The Army is responsible for managing its lands to meet the primary military mission, including 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.

4.14.3 Activity Groups That Affect Public Access and Recreation

The textbox below lists activity groups that could affect public access and recreation due to transformation.

Activity Groups With Impacts	Activity Groups Without Impacts
• Stationing • Construction • Training • Systems Acquisition • Institutional Matters	• Deployment

4.14.3.1 Stationing

Transformation would result in additional personnel stationed at Fort Wainwright (FWA) and Fort Richardson (FRA). The increase in troops stationed on USARAK properties could affect recreational demand and access.

4.14.3.2 Construction

Proposed construction projects associated with transformation include the company operations facilities at FWA; the unmanned aerial vehicle (UAV) maintenance support facility at Donnelly Training Area (DTA); and the mission support training facility, new barracks facilities, and development of the Port of Anchorage deployment staging area at FRA (Appendix D). Construction, especially range construction, could reduce the area available for some types of recreation, such as hunting.

4.14.3.3 Training

The frequency and intensity of maneuver and weapons training could increase if USARAK were to transform (Table 4.1.a). Maneuver space requirements would increase from approximately 67,000 to either 121,000 or 138,000 km^2 days. Increased training space requirements would reduce the time available for public access to training lands.

4.14.3.4 Systems Acquisition

New equipment would be used under transformation, including the eight-wheeled 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) (Table 4.1.a). The UAV may lead to more frequent closures of airspace to public use.

4.14.3.5 Institutional Matters

Institutional matters include USARAK management activities, land stewardship, policy and program implementation. Transformation is expected to change management processes, which should lead to better data collection and management. This would improve stewardship of USARAK lands and resources. Management activities included in the Integrated Natural Resources Management Plans (INRMPs), the Integrated Training Area Management program, and USARTRAK automated check-in phone system, are all expected to provide benefits for public access and recreation on USARAK lands.

4.14.4 Comparison of Alternatives

4.14.4.1 Description of Methodology

Analysis of public access and recreation impacts is based on a number of variables that might be affected by the activity groups mentioned in Section 4.14.3. 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 impact is expected to occur to public access and recreation.
- Minor – Some impact would occur and would result in a slight change in public access and recreation patterns.
- Moderate – 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.
- Severe – Impacts are highly probable and would definitely limit public access and recreation.
- Beneficial – Impacts are expected to improve public access and recreation.

The first two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to public access are presented in 4.14.6, Mitigation.

4.14.4.2 Fort Wainwright

4.14.4.2.1 Alternative 1 (No Action)

Under this alternative, few impacts are expected to occur on FWA. USARAK would continue to utilize its lands in the same pattern as currently exists. Construction of new facilities would occur, and training frequency and land use would remain the same.

On FWA Main Post, mission-essential construction projects are expected to take place. However, facilities are expected to be placed within the currently developed cantonment area. There should be no change in recreational opportunities. Impacts are summarized in Table 4.14.a.

Access and transport methods would remain the same under this alternative. New USARAK policy regarding ORRV use on wetlands would affect some ORRV access. However, ground access, air access, and boat use on open waterways and lakes would remain the same. Impacts to air and ORRV access and use are expected to be minor, and nonexistent to ground and boat access and use.

Impacts would occur on Tanana Flats Training Area (TFTA) and Yukon Training Area (YTA) (Table 4.14.a). New range construction would occur, and a buffer zone might be created around each range, within which some forms of hunting and trapping would be prohibited. This would have a minor impact on recreational hunting and trapping.

Training activities would continue at the same rate on the post and training areas. Maneuver space requirements on FWA are expected to remain at approximately 37,500 km^2 days (2,300 on Main Post, 2,700 on TFTA, and 32,500 on YTA). This would require ongoing access closures. Impacts to area and time availability would continue to be minor.

Public access and recreation would continue per the latest INRMP (USARAK 2002g).

4.14.4.2.2 Alternative 3 (Transform with New Infrastructure)

Under Alternative 3, impacts are expected to occur on all FWA properties (Table 4.14.a). The end state would involve the approximate addition of 1,000 Soldiers stationed at FWA. Two facilities would be built on Main Post.

Training frequency would increase with transformation. This is due both to the increase in Soldiers stationed at FWA and the expected SBCT maneuver training regime. Expected end-state training space requirements on Main Post would be approximately 9,400 km^2 days. There would probably be more access closures on Main Post for training, although this is more likely to be localized away south of the Chena River on the training areas because of a higher amount of training. Impacts to temporal availability are expected to be minor. No other impacts are expected on Main Post.

On TFTA, some impacts are expected. Due to the mobile nature of the SBCT, more winter trails might be cleared for maneuver training, which could then be utilized by off-road recreational vehicles such as snow machines. These trails could also provide increased recreational opportunities for skiing and dog-sledding. Furthermore, they could create better access for hunting and trapping opportunities. Trail creation is expected to have a beneficial impact. Other forms of access are expected to remain the same. Restricted airspace would continue to affect air access across some USARAK lands. Impacts to specific types of access range from beneficial to minor (Table 4.14.a).

An increase in maneuver training, from approximately 37,500 to 41,000 km^2 days, would lead to more frequent land closures for military purposes, including winter training on TFTA and all-seasons training on YTA. Impacts to temporal availability would be minor. No other impacts are expected.

Transformation might also result in increased stress on wildlife populations. Training frequency and intensity would increase and land use would be more extensive. MIMs are expected to increase from approximately 11,500 to 69,000 on FWA (Table 4.1.a). Slight increases in sediment loads on TFTA and YTA could impact water quality, possibly affecting local fish populations. Impacts to fishing from decreased water quality are not expected. Impacts to hunting and trapping from effects on wildlife are expected to be minor.

Increased troop stationing would increase pressure on recreational fishing in the area. Use of stocked lakes on and near FWA is expected to increase. This would lead to reduced fish stocks and increased competition amongst recreational anglers unless stocking were increased to accommodate the demand. For projected impacts to the local economy, see Section 4.13, Socioeconomics. This is expected to be a minor impact.

4.14.4.2.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts to public access and recreation on FWA under this alternative are expected to mirror those under Alternative 3. Most or all military activity on the post and its training areas would involve the SBCT. The newly created Airborne Task Force, stationed at FRA, is expected to

conduct large-scale exercises on DTA; this is supported by expected deployments, in Section 4.17, Human Health and Safety (Table 4.17.b). MIMs and km^2 days on FWA are expected to remain the same under this alternative. All impacts on FWA would be as listed for Alternative 3.

4.14.4.3 Donnelly Training Area

4.14.4.3.1 Alternative 1 (No Action)

Impacts to public access and recreation are expected on DTA under this alternative (Table 4.14.b). USARAK mission-essential range expansion would reduce access to certain areas for recreation. Each range is expected to have a buffer zone, within which trapping and some hunting, such as bear-baiting, would be prohibited. This is expected to be a minor impact to hunting and trapping. No impacts are expected to fishing.

Access methods on Army lands are expected to remain the same. New USARAK policy regarding ORRV use on wetlands might affect ORRV access part of the year. In addition, existing restricted airspace designations would remain and are expected to limit some air traffic onto or across DTA. Impacts to forms of access are expected to be minor to negligible, depending on access type (Table 4.14.b).

USARAK would continue to utilize the training area in the same manner. Maneuver space requirements would remain at approximately 15,000 km^2 days, and no new construction or modification is planned on the training area. Public access and recreation would be allowed and managed as specified under the most recent INRMP (USARAK 2002e). Military activities would continue to have minor impacts to time and area availability.

4.14.4.3.2 Alternative 3 (Transform with New Infrastructure)

Impacts are expected to public access and recreation under this alternative (Table 4.14.b). Transformation is expected to lead to development of new maneuver trails on DTA and within the Jarvis Creek watershed. 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. Impacts are expected to be beneficial.

Transformation would also require a greater frequency of training land closures due to increased numbers of Soldiers and expected SBCT maneuver training requirements. MIMs are expected to increase from 17,000 to 86,000 on the training area (Chapter 2, Table 2.2.s), and training space requirements would increase from approximately 15,000 to 65,000 km^2 days, including Gerstle River Training Area (Table 4.1.a). An increase in maneuver training would lead to more frequent training land closures, including all-seasons training on DTA. Impacts could be moderate, depending on duration and timing of access closures; however, the training area would still be available for recreation.

The UAV would comply with existing Federal Aviation Administration 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 would continue to have a minor impact to air access.

Transformation could affect some game species such as caribou and moose (Section 4.9.4.3.1). The overall harvest of caribou is minimal in Unit 20D; only 40 animals from this herd are harvested each year. 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. In addition, mission-essential ranges would affect the total area available for some types of hunting and trapping. While having a greater impact than the No Action Alternative, 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 remote possibility of affecting local fish populations. Impacts to fishing from decreased water quality are not expected. In addition, increased troop stationing would increase pressure on recreational fishing on DTA. Use of stocked lakes, especially those along Meadows Road, is expected to increase, which would lead to reduced fish stocks and increased competition among recreational anglers, unless stocking was increased to accommodate the increase. Impacts from increased competition could be minor. For projected economic impacts, see Section 4.13, Socioeconomics.

4.14.4.3.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts to public access and recreation on DTA under this alternative are expected to be similar to or slightly greater than those listed under Alternative 3. SBCT training would occur on the training area. In addition, the Airborne Task Force to be stationed at FRA is expected to conduct large-scale exercises on DTA.

Because of this, a greater frequency of military closures is expected. Training space requirements are expected to increase under this alternative, from approximately 15,000 km^2 days under Alternative 1 to 69,000 under Alternative 4 (Table 4.1.a). These exercises may also include airdrops and subsequent airlifts of the task force troops. MIMs for this alternative would be approximately 86,000. Impacts to time availability are expected to be moderate due to increased closures for both SBCT and Airborne Task Force training. All other impacts are expected to be the same as under Alternative 3.

4.14.4.4 Fort Richardson

4.14.4.4.1 Alternative 1 (No Action)

Under this alternative, impacts are expected to resemble current public access and recreation policies and management on FRA (Table 4.14.c). All forms of legal access would continue in their current form. Restricted airspace, particularly over and around Eagle River Flats Impact Area, would continue to affect transit across the area, and is a minor impact. Other forms of access are not expected to be affected by this alternative.

MIMs on FRA would remain at 3,300 and maneuver training space requirements would remain at 15,000 km^2 days. USARAK mission-essential range construction activities would occur. These may have minor impacts to public access or recreation (Stout 2002c) involving limited access or recreational restrictions within the range areas. Hunting impacts would be minor.

Public access and recreation would be managed as stated in the most recent INRMP (USARAK 2002f). Recreational activities, including ORRV use, fishing, hunting, hiking and skiing, are expected to continue. Minor impacts to temporal and area availability would occur from access closures and area restrictions.

4.14.4.4.2. Alternative 3 (Transform with New Infrastructure)

Under this alternative, impacts are expected to occur to public access and recreation on FRA (Table 4.14.c). The majority of impacts are expected to occur for the interim period during which one SBCT infantry battalion would be stationed at FRA before relocating to FWA.

All types of legal public access are expected to continue under this alternative. Air restrictions would continue to be minor, and some areas would remain off-limits to public access. In addition, there would potentially be a decrease in the amount of public access to FRA. MIMs on FRA would increase from about 3,300 to 10,600 (interim), then to 3,500 (end state). Maneuver space requirements would increase from approximately 15,000 km^2 days to 26,000 (interim) then return to 15,000 at end state. Due to the projected increase in training activity, land closures are expected to occur more frequently, which would limit access to recreational opportunities. Given the increased maneuver space required for the SBCT, much of the training area would be used for squad or company training activities. Time availability impacts due to increased training levels are expected to be moderate during the interim phase. Time availability impacts would be minor for the end state. No other impacts are expected on FRA.

Increased military training on post may affect local wildlife populations such as grizzly bear, black bear, wolf, and wolverine (Section 4.9, Wildlife and Fisheries). Impacts are not expected to most other game species, and overall hunting impacts would be minor. Lakes on FRA are expected to remain within the Alaska Department of Fish and Game's stocking program. Transformation is not expected to impact fish populations or fishing opportunities on FRA. Hiking and access to northern and southern FRA is expected to continue.

4.14.4.4.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Under Alternative 4, additional impacts are expected due to the transition of the 1-501st PIR into an Airborne Task Force at FRA. The number of personnel stationed and training at FRA would increase by 1,000 for the interim phase, then by 300 for the end state. Impacts under this alternative would also involve an increase in military closures of FRA to recreation due to training. MIMs are expected to increase from approximately 3,300 to 10,600 during the interim phase, then to 8,000 for the end state (Table 4.1.a). In addition, training space requirements would increase from 15,000 km^2 days under the No Action Alternative to almost 40,000 km^2 days at end state under this alternative.

Impacts under Alternative 4 would be similar to Alternative 3. Military closures are expected to occur more frequently during both the interim and end state. Time availability impacts would be moderate. Impacts to all methods of public access would remain the same under this alternative as under Alternative 3. The additional range modifications listed under Alternative 3 would occur and might limit public access to and recreation on some areas. However, such impacts are expected to be minor. Due to the increase in training, closures would result in moderate impacts to temporal availability of lands for recreation.

Impacts to game species are not expected to increase significantly over those listed under Alternative 3, although the increase in military training may further disturb game species or may lead to preferential use of more remote areas. Impacts to hunting would be minor. No additional impacts are expected to other forms of recreation, such as fishing and hiking.

4.14.5 Comparison of Alternatives Summary

4.14.5.1 Comparison of all Alternatives

Tables 4.14.a, 4.14.b, and 4.14.c present a summary of public access and recreation impacts under each alternative. Definitions of the qualitative impact categories are provided in Section 4.14.4.

Table 4.14.a Summary of Impacts to Public Access and Recreation on Fort Wainwright.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Access					
Ground	None	Beneficial	Beneficial	Beneficial	Beneficial
ORRV	Minor	Beneficial	Beneficial	Beneficial	Beneficial
Boat	None	None	None	None	None
Air	Minor	Minor	Minor	Minor	Minor
Area Available	Minor	Minor	Minor	Minor	Minor
Time Available	Minor	Minor	Minor	Minor	Minor
Recreation					
Hunting	Minor	Minor	Minor	Minor	Minor
Fishing	None	Minor	Minor	Minor	Minor
Trapping	Minor	Minor	Minor	Minor	Minor

Table 4.14.b Summary of Impacts to Public Access and Recreation on Donnelly Training Area.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Access					
Ground	None	Beneficial	Beneficial	Beneficial	Beneficial
ORRV	Minor	Beneficial	Beneficial	Beneficial	Beneficial
Boat	None	None	None	None	None
Air	Minor	Minor	Minor	Minor	Minor
Area Available	Minor	Minor	Minor	Minor	Minor
Time Available	Minor	Moderate	Moderate	Moderate	Moderate

Table 4.14.b cont. Summary of Impacts to Public Access and Recreation on Donnelly Training Area.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Recreation					
Hunting	Minor	Minor	Minor	Minor	Minor
Fishing	None	Minor	Minor	Minor	Minor
Trapping	Minor	Minor	Minor	Minor	Minor

Table 4.14.c Summary of Impacts to Public Access and Recreation on Fort Richardson.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Access					
Ground	None	None	None	None	None
ORRV	None	None	None	None	None
Boat	None	None	None	None	None
Air	Minor	Minor	Minor	Minor	Minor
Area Available	Minor	Minor	Minor	Minor	Minor
Time Available	Minor	Moderate	Minor	Moderate	Moderate
Recreation					
Hunting	Minor	Minor	Minor	Minor	Minor
Fishing	None	None	None	None	None
Trapping	N/A	N/A	N/A	N/A	N/A

4.14.5.2 Comparison of Alternatives 3 and 4

Both alternatives would result in transformation from the Current Force to the SBCT. Alternative 4 would result in higher numbers of personnel and equipment, but construction projects would remain the same. Training intensity would be higher. Impacts to public access and recreation under Alternative 4 could potentially increase by 5-10% due to stationing, maneuver and weapons training. Impacts on FRA from Alternative 4 would be long-term, as compared to the short-term impacts from the interim occupancy of one SBCT infantry battalion.

The primary difference between Alternatives 3 and 4 would result from the institutional matters. For Alternative 3, institutional matters relating to range management, the Integrated Training Area Management program, environmental management, and sustainable range management would remain essentially the same as the No Action Alternative. However, with Alternative 4, these four programs would be fully funded and implemented. Institutional matters affecting public access and recreation would also involve fully implementing both a Training Area Recovery Plan and USARAK ecosystem management. See Appendix H for a description of these programs. The result would be improved environmental management of USARAK lands.

4.14.6 Mitigation

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts. These mitigation measures are implemented as funding is available. Often funding only provides for partial implementation.

4.14.6.1 Existing

- Continue to implement recreational vehicle use policies, per the most recent INRMPs (USARAK 2002e,f,g). The INRMPs lay out specific actions to maintain and improve public access and recreation opportunities on USARAK lands.
- Continue to implement USARTRAK automated check-in phone system. This will provide information regarding daily closures, and should greatly simplify the public access process.
- Continue to streamline public access to USARAK lands through the Recreational Access Permit.
- Maintain the extended two-year renewal duration on the FWA and DTA Recreational Access Permits. A two-year permit duration would simplify public access to USARAK lands.
- Continue or increase hunter safety education courses and work with Alaska Department of Fish and Game to provide educational opportunities on USARAK lands. Hunter safety courses and educational opportunities would allow USARAK to better and more safely manage its lands for a wide range of public uses.
- Monitor recreational usage of each training area through the USARTRAK phone system. This will inform USARAK and Alaska Department of Fish and Game about use patterns, which should help to improve management for public access and recreation.

4.14.6.2 Proposed

- Proposed mitigation for Alternative 4 is to fully implement plans and projects that have already been identified by USARAK's INRMPs and ecosystem management. These projects and plans are further described in Appendix H. Additional mitigation measures are also listed below.
- Conduct a detailed study to assess the impacts of recreational vehicles on USARAK lands. This would support USARAK's long-term recreational management plans.
- Build kiosks at all primary entrances to recreational areas on USARAK lands and provide visitors maps and information geared towards that area. Information kiosks can assist users to quickly identify areas designated for recreational use, as well as the times and locations of military activities.

- Monitor recreational impacts on stocked lakes and streams, and upgrade access and recreational opportunities when needed. Improved monitoring of and access to stocked lakes would allow USARAK and Alaska Department of Fish and Game to better manage the stocked lakes program on Army lands.
- Fully fund conservation officers to enforce state and federal game laws, and military rules and restrictions.

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4.15 SUBSISTENCE

This section analyzes and compares the subsistence impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.15.

4.15.1 Background

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. Subsistence is often integrated with traditional, cultural, and spiritual values. Information about subsistence on and around U.S. Army Alaska (USARAK) lands can be found in Section 3.15.

4.15.2 Review of Impacts to Subsistence

Impacts to subsistence can stem from a number of sources. Subsistence relies on the user's ability to locate and harvest local 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.
- Resource availability – Subsistence requires that necessary resources, such as fish and wildlife populations, can be located and harvested. More information is needed to determine the impact that Army activities would have on availability of plants that are important for subsistence needs. Accessibility to plant resources is, however, assessed in this section.

The Bureau of Land Management completed a Section 810 evaluation when the land withdrawal EIS (USARAK 1999a) was completed. This 810 evaluation remains valid. Based upon information currently available, analysis in this section, and the proposed mitigation measures, USARAK determines that impacts to subsistence would not be significant.

4.15.3 Activity Groups That Affect Subsistence

The textbox below lists the activity groups that could impact subsistence due to transformation.

Activity Groups With Impacts	**Activity Groups Without Impacts**
• Stationing	• Deployment
• Construction	
• Training	
• Systems Acquisition	
• Institutional Matters	

4.15.3.1 Stationing

Transformation would result in additional personnel stationed at Fort Wainwright (FWA) and Fort Richardson (FRA) (Table 4.1.a). Increased stationing could affect subsistence access and resource availability due to increased numbers of personnel that train on USARAK properties. Additional personnel may increase sport hunting interest which would increase competition with existing

recreational hunters for fixed-quantity permits and for harvest take where unlimited open entry permits are available. The Alaska Department of Fish and Game manages harvest through its permit system and affects harvest through early closures and/or regulation changes.

4.15.3.2 Construction

Proposed construction projects associated with transformation include the company operations facilities at FWA; the unmanned aerial vehicle (UAV) maintenance support facility at Donnelly Training Area (DTA); and the mission support training facility, new barracks facilities, and development of the Port of Anchorage deployment staging area at FRA (Appendix D). Construction impacts would cause ground and vegetation disturbance, but are unlikely to affect subsistence wildlife, since no high quality habitats would be affected. Construction activities are described in Appendix D.

4.15.3.3 Training

The frequency and intensity of maneuver and weapons training could increase if USARAK were to transform (Table 4.1.a). Increased training could affect activity patterns or movements of some wildlife species. Increased training may also affect access because of increases in range closures for training purposes.

4.15.3.4 Systems Acquisition

New equipment would be used under transformation, including the eight-wheeled 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) (Table 4.1.a). It is expected that USARAK lands would be used more extensively under transformation than under the current training programs.

4.15.3.5 Institutional Matters

Institutional matters include USARAK management activities, land stewardship, policy and program implementation. Transformation is expected to change management processes, which should lead to better data collection and management. This would improve stewardship of USARAK lands and resources, including subsistence resources.

4.15.4 Comparison of Alternatives

4.15.4.1 Description of Methodology

Analysis of subsistence impacts is based on a number of variables that might be affected by the five activity groups mentioned in Section 4.15.3. The primary variables include 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.

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 impact is expected to occur to subsistence resources.
- Minor – Some impact would probably occur and might result in a slight change in subsistence patterns.
- Moderate – 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 – Impacts would occur, with unavoidable effects on subsistence.
- Beneficial – Impacts are expected to improve subsistence resources.

The first two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to subsistence are presented in 4.15.6, Mitigation.

4.15.4.2 Fort Wainwright

4.15.4.2.1 Alternative 1 (No Action)

Mission and training at FWA would remain at current levels. Continuation of military activities on USARAK managed lands would result in minor adverse impacts to wildlife and plant resources.

Access

Military training activities would occur with the same frequency, requiring occasional closures of training lands. Under this alternative, maneuver training would continue to require approximately 37,000 km^2 days. Impacts to access of subsistence resources including fish, wildlife, and plants at FWA would be minor under this alternative.

Resource Availability

Construction and training activity could have effects on wetlands, riparian areas, and stream habitat, thus affecting waterfowl and mammal populations that browse and range through these areas. However, impacts on wetlands would be highly localized. Petrochemical spills resulting from military activity could also adversely impact stream health and subsistence resources. Existing USARAK procedures would minimize the risk of spills.

Effects to fisheries are possible, primarily from erosion and sedimentation due to construction and maneuver training. Vehicles would use designated stream crossings to minimize this impact. Explosive munitions residues from weapons training could also impact water quality. However, studies conducted on USARAK impact areas and adjacent waterways have shown that aquatic concentrations of residues are negligible (Ferrick et al. 2001). Impacts of explosive munitions residues on plants have also been studied and those impacts also appear negligible, suggesting that residue intake through ingestion by birds and mammals would not adversely impact such wildlife or individuals who consume birds and mammals for subsistence. Additional soil and water monitoring is planned (Appendix H). The total impacts to resource availability at FWA would be minor under the No Action Alternative.

Management of wildlife, plant, and fisheries resources has been implemented through the Integrated Natural Resources Management Plan (INRMP) in efforts to reduce the risk and minimize the effects of military activity on wildlife, plant, and fisheries resources (Appendix H).

4.15.4.2.2 Alternative 3 (Transform with New Infrastructure)

Access

Under this alternative, increased military training would require a slight increase in access closures. Projected maneuver space requirement for FWA under Alternative 3 would be approximately 41,000 km^2 days and an increase of 11% over current space requirements.

Transformation would necessitate the construction of additional roads and maneuver trails on the training areas. This is expected to have a beneficial effect on subsistence, due to the greater land area accessible following extension of the maneuver trail system. Increased closure of training lands would affect access to subsistence resources in areas of closure. This impact is expected to be minor because alternate areas on FWA would still be available to access subsistence resources including wildlife, fish, and plants.

Resource Availability

Additional personnel stationed at FWA might participate in recreational hunting and fishing activities (Section 4.13, Socioeconomics). This could lead to estimated increases in the local sport fishing and hunting populations of 1.27% during the interim and 2.66% at the end state (less than 1% of current licenses in interior Alaska), and impact current availability of subsistence resources on or near FWA. An increase in sport hunting interest would compete with existing recreational hunters for fixed-quantity permits and for harvest take where unlimited open entry permits are available. The Alaska Department of Fish and Game manages harvest through its permit system and impacts harvest through early closures and or regulation changes.

Two company operations facilities would be constructed at FWA Main Post (Appendix D). The proposed construction site is located in the cantonment area, where vegetation and soils have been heavily disturbed. No impacts to subsistence resources are expected because disturbance would occur in existing developed areas.

Transformation would involve training with new equipment, most notably the Stryker vehicle (but also a mobile gun system, unmanned aerial vehicle, and 155mm howitzer), in addition to increased maneuver and weapons training. These changes to training could affect individuals, groups, or localized wildlife populations by disrupting activity patterns or movements. Noise may affect wildlife important for subsistence. Additionally, due to increases in weapons training, increased incidental wildlife mortality could occur. It is expected that moose and waterfowl could be moderately affected by increased artillery training in Alpha Impact Area in Tanana Flats Training Area (TFTA). However, if firing was limited during spring calving and brooding seasons, the impacts would not affect subsistence.

An increase in MIMs from maneuver training could also result in increased erosion, the possibility of increased petroleum spills during re-fueling, and higher levels of fragments of unexploded or partially exploded ordnance. However, munitions residues either degrade rapidly or are immobilized, and it is believed that the risk of such pollutants leaching into the streams and ponds at toxic concentrations is remote (see also Section 4.9, Wildlife; Houston 2002; Palazzo et al. 2002). Increased training intensity may also cause a higher frequency of fires, contributing to additional erosion into streams, ponds and waterways.

Some wildlife could be affected by deployment by increased numbers of convoys on the highways in land deployments. These effects are expected to be short term, localized, and would not affect subsistence wildlife at the population level.

Continued implementation of institutional matters could benefit subsistence resources on USARAK managed lands or resources affected by USARAK activities, as monitoring of population levels and management of resources would improve.

Overall impacts to subsistence under Alternative 3 are expected to be minor during the interim phase and at the end state of transformation due to insignificant increases in access closures and the localized nature of expected wildlife, fisheries, and plant resource impacts.

4.15.4.2.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts to wildlife, fisheries and other subsistence resources under Alternative 4 would be similar to Alternative 3. Impacts would primarily result from construction activities, increased maneuver training, weapons training, fires and deployment. The number of personnel stationed at FWA would be similar to that proposed under Alternative 3. It is expected that the implementation of institutional matters, such as wildlife, vegetation and habitat monitoring and management programs, would intensify, thereby benefiting subsistence resources. The end result would be a minor impact on subsistence resources.

4.15.4.3 Donnelly Training Area

4.15.4.3.1 Alternative 1 (No Action)

Access

Under this alternative, USARAK would continue to train on DTA and would occasionally utilize Gerstle River Training Area. MIMs are expected to remain at approximately 17,000 per year, and maneuver space requirements would remain at 15,000 km^2 days per year. This would require occasional closures of some training areas, making them temporarily unavailable for non-military purposes, including subsistence. The training program is expected to remain approximately the same, and training areas would be closed to non-military activities with the same frequency and duration. Access impacts to subsistence resources, including fish, wildlife, and plants, at DTA would be minor under this alternative.

Resource Availability

Wildlife management would continue to be implemented through both USARAK and the Alaska Department of Fish and Game. Analysis of impacts to wildlife and fisheries can be found in Section 4.9, Wildlife and Fisheries.

Ongoing USARAK maneuver and weapons training on DTA would affect subsistence resources. Maneuver training can affect wildlife individuals and groups by disrupting normal activity patterns. However, such training is not likely to affect wildlife at the population level, due to the frequency and scale of training in conjunction with the adaptability of most wildlife species to such disturbance. Maneuver training could also lead to petrochemical spills, bankside erosion and sedimentation, which could affect local fisheries. However, existing USARAK procedures sharply curtail the risk of inadvertent petrochemical release, and vehicles use designated stream crossings to minimize sedimentation impacts.

Weapons training would also have the potential to impact subsistence resources. Ongoing weapons training could lead to incidental mortality, and munitions residues could lead to reduced water quality and wildlife health. Incidental mortality is rare and is not expected to affect wildlife beyond the individual level. Studies conducted on USARAK ranges indicate that

munitions residues either degrade rapidly or are immobilized (Houston 2002; Palazzo et al. 2002). Additional soil and water monitoring would be planned under this alternative.

In 1999, a Section 810(a) finding for the preferred alternative of no significant adverse effects on the customary or traditional subsistence uses of withdrawn lands at Fort Greely (now Donnelly Training Area) was completed for the legislative land withdrawal EIS of 1999 (USARAK 1999a). In this transformation EIS, the No Action Alternative contains no actions affecting this earlier Section 810 finding.

Overall impacts to subsistence resources at DTA under the No Action Alternative would continue to be minor due to occasional access closures and low-level wildlife disturbance. Management of wildlife, plant, and fisheries resources has been implemented through the INRMPs in efforts to reduce the risk and minimize the effects of military activity on wildlife, plant, and fisheries resources.

4.15.4.3.2 Alternative 3 (Transform with New Infrastructure)

Under this alternative, training intensity at DTA would increase due to increased numbers of personnel training at DTA. Local subsistence resources could be affected by increased frequency and intensity of training, as well as more extensive land use.

Access

There would be an increase in the frequency of training area closures. Deployments to DTA would increase with a majority being company-level deployments and would probably only utilize portions of the training area. Maneuver space requirements would increase from approximately 15,000 to 65,000 km^2 days per year on DTA, including an expected 4,000 km^2 days on Gerstle River Training Area. Typically, public access closures due to training during moose hunting season have been very limited. Transformation is unlikely 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 on DTA would still be available for access to subsistence resources including wildlife, fish, and plants.

Transformation would necessitate the construction of additional roads and maneuver trails on the training area. This is expected to have a beneficial effect on subsistence, due to the greater land area accessible following extension of the maneuver trail system.

Resource Availability

Under transformation, the Army would use more of DTA for maneuver training. USARAK might also use Gerstle River Training Area in conjunction with DTA. New trails would expand training area availability. These new trails and increased road use may affect existing wildlife populations and habitat, with potential disruption to current activity patterns, movement and higher incidental mortality of individuals. As noted in Section 4.9, Wildlife and Fisheries, wildlife populations can tolerate some disturbance from vehicular traffic; however, information available currently is insufficient to determine the extent of population-wide effects. 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.

Transformation could affect populations of moose and caribou. Note that the overall harvest of caribou is minimal in Unit 20D. The Macomb herd is not a federal subsistence resource (Section 3.9.3.1.1) and only 25 animals from this herd are harvested each year. 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 seems 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, moose are readily adaptable to creation of new early succession habitat. Overall, the impact of transformation to the availability of moose would be minor to subsistence hunters.

Training could also result in minor impacts to 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. Increased levels of chemical components from unexploded or partially exploded ordnance are also a potential impact to subsistence resources under Alternative 3. Studies conducted on USARAK impact areas and adjacent waterways have shown that aquatic concentrations of residues are negligible (Ferrick et al. 2001).

Additionally, transformation would result in the construction of a UAV maintenance support facility within Training Area 57 (Appendix D). The exact location has not yet been proposed, but it is expected that impacts would occur in approximately 0.5 acres of habitat. The habitat is currently used by most of the wildlife species represented on post, and construction may affect localized populations currently located or passing through the expected footprint.

Additional personnel stationed at FWA might participate in recreational hunting and fishing activities (Section 4.13, Socioeconomics). This could lead to estimated increases in the local sport fishing and hunting populations of 1.27% during the interim and 2.66% at end state (less than 1% of current licenses in interior Alaska), and impact current availability of subsistence resources on or near DTA and associated training lands (i.e., Gerstle River and Black Rapids training areas). An increase in sport hunting interest would compete with existing recreational hunters for fixed-quantity permits and for harvest take where unlimited open entry permits are available. The Alaska Department of Fish and Game manages harvest through its permit system and impacts harvest through early closures and or regulation changes.

Some wildlife populations might benefit from transformation. USARAK would clear land for ranges, leading to grass, shrub, and successional habitat. This habitat is of high value to moose and bison. Moose makes up a large portion of the overall subsistence harvest in interior Alaska (Marcotte 1991; ADFG 2000d).

The implementation of institutional matters associated with Alternative 3 is expected to improve monitoring and management of wildlife, fisheries, vegetation and habitat on DTA. Overall impacts on subsistence under Alternative 3 are expected to be minor during the interim phase and at the end state of transformation, due to the expected increase in access closures and the potential disruption or partial migration of the Delta caribou herd.

4.15.4.3.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts under Alternative 4 are expected to be similar to those listed under Alternative 3. There could be a slight increase in frequency of closures expected under Alternative 4. Following the modification of the 1-501st Parachute Infantry Regiment to an Airborne Task Force, large-scale maneuvers are expected to occur on DTA. Maneuver space requirements are expected to increase to approximately 69,000 km^2 days under this alternative, including 4,000 km^2 days at Gerstle River Training Area, resulting in higher disturbance to wildlife and habitat. Implementation of

institutional matters would improve monitoring and management strategies on DTA (Appendix H). Overall effects on subsistence are expected to be minor.

4.15.4.4 Fort Richardson

The Federal Subsistence Board has delineated a FRA and Elmendorf Air Force Base Management Area (consisting of FRA and Elmendorf military reservations). Under the special provisions for Unit 14, the FRA and Elmendorf Management Area is "closed" to subsistence taking of wildlife (Subsistence Management Regulations 2002-2003). Hunting and fishing is, however, permitted on FRA under the Alaska Department of Fish and Game regulations, and it is recognized as an important area for the subsistence lifestyle of Native people. Therefore, impacts to subsistence from military activities and management on FRA were assessed even though federal subsistence limits and seasons do not exist.

4.15.4.4.1 Alternative 1 (No Action)

Mission and training at FRA would remain at current levels. Continuation of military activities on USARAK managed lands would result in minor adverse impacts to accessibility, wildlife, and plant resources.

Access

Military training activities would occur with the same frequency, requiring occasional closures of training lands. Under this alternative, maneuver training would continue to require approximately 15,000 km^2 days. This would result in a minor impact for accessibility to subsistence resources.

Resource Availability

Construction and training activity could have effects on wetlands, riparian areas, and stream habitat, thus affecting waterfowl and mammal populations. However, impacts on wetlands would be highly localized. Petrochemical spills resulting from military activity could also adversely impact stream health and subsistence resources. Existing USARAK procedures would minimize the risk of spills.

Minor impacts to fisheries are possible, primarily from erosion and sedimentation due to construction and maneuver training. Explosive munitions residues from weapons training could also impact water quality. However, studies conducted on USARAK impact areas and adjacent waterways have shown that aquatic concentrations of residues are negligible (Ferrick et al. 2001). Impacts of explosive munitions residues on vegetation have also been studied and those impacts also appear negligible, suggesting that residue intake through ingestion by birds and mammals will not adversely impact such wildlife or individuals who consume birds and mammals for subsistence.

Management of wildlife, plant, and fisheries resources has been implemented through the INRMPs in efforts to reduce the risk and minimize the effects of military activity on wildlife, plant, and fisheries resources.

4.15.4.4.2 Alternative 3 (Transform with New Infrastructure)

Access

Under this alternative, increased military training would require an increase in access closures. Projected maneuver space requirement for FRA under Alternative 3 would be approximately 26,000 km^2 days at the interim state and 15,000 km^2 days at the end state. Due to the projected increase in training activity, land closures are expected to occur more frequently. This would result in a moderate impact for accessibility during the interim stage and reduce to a minor impact at the end state of transformation.

Resource Availability

Additional personnel stationed at FRA might participate in recreational hunting and fishing activities (Section 4.13, Socioeconomics). Due to FRA's relative size in proportion to the non-Army population and the projected changes in uniformed personnel, the slight change in numbers of sport fishers and hunters (less than 1%) would have a negligible increase in competition hunting and fishing in both the interim and end state. Hunting success is likely to have minor impacts under Alternative 3.

Transformation would involve training with new equipment, most notably the Stryker vehicle (but also a mobile gun system, unmanned aerial vehicle, and 155mm howitzer), in addition to increased maneuver and weapons training. These changes to training could affect individuals, groups, or localized wildlife populations by disrupting activity patterns or movements. An increase in MIMs from maneuver training could also result in increased erosion, the possibility of increased petroleum spills during re-fueling, and higher levels of fragments of unexploded or partially exploded ordnance. However, munitions residues either degrade rapidly or are immobilized, and the risk of such pollutants leaching into the streams and ponds at toxic concentrations is remote (Section 4.9, Wildlife and Fisheries; Houston 2002; Palazzo et al. 2002).

Transformation is not expected to impact fish populations or fishing opportunities on FRA. The continued use of existing stream crossings would minimize sedimentation impacts. The continued implementation of institutional matters could benefit subsistence resources on USARAK managed lands or resources affected by USARAK activities, as monitoring of population levels and management of resources would improve.

Overall impacts to subsistence under Alternative 3 are expected to have moderate impacts during the short term due to decreased accessibility, and minor at end state. Impacts would be minor at end state due to the eventual decrease in access closures and the expected minor impacts to wildlife and fisheries.

4.15.4.4.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts to wildlife, fisheries and other subsistence resources under Alternative 4 would be similar to Alternative 3. Impacts would primarily result from increased maneuver training, weapons training, and deployment. The number of personnel stationed at FRA would increase to 3,187 in the interim stage, then reduce to 2,505 at the end state. Impacts to access at FRA for subsistence harvesting of resources are expected to be moderate during the interim stage then minor at the end state. The impacts to wildlife availability are expected to be minor.

It is expected that the implementation of institutional matters, such as wildlife, vegetation, and habitat monitoring and management programs, would intensify, thereby benefiting subsistence resources (Appendix H).

4.15.5 Comparison of Alternatives Summary

4.15.5.1 Comparison of All Alternatives

See Table 4.15.a for a summary comparison of impacts on subsistence from each alternative. Definitions of the qualitative impact categories are defined in Section 4.15.4.

Table 4.15.a Summary of Impacts to Subsistence on USARAK lands.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Fort Wainwright					
Access	Minor	Minor	Minor	Minor	Minor
Wildlife	Minor	Minor	Minor	Minor	Minor
Plant Gathering/Berry Picking	Minor	Minor	Minor	Minor	Minor
Donnelly Training Area					
Access	Minor	Minor	Minor	Minor	Minor
Wildlife	Minor	Minor	Minor	Minor	Minor
Plant Gathering/Berry Picking	Minor	Minor	Minor	Minor	Minor
Fort Richardson					
Access	Minor	Moderate	Minor	Moderate	Minor
Wildlife	Minor	Minor	Minor	Minor	Minor
Plant Gathering/Berry Picking	Minor	Moderate	Minor	Moderate	Minor

4.15.5.2 Comparison of Alternatives 3 and 4

Both alternatives would result in transformation from the Current Force to the SBCT. Alternative 4 would result in slightly higher numbers of personnel and equipment, but construction projects would remain the same. Training intensities would be slightly higher. The implications for subsistence are that under Alternative 4 impacts could potentially increase by 1-2% due to stationing, maneuver and weapons training, and use of additional equipment. All of these activities could potentially affect wildlife populations, stream and habitat health, and access to resources.

The primary difference between Alternatives 3 and 4 would result from the institutional matters. For Alternative 3, institutional matters relating to range management, the Integrated Training Area Management program, environmental management, and sustainable range management would remain essentially the same as the No Action Alternative (Appendix H). However, under Alternative 4, these four programs would be fully funded and implemented. Institutional matters affecting subsistence would also involve fully implementing both a Training Area Recovery Plan, ecosystem management, and the INRMPs. The result would be improved environmental

management of USARAK lands, to the benefit of wildlife and plant resources and habitat on USARAK managed lands.

4.15.6 Mitigation

4.15.6.1 Existing

The following mitigation measure is currently implemented on USARAK lands and is part of the No Action Alternative.

- Follow regulations listed under the ANILCA. Working with relevant federal and state officials to protect local subsistence populations through priority for harvest when resources are reduced would protect the viability of subsistence in the area.

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts. These mitigation measures are implemented as funding is available. Often funding only provides for partial implementation.

- Continue implementation of the INRMPs, with specific actions for the management of wildlife, fisheries, vegetation, and habitat.
- Continue with 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 Appendix H.

4.15.6.2 Proposed

Some programs already propose measures that would mitigate impacts to subsistence. These programs are only partially implemented and funded. The proposed mitigation under Alternative 4 is to fully implement plans and projects that have already been identified by USARAK's INRMPs and other programs. These projects and plans are further described in Appendix H. Additional mitigation measures are also listed below.

- Consult with all interested parties, especially Native Tribes and rural dwellers, to determine subsistence need and subsistence areas. This would identify USARAK lands potentially or historically used for subsistence harvest.
- Implement an education and awareness program for military personnel and others applying for hunting and fishing permits on USARAK lands to emphasize the importance of subsistence resources to rural dwellers and to discourage the waste of any subsistence resource.
- Ensure through tribal consultation and use of a newsletter that subsistence users are aware of and provided opportunity to comment on existing hunting and fishing programs on USARAK lands.
- Initiate research and cooperative studies with Tribes to address possible effects of Army activities on subsistence resources both directly within USARAK installation boundaries and those outlying resources that may also be affected by Army activities.

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4.16 NOISE

This section analyzes and compares the noise impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.16. Additional noise information is presented in Appendix F.

4.16.1 Background

Noise is unwanted sound that interferes with communications or other human activities, is intense enough to damage hearing, or is otherwise annoying. Types of noise associated with military activities result from transportation, explosives from artillery firing, small arms, or demolitions. 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.

4.16.2 Review of the Impacts of Noise

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). The effects of aircraft noise on recreation were studied by Fidell et al. (1992) who reported that 1-12% 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 can potentially affect subsistence activities (USAF 1995). Impacts could range from startling of animals, thus increasing hunt time, to long-term adverse effects at the population level, resulting in impacts to the viability of subsistence hunting.

The effects of noise can impact land use compatibility. The Federal Interagency Committee on Urban Noise (FICUN) has developed guidelines for considering noise in land use planning and control. The FICUN guidelines use the A-Weighted Day-Night Average Sound Level (ADNL). The DNL is an average measure of noise events occurring over a 24-hour period with a 10 decibel penalty added to noise events between 10 pm and 7 am. Land uses such as residential areas, schools, and hospitals are not compatible within zones above 65 ADNL unless measures, such as double-pane windows, have been included in construction to lower interior noise levels by 25 decibels. Over 75 ADNL, noise-sensitive land uses are not compatible (FICUN 1980).

The effects of noise 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. This section focuses on the impacts of noise to humans. Each species of wildlife has unique sensitivities and responses to noise, and without empirical data it is not possible to extrapolate information from human annoyance (William Russell Ph.D., personal communication 2003).

Appendix F has a review of scientific articles on the impacts of human disturbance (including noise) to wildlife. Note that the majority of research has focused on the impacts of aircraft noise on wildlife, especially birds of prey. Relatively few studies have evaluated the effects of artillery or blast noise on wildlife (Larkin 1996). Most published studies evaluating blast noise on wildlife have focused on raptors.

4.16.3 Activity Groups that Affect Noise Levels

The textbox below lists activity groups that could affect noise levels due to transformation.

Activity Groups with Impacts	Activity Groups without Impacts
• Construction • Training • Systems Acquisition • Deployment • Institutional Matters	• Stationing

This section analyzes and compares the noise impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.16. Additional information on noise is presented in Appendix F.

4.16.3.1 Construction

Proposed construction projects associated with transformation include the company operations facilities at Fort Wainwright (FWA); the unmanned aerial vehicle (UAV) maintenance support facility at Donnelly Training Area (DTA); and the mission support training facility, 60-personnel barracks, and development of the Anchorage Port support staging area at Fort Richardson (FRA) (Appendix D). These construction activities would contribute to temporary 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.

4.16.3.2 Training

The frequency and intensity of maneuver and weapons training could increase if U.S. Army Alaska (USARAK) were to transform (Table 4.1.a). 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 maneuver training intensities would increase, the noise levels associated with maneuver training would not increase significantly.

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. Although some Noise Zone II and III contours would occur off the Army posts, the locations would not be considered to be noise-sensitive areas (e.g., residential areas or sensitive commercial sites). However, there is still the potential that neighbors would hear the training, especially if weather conditions carry the sound to residential areas.

4.16.3.3 Systems Acquisition

New equipment would be used under transformation, including the eight-wheeled 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) (Table 4.1.a). The 155mm towed howitzer and 105mm mobile gun system would result in loud impulse noise in ranges. The Stryker vehicle itself would be similar in noise levels to trucks. Use of the UAV would not create loud noise levels.

4.16.3.4 Deployment

Deployment would occur by air, land, or sea. Transformation would result in increased frequency of out-of-state and overseas deployments. Under current training doctrine, deployment would not increase on a unit basis (e.g., individual platoon unit deployments would remain at four times a year regardless of alternative). However, the number of units, to include platoon, company, and battalion, would increase under the proposed action. Therefore, the total number of unit deployments and miles would increase. Air deployments would likely result in short-term negative impacts at airfields, primarily from jets.

4.16.3.5 Institutional Matters

Institutional matters include USARAK management activities, land stewardship, policy and program implementation. Transformation is expected to change management processes, which should lead to better data collection and management. This would improve stewardship of USARAK lands and resources.

4.16.4 Comparison of Alternatives

4.16.4.1 Description of Methodology

The primary means of assessing environmental noise is through computer simulations since direct measurement of noise levels is often impractical, expensive, and inconclusive. Computer simulations can be summarized on installation maps. The noise contours depicted in this section represent a combination of small arms, large weapons, and demolitions.

4.16.4.1.1 Artillery and Demolitions Noise

The noise simulation program used to assess heavy weapons noise is BNOISE (Hottman et al. 1986). The BNOISE program requires operational data concerning types of weapons fired from each range or firing point. Included in the model are the number and type of rounds fired from each weapon, the location of targets for each range or firing point, and the amount of propellant used to reach the target. Contours are generated from range utilization data and reasonable assumptions.

For the analysis in this EIS, the BNOISE model was used to calculate the noise contours for existing operations. The program was subsequently run to generate estimates of training that would occur under transformation. In addition, the predicted sound levels of artillery at different distances were calculated with the program BNOISE (Table 4.16.a). The changes in the large caliber weapons firing for the proposed action would be the addition of the 105mm Stryker mobile gun system and the 120mm mortar, and the 155mm towed howitzer would replace the 105mm howitzer. The information in Table 4.16.a can be used to estimate annoyance levels of currently used and proposed weapons.

Table 4.16.a Unweighted Peak Noise Levels (dBP) from Artillery in Relation to Distance and Direction of Fire.

Unweighted Peak Noise Levels (dBP) Sound Level 180 Degrees from Explosion					
Distance (feet) [1]	155mm Howitzer[2]	105mm Howitzer[2]	60mm Mortar[3]	81mm Mortar[3]	120mm Mortar[3]
500	153	132	134	133	135
2,500	127	106	108	107	117
5,000	116	95	98	96	111
Sound Level 90 Degrees from Explosion					
500	150	142	137	135	138
2,500	125	117	112	110	120
5,000	114	106	101	99	114

[1]Distance from noise source to recording device.
[2]5 Charge
[3]3 Charge
Source: USACHPPM 2002; Catherine Stewart, personal communication 2003

4.16.4.1.2 Small Arms Noise

Small arms noise contours are generated using the Small Arms Range Noise Assessment Model (SARNAM) (U.S. Army 1996). The model incorporates the latest available information on weapons noise source models (including directivity and spectrum), sound propagation, effects of noise mitigation and safety structures (walls, berms, ricochet barriers), and community response protocols for small arms noise. Model inputs include: range grid coordinates, number of firing lanes, distances to targets, firing azimuth, location and size of barriers, berms and baffles, and number of rounds by weapon type firing during daytime and nighttime hours.

USARAK has addressed the levels of small arms noise in the installation Environmental Noise Management Plans for FWA, DTA, and FRA. The noise contours for small arms firing stay well within the installations. The increase in small arms training associated with transformation would not extend noise contours off any installations.

4.16.4.1.3 Vehicle Noise

The noise levels generated by the use of Stryker vehicles would be less than or equal to the noise generated by other equipment used by the Army (Table 4.16.b). For example, the noise level of a Stryker moving at 50 mph is approximately 85 dBA at 60 feet away, compared to 92 dBA for a moving M1A2 tank (speed unspecified) at 328 feet away (Project Manager Brigade Combat Team, personnel communication 2002).

Table 4.16.b Comparison of Noise Levels of the Stryker Compared With Other Common Army Vehicles.

Type	Distance (feet)[1]	Speed (mph)	Noise Level (dBA)
Stationary Stryker	20	0	78
Moving Stryker	60	50	85
Bradley Fighting Vehicle[2]	98	20	80
M1A2 Tank[2]	328	Moving	92
Passenger Car	25	65	77

[1]Distance from noise source to recording device.
[2]Not used in Alaska, but included for comparative purposes.

Source: Project Manager Brigade Combat Team 2002

4.16.4.1.4 Airfield Noise

Studies have found that a good predictor of annoyance at airfields with 50 to 200 operations per day is the maximum noise level of the three loudest events (Rylander 1974). Although evidence is lacking in evaluating annoyance at airfields or flight tracks with fewer than 50 operations per day, this remains a qualitative tool to provide an indicator of the percentage of people who might be annoyed from aircraft. Table 4.16.c shows expected sound levels and annoyance rates from C-130 aircraft at different distances.

Table 4.16.c Maximum Noise Levels (dBA) of C-130 Aircraft and Approximate Percentage of People Expected to be Highly Annoyed.

Slant Distance Feet[1]	C-130 Maximum Level dBA	Approximate Percentage (%) Highly Annoyed
200	100.8	No data
500	94.2	40
1,000	88.8	33
2,000	82.7	30
5,000	73.2	15
10,000	64.8	<5

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

The UAV is designed to not be detected by the human ear when it is in flight. See Table 4.16.d and Appendix F for comparative testing data of the noise levels generated by a stationary UAV.

Table 4.16.d 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; Catherine Stewart, personal communication 2003.

4.16.4.1.5 Analysis of Noise Impacts on USARAK Lands

Listed below are five levels of impacts resulting from military activity (or other intensive land use programs):

- None – Noise levels are within ambient conditions.
- Minor – Equivalent to Zone I conditions in which the average day-night sound level is less than 65 dBA. Areas under Zone I are suitable for all types of land use activities. Approximately 15% of the population would be annoyed with these levels.
- Moderate – Equivalent to Zone II conditions; day-night sound levels range between 65 and 75 dBA. Exposure to noise within these areas is considered significant, and land uses should normally be limited to activities such as industrial, manufacturing, transportation and resource production. Approximately 15-39% of the population would be annoyed at the Zone II level.
- Severe – Equivalent to Zone III conditions; day-night sound levels exceed 75 dBA. The noise levels are considered so severe that noise-sensitive land uses should not be considered. Forty percent or more of the population would be annoyed in Zone III areas.
- Beneficial – Noise would decrease below current levels.

The following analysis estimates acreages of Zone II and Zone III levels according to land use category (training lands, cantonment areas, and off post), by alternative for each post. In addition, the total acreage of noise zone levels is compared by alternative for each installation.

The first two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant. Existing and proposed mitigation for impacts to noise are presented in 4.16.6, Mitigation.

4.16.4.2 Fort Wainwright

4.16.4.2.1 Alternative 1 (No Action)

Construction of USARAK mission-essential projects would contribute short-term and localized noise impacts (Stout 2002a,d). Maneuver training creates very slight impacts to noise levels.

Currently two infantry battalions and a field artillery battalion train at FWA. The existing noise contours at Main Post were based on data from 1999 when no artillery exercises were conducted. Although Main Post firing points and the Alpha Impact Area have been used in the past, only two artillery exercises have been conducted from the Main Post since 1999 (Steve Reidsma,

personal communication 2002). Use of the small arms range complex indicates noise-generating activity (Appendix A, Figure 4.16.a), but the infrequency of firing into Alpha Impact Area did not generate sufficient noise levels to develop contours (Appendix A, Figure 4.16.b).

At Main Post, the projected Level II and III noise contours would extend beyond the firing range and affect 165 acres of off-post land, as well as 170 acres in the cantonment area (Appendix A, Figure 4.16.a) and (Table 4.16.d). At YTA, all Zones II and III noise contours would be on training lands (Appendix A, Figure 4.16.c). Under certain weather conditions (e.g., temperature inversions), use of Firing Points 25 and 26 could result in complaints because some residential neighborhoods are within 1.25 to 1.8 miles of the ranges.

Use of military aircraft would continue to be a source of noise on USARAK lands (USARAK 1999a). The most common source of noise is from low-flying Air Force jets that use the impact areas. Helicopter flights, averaging two flights per week, from the Main Post follow the Tanana River and Richardson Highway corridor to DTA or Fort Greely. Helicopters also follow routes to YTA that branch off from the Tanana/Richardson corridor.

Noise levels increase during air deployments, primarily from transport jets.

4.16.4.2.2 Alternative 3 (Transform with New Infrastructure)

Construction of the two company operations facilities would contribute to noise levels, but the effects would be short term, localized, and would not affect the outlying communities.

Most changes in the noise levels due to transformation would result from weapons training. Changes would include use of the 105mm Stryker mobile gun system, the 120mm mortar, and the 155mm towed howitzer. The Alpha Impact Area in Tanana Flats Training Area (TFTA) would be utilized for artillery and mortar training at higher than current levels. This is the primary reason for the increase in the size of the noise contours at FWA.

During the interim phase, munitions expenditures would remain relatively close to current levels or equivalent to the No Action Alternative. However, during the end state, transformation would result in increased acreages of Level II and Level III noise contours at Main Post and on Alpha Impact Area (Appendix A, Figure 4.16.b). If the firing is from the central portion of the range (Firing Point 24), the noise contours would remain on the post; however, 297 acres of the cantonment area would be affected by Zone II and 3 acres by Zone III noise levels (Appendix A, Figure 4.16.a) and (Table 4.16.d).

The noise contours at TFTA would stay within USARAK training lands (Appendix A, Figure 4.16.b) and (Table 4.16.d). Proposed use of Firing Point 24 would decrease the likelihood of noise complaints because this site is more than two miles from any residential neighborhoods (Table 4.16.b). At YTA, about 119 acres would be off post; this would occur on Eielson Air Force Base (Appendix A, Figure 4.16.c) and would not likely result in noise complaints.

The total acreage under moderate or severe noise levels (Zones II and III) would increase from 0.4% to 3.5% at Main Post and TFTA (Table 4.16.e). However, the vast majority of the increase is on training lands due to greater use of the Alpha Impact Area. Zone II and Zone III contours would approximately double in size in the cantonment area, from about 170 acres to 300 acres. Moderate to severe noise levels at YTA would increase from 5.5% to 6.4% (Table 4.16.b). The impacts would only affect military training lands.

Use of the range for artillery firing would result in a substantial increase in the acreage of noise contours in the Alpha Impact Area. Although this would not affect humans, it could affect

wildlife, including moose, trumpeter swans or other species of waterfowl (Section 4.9, Wildlife and Fisheries).

Aircraft also generate high noise levels. Air Force and helicopter flyovers would continue as described in the No Action Alternative. In addition, increases in aircraft activity would occur during deployments. These would occur up to six times annually with flights using C-130 aircraft between FRA and FWA. However, the number of flights would not be frequent enough to generate a noise contour. The maximum noise levels (USAF 1990) for the aircraft (C-130) are listed in Table 4.16.c. These maximum levels can be compared with annoyance levels to determine the percent of the population that would be highly annoyed.

Although the frequency and size of these deployments would increase noise levels, the deployments are of relatively short duration and would not result in a significant adverse impact to noise levels compared to current military use of airstrips.

The adverse effects of noise resulting from military training would increase at FWA but the overall impact would be minor. Changes in noise levels could occur from maneuver training, but the effects on humans would be minor.

4.16.4.2.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Any difference in noise levels between Alternatives 3 and 4 would be negligible at FWA because munitions training requirements would be similar.

4.16.4.3 Donnelly Training Area

4.16.4.3.1 Alternative 1 (No Action)

Construction of USARAK mission-essential projects, including the battle area complex and combined arms collective training facility, would contribute short-term and localized effects (Stout 2002b).

The existing noise contours for DTA were developed in 2001 using the operational data from fiscal year 2000. Operations include 60mm and 81mm mortars, 105mm and 155mm howitzers, as well as demolition activities. Although munitions expenditures can be heard in Delta Junction or nearby rural areas, the Zones II and III contours do not extend beyond the boundaries of the training area (Appendix A, Figure 4.16.d). The probability of noise complaints would be minimal because firing points are greater than two miles from any residential areas (Table 4.16.a).

Use of military aircraft would continue to be a source of noise at DTA, especially at Oklahoma Impact Area (which is used primarily by the U.S. Air Force) and nearby areas (USARAK 1999a). Another contribution to noise levels in the area would result from periodic helicopter flights from FWA Main Post follow the Tanana River and Richardson Highway corridor to DTA. In addition, noise levels increase during deployments and large-scale training exercises, but the impacts would be short-term.

Noise levels would increase temporarily during deployments to DTA, primarily from jets landing and taking off at Allen Airfield.

4.16.4.3.2 Alternative 3 (Transform with New Infrastructure)

Construction of the unmanned aerial vehicle maintenance support facility could contribute to noise levels, but the effects would be short term, localized and would not affect the outlying community.

Munitions use and noise levels during the interim phase would remain similar to current levels or to the No Action Alternative. However, at end state, the use of artillery and demolitions could cause increased acreages of noise contours at DTA (Appendix A, Figure 4.16.d). The areas covered by Zones II and III noise contours would increase (Table 4.16.d). Use of 105mm Stryker mobile gun system, the 120mm mortar, and the 155mm towed howitzer would occur. Training would continue at the Washington and Mississippi impact areas and nearby ranges and firing points. Although the extent of the contours would increase, the Zones II and III contours would stay within the training areas (Appendix A, Figure 4.16.d). Although the use of high-explosive weapons would increase, the probability of noise-related complaints would be minimal because residential areas are at least two miles from any firing points or ranges (Table 4.16.a and Appendix A, Figure 4.16.d).

The total acreage under moderate or severe noise levels (Zones II and III) would increase from 2.3% to 3.8% on DTA (Table 4.16.e). This increase would be on training lands and would not affect the cantonment area or areas off post.

Similar to FWA, the Air Force and helicopter flyovers would continue as described in the No Action Alternative. Use of C-130 transport planes may occur at Allen Airfield. Changes in noise levels could occur from maneuver training.

The adverse effects of noise resulting from military training would increase in the DTA area, but the overall impact would be minor.

4.16.4.3.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Any difference in noise levels between Alternatives 3 and 4 would be negligible at DTA because munitions training requirements would be similar (Tables 4.16.d and 4.16.e). Implementation of institutional matters with Alternative 4 could improve noise management.

4.16.4.4 Fort Richardson

4.16.4.4.1 Alternative 1 (No Action)

Construction of mission-essential projects – the barracks complex, Anchorage Port staging area, and mission support training facility – would contribute short-term and localized effects (Stout 2002c).

The existing noise contours for FRA are based on firing data for fiscal year 2002. Noise contours from small arms and artillery training generally remain on the post (Appendix A, Figure 4.16.e). The largest areas of Zones II and III noise levels occur on and adjacent to Eagle River Impact Area. A small portion of the cantonment area (100 acres), the northern portion of the Otter Lake Recreation Area, is within the Zones II and III contours. Noise-related complaints probably would not increase over current levels.

Zones II and III noise contours extend off post and overlap a portion of Eagle Bay in the Knik Arm near Eagle River Flats. In addition the northeast corner of Elmendorf Air Force Base is also within Zone II and III contours (Appendix A, Figure 4.16.e).

Helicopter flights from USARAK training and the Alaska National Guard would contribute to noise levels. Noise levels increase during air deployments from Elmendorf Air Force Base. Maneuver training contributes slight impacts to noise levels.

Noise levels would increase during air deployments from Elmendorf Air Force Base, but these would be short term and intermittent.

4.16.4.4.2 Alternative 3 (Transform with New Infrastructure)

During the interim phase, the acreage of Zone II and III noise levels would increase by about 144%. However, the increases would be over training areas, other military lands, or the Knik Arm. Residential areas would not be impacted by Zone II and III levels.

Noise at end state would increase by about 82% compared to current levels. Most of this increase would occur on training lands, including the Eagle River Impact Area. Zone II and III levels would increase by about 20% on the cantonment area, and 43% off-post. Note that the off-post increase would be on Elmendorf Air Force Base, or over the Knik Arm. The artillery firing points are more than two miles from any residential areas, which would reduce the probability of noise complaints.

Construction noise from the development of the mission support training facility, barracks, and Anchorage Port staging area would result in increased noise levels, but the impact would be short term and localized.

Transformation would result in the use of new weapons. Training would continue with the 81mm and 60mm mortars, but the 120mm mortar would be acquired as well. The 120mm mortar has a range of 7,200 meters, so there may occasionally be mortar firing further from the Eagle River Impact Area, meaning closer to the boundary. Currently, a field artillery battery fires the 105mm howitzer. In the future, this would be replaced with the 155mm howitzer. The SBCT would also acquire 27 mobile gun systems, which is a variation of the Stryker vehicle.

The contours in the Eagle River Flats area do not change appreciably between the No Action Alternative and Alternatives 3. Development of the multi-purpose training range would result in increased Zones II and III noise levels in the northeastern portion of FRA (Appendix A, Figure 4.16.e). If the firing points are moved from near the edge northeast portion of the post (i.e., from Firing Points 23 and 33), then the noise contours would not extend beyond the boundaries of FRA (Appendix A, Figure 4.16.e).

The total acreage under moderate or severe noise levels (Zones II and III) would increase from 15% to 27% at FRA (Table 4.16.e). A large proportion of the increase would result from the use of the new range in the northeast portion of the post (Appendix A, Figure 4.16.e). This increase is on training lands and would not affect the cantonment area or areas off post. Zones II and III noise levels would nearly double off post (Table 4.16.d); however, the areas would not affect sensitive land use areas such as residential or commercial zones. The off-post contours are over the ocean or Elmendorf Air Force Base. The increased noise levels in the cantonment would mostly be on lands adjoining the Otter Lake Recreation Area (Appendix A, Figure 4.16.e).

Aircraft noise during deployments would increase, but these would be short term and infrequent (approximately six times per year). The percentage of people annoyed by C-130 jets at different distances is presented in Table 4.16c. Although the frequency and size of these deployments would increase the noise levels, the deployments are of relatively short duration and would not increase levels compared to current military use of airstrips.

Increased intensity of maneuver training would possibly result in increased noise levels from Stryker vehicles, but the level of noise would likely not rise above background levels from the Glenn Highway. No adverse effect would be expected.

The adverse effects of noise resulting from military training would increase at FRA, especially during the interim phase when troops and training levels would be higher. However, the overall impacts of noise levels would be minor.

4.16.4.4.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Zone II and III noise levels under Alternative 4 would increase by 177% during the interim phase. Similar to Alternative 3, however, the increases would be over training lands, other military lands, or Knik Arm. Noise levels from explosives at end state of Alternative 4 would be very similar to Alternative 3.

4.16.5 Comparison of Alternatives Summary

4.16.5.1 Comparison of All Alternatives

See Tables 4.16.e, and 4.16.f for a summary comparison of impacts on noise from each alternative.

Table 4.16.e Comparison of Acres under Noise Zones II and III (combined) by Land Use and Alternative.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Fort Wainwright Main Post and Tanana Flats Training Area					
Training Land	2,207	2,207	22,477	2,207	22,477
Cantonment Area	170	170	300	170	300
Off Post	165	165	0	165	0
Total acreage (Zones II and III)	2,542	2,542	22,777	2,542	22,777
Yukon Training Area					
Training Land	12,811	12,831	14,910	12,831	14,910
Off Post	0	0	36	0	36
Total acreage (Zones II and III)	12,831	12,831	14,946	12,831	14,946
Donnelly Training Area					
Training Land	14,154	14,154	23,011	14,154	23,011
Off Post	0	0	0	0	0

Table 4.16.e cont. Comparison of Acres under Noise Zones II and III (combined) by Land Use and Alternative.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Total acreage (Zones II and III)	14,154	14,154	23,011	14,154	23,011
Fort Richardson					
Training Land	6,312	16,172	11,910	18,335	11,910
Cantonment Area	533	662	638	676	638
Off Post	2,469	5,229	3,537	6,258	3,537
Total acreage (Zones II and III)	9,036	22,063	16,461	25,269	16,461

Table 4.16.f Comparison of Acres Affected by Noise Levels under Each Alternative.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Fort Wainwright Main Post and Tanana Flats Training Area					
Zone I	666,612	666,612	645,921	666,612	645,921
Zone II	1,726	1,726	12,809	1,726	12,809
Zone III	812	812	9,970	812	9,970
Percent (Zones II and III)	0.4%	0.4%	3.5%	0.4%	3.5%
Impact	Minor	Minor	Minor	Minor	Minor
Yukon Training Area					
Zone I	235,121	235,121	233,006	235,121	233,006
Zone II	7,509	7,509	8,562	7,509	8,562
Zone III	5,321	5,321	6,384	5,321	6,384
Percent (Zones II and III)	5.5%	5.5%	6.4%	5.5%	6.4%
Impact	Minor	Minor	Minor	Minor	Minor

Table 4.16.f cont. Comparison of Acres Affected by Noise Levels under Each Alternative.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Donnelly Training Area					
Zone I	616,846	616,846	607,989	616,846	607,989
Zone II	9,678	9,678	14,995	9,678	14,995
Zone III	4,476	4,476	8,016	4,476	8,016
Percent (Zones II and III)	2.3%	2.3%	3.8%	2.3%	3.8%
Impact	Minor	Minor	Minor	Minor	Minor
Fort Richardson					
Zone I	52,340	39,313	44,915	36,107	44,915
Zone II	5,698	14,525	10,429	16,524	10,429
Zone III	3,338	7,538	6,032	8,745	6,032
Percent (Zones II and III)	14.7%	36.0%	14.7%	41.2%	14.7%
Impact	Minor	Minor	Minor	Minor	Minor

4.16.5.2 Comparison of Alternatives 3 and 4

Both alternatives would result in transformation from the Current Force to an SBCT. In general, Alternative 4 would result in higher numbers of personnel and equipment, but construction projects would remain the same. Training intensity would be higher. The implications for noise are that under Alternative 4 impacts could increase by approximately 15% due to weapons training (Table 4.1.a).

The primary difference between Alternatives 3 and 4 would result from the institutional matters. For Alternative 3, institutional matters relating to range management, the Integrated Training Area Management program, environmental management, and sustainable range management would remain essentially the same as the No Action Alternative. However, under Alternative 4, these four programs would be fully funded and implemented. The result would be improved noise management on USARAK lands.

4.16.6 Mitigation

4.16.6.1 Existing

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts. These mitigation measures are implemented as funding is available. Often funding only provides for partial implementation.

- Continue to implement existing USARAK Range Regulation 350-2.
- Continue public notification of nighttime firing.

4.16.6.2 Proposed

Some programs already propose measures that would mitigate many noise impacts. These programs are only partially implemented and funded. The proposed mitigation is therefore to fully implement plans and projects that have already been identified by the Sustainable Range Program. These projects and plans are further described in Appendix H. Additional mitigation measures are also listed below.

Mitigation is proposed to fully implement programs needed to successfully mitigate noise impacts. These results could help make future impact modeling more accurate.

- Calculate noise contours using actual firing data if either Alternative 3 or Alternative 4 is implemented.

4.17 HUMAN HEALTH AND SAFETY

Issue B: Traffic. Concerns over military convoys and subsequent traffic issues were voiced by the public during scoping meetings. Military convoys deploying to training exercises can present a significant nuisance to vehicular traffic on Alaska highways. It is therefore evaluated in this EIS (see Section 1.8, Scoping Issues of Concern).

This section analyzes and compares the human health and safety impacts associated with each alternative. Baseline data for this comparison was presented in Section 3.17.

4.17.1 Background

Human health and safety issues concerning U.S. Army Alaska (USARAK) involve both the public and the military and civilian employees/dependents. Concerns include the presence of toxic or carcinogenic chemicals on USARAK lands, petrochemical spills and chemical storage, and hazardous waste management.

Information regarding the current state of human health and safety on USARAK lands can be found in Section 3.17.

4.17.2 Review of Impacts to Human Health and Safety

USARAK is responsible for the health and safety of both its troops, civilian employees, and those who use its properties. Health and safety concerns on USARAK properties come from a number of sources listed below:

- Traffic is usually a nuisance concern but may occasionally be severe enough to increase risk to human health and safety.
- Polychlorinated biphenyls (PCBs) are environmentally persistent chemicals that can travel far from their point of origin and may cause various health problems.
- Lead-based paint is found in millions of buildings and residences constructed prior to 1978, and lead is a hazard that can lead to damage of the brain and nervous system.
- Asbestos, a naturally occurring mineral used in a variety of insulation and building materials, is a toxic substance and a known carcinogen.
- Most pesticides create some risk of harm to humans, animals, or the environment because they are designed to kill or otherwise adversely affect living organisms.
- Radon, a naturally occurring, radioactive element, is a toxic, colorless gas.
- Materials released at contaminated sites tend to be petroleum products and solvents. Contaminated sites pose threats to human health and the environment because contaminated soil and groundwater could potentially be ingested by animals and humans.
- Petrochemicals may be carcinogenic and require cleanup in accordance with regulatory requirements.
- Unexploded ordnance (duds or dudded munitions) is produced when munitions fail to detonate properly, leaving a potential chemical hazard or explosive at the impact point.

4.17.3 Activity Groups That Affect Human Health and Safety

The textbox below lists activity groups that could affect human health and safety due to transformation.

Activity Groups With Impacts	Activity Groups Without Impacts
• Stationing • Construction • Training • Deployment • Systems Acquisition • Institutional Matters	None

4.17.3.1 Stationing

Transformation would result in additional personnel stationed at Fort Wainwright (FWA) and Fort Richardson (FRA). The increase in troops stationed on USARAK properties could affect human health and safety due to the potential presence of hazardous materials in post housing.

4.17.3.2 Construction

Proposed construction projects associated with transformation include the company operations facilities at FWA; the unmanned aerial vehicle (UAV) maintenance support facility at Donnelly Training Area (DTA); and the mission support training facility, new barracks facilities, and development of the Port of Anchorage deployment staging area at FRA (Appendix D). Construction impacts can be expected due to the presence and potential disturbance to asbestos and lead-based paint. Detailed construction information can be found in Appendix D.

4.17.3.3 Training

The frequency and intensity of maneuver and weapons training could increase if USARAK were to transform (Table 4.1.a). Explosive munitions use is expected to increase from 196,000 rounds per year to either 262,000 or 328,000, with an approximate dud rate of 3.5% (Dauphin and Doyle 2000, 2001). This could affect human health and safety due to proportional increases in unexploded ordnance and petrochemical spills during refueling operations.

4.17.3.4 Systems Acquisition

New equipment would be used under transformation, including the eight-wheeled 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) (Table 4.1.a). The use of Strykers is expected to require greater quantities of petrochemicals and solvents. USARAK's existing capacity for storage and disposal of hazardous wastes and materials is expected to be fully sufficient to handle any potential increase in generation.

4.17.3.5 Deployment

Deployment would occur by air, land, or sea. Transformation would result in increased frequency of out-of-state and overseas deployments. Under current training doctrine, deployment would not increase on a unit basis (e.g., individual platoon unit deployments would remain at four times

a year regardless of alternative). However, the number of units, to include platoon, company, and battalion, would increase under the proposed action. Therefore, the total number of unit deployments and miles would increase. Deployment primarily involves highway transport, but may occasionally include air or rail transport methods. Disparity between USARAK convoy speed and civilian traffic is now exacerbated with the recent speed limit increase to 65 mph. The addition of Stryker vehicles to Alaskan highways during convoys is not expected to affect roadway degradation. A study currently underway will evaluate costs associated with roadway degradation from convoys.

4.17.3.6 Institutional Matters

Institutional matters include USARAK management activities, land stewardship, policy and program implementation. Transformation is expected to change management processes, which should lead to better data collection and management. This would improve stewardship of USARAK lands and resources.

4.17.4 Comparison of Alternatives

4.17.4.1 Description of Methodology

Due to lack of available data or predictive modeling for quantitative analysis, qualitative analysis of human health and safety impacts is utilized. Qualitative data 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 impact is expected to occur to human health and safety.
- Minor – Some impact would occur and would result in a slight change to human health and safety.
- Moderate – 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 – 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 two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to human health and safety are presented in 4.17.6, Mitigation.

4.17.4.2 Fort Wainwright

4.17.4.2.1 Alternative 1 (No Action)

Under this alternative, minor impacts are expected to human health and safety (Table 4.17.b). USARAK would continue to store and use various chemicals necessary for maintenance and training at FWA. Chemical storage and usage rates are expected to remain at current levels, and risks posed from storage are considered minor. USARAK would also continue to refine and reduce the amount of waste generated on post. No new types of hazardous wastes are expected to be generated at FWA.

The existing programs, management plans, and regulations that govern the handling, use, storage, and disposal of both hazardous and non-hazardous materials would remain in place. USARAK would maintain response and cleanup programs to remediate contaminated sites. Additionally, the Army has developed institutional controls to limit access to current contaminated sites. These controls would remain intact and the Army would continue to track and control access to these areas. Health and safety risks from contaminated sites would remain minor.

Ongoing munitions training would continue at the same rate under this alternative. Approximately 130,000 rounds per year of explosive munitions would be used on FWA and DTA combined, which would continue to produce unexploded ordnance risks (approximate dud rate of 3.5% for complete failure and approximately 0.3% for partial detonation (Dauphin and Doyle 2000, 2001). These would occur on the existing impact areas, which are heavily posted as off-limits to public access. Due to risks associated with unexploded ordnance, including ordnance residue concerns, impacts would be minor.

The Army would remediate lead-based paint and asbestos from buildings on post as necessary, which would be a beneficial impact. USARAK would maintain the "green" initiative, which requires housing to be free from lead and asbestos health risks by 2007. Total round-trip deployment miles associated with FWA would remain at approximately 225,000, and convoy frequency and size would stay the same, with 108 platoon-sized convoys to Yukon Training Area (YTA), and 26 company and battalion-sized convoys to DTA. Traffic impacts are considered minor.

4.17.4.2.2 Alternative 3 (Transform with New Infrastructure)

Under this alternative, potential impacts are expected on FWA (Table 4.17.b). Traffic is expected to increase under this alternative because the SBCT would incorporate an additional 322 Strykers into the USARAK maneuver training regimen. Most of these would be stationed at FWA Main Post and would have to convoy to YTA and DTA for exercises, along with other maneuver training and support vehicles. Total deployment miles associated with FWA would increase from approximately 225,000 to 358,000 for the interim phase, then 482,000 for the end state. Platoon-sized convoys to YTA would occur approximately 144 times per year, and company or battalion-sized convoys to DTA would occur 44 times per year. Winter and spring convoys are expected to have a greater impact due to hazardous driving conditions or roadway degradation. Summer convoys would exacerbate tourist-season traffic loads. Convoy size and frequency increases are expected to have a moderate impact. Current and projected deployments and deployment miles are listed in Tables 4.17.a, 4.17.b, and 4.17.c.

Table 4.17.a Predicted Deployment Size and Frequency.

Route	Unit Level	Alternatives								
		1 No Action			3 Transform with New Infrastructure			4 Transform with New Infrastructure and Airborne Task Force		
		# Veh.	# Units	Deploy per year	# Veh.	# Units	Deploy per year	# Veh.	# Units	Deploy per year
FWA-YTA	Platoon	6	27	4	9	36	4	9	40	4
FWA-DTA	Company	30	12	2	39	20	2	39	20	2
FRA-DTA	Company	58	2	2	39	4	2	39	8	2
FWA-DTA	Battalion	122	2	1	131	4	1	131	4	1
FRA-DTA	Battalion	122	1	1	122	1	1	122	2	1

Table 4.17.b Predicted Total End-State Deployments and Deployment Miles.

Total Deployments		Alternatives		
		1 No Action	3 Transform with New Infrastructure	4 Transform with New Infrastructure and Airborne Task Force
FWA-YTA	Platoon	108	144	160
FWA-DTA	Company	24	40	40
FRA-DTA	Company	4	8	16
FWA-DTA	Battalion	2	4	4
FRA-DTA	Battalion	1	1	2
Deployment Miles		437,600	742,000	1,009,600

Table 4.17.c Predicted Total Deployment Miles by Route.

Deployment Route	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Fort Wainwright to Yukon Training Area	32,400	54,000	64,800	54,000	72,000
Fort Wainwright to Donnelly Training Area	192,800	303,600	416,800	303,600	416,800

Table 4.17.c cont. Predicted Total Deployment Miles by Route.

Deployment Route	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Fort Richardson to Donnelly Training Area	212,400	492,000	260,400	738,000	520,800
Total Deployment Miles	437,600	849,600	742,000	1,095,600	1,009,600

Due to the increased number of vehicles, it is expected that petrochemicals would be utilized at a greater rate. In addition, cleaning solvent use is expected to increase due to maintenance and repair work on the new vehicles. However, existing USARAK capacity for handling, storage, and disposal of hazardous wastes and materials is expected to be fully sufficient for any potential increase in generation. The risk of petrochemical spills is expected to increase under this alternative due to the need to transport fuel and perform refueling operations in the field to support training requirements. Spills could also occur during refueling operations on the training areas. This is considered a minor impact, due to frequency and existing procedures and controls.

The need for additional housing may accelerate abatement of lead paint and asbestos as buildings are renovated to provide modern accommodations. The current housing plan includes construction of new housing and renovation of existing housing units. As post facilities are altered to meet new requirements, lead-based paint and asbestos would need to be abated to meet regulatory requirements. New construction under SBCT would likely increase the rate of building renovation. This is considered a minor beneficial impact due to the removal of hazardous materials.

Munitions use would change given transformation. Munitions are expected to increase from 130,000 to 194,000 rounds per year at FWA and DTA combined (Tables 2.2.d and 2.2.r). This is the predicted end-state munitions requirement, when all SBCT battalions would be stationed at FWA. An increase in munitions use is expected to lead to a proportional increase in unexploded ordnance (approximate dud rate of 3.5% for complete failure and approximately 0.3% for partial detonation (Dauphin and Doyle 2000, 2001). Dudded munitions would only be found on the existing impact areas, which are heavily posted as off-limits to the public and most military. Munitions constituents are expected to remain the same. Therefore, no new residues would be introduced into the environment. It is expected that the munitions residues, particularly from partially exploded munitions, would still not present significant risks due to low transport rates and degradation demonstrated on Alaska ranges (Houston 2002; Ferrick et al. 2001). Impacts from unexploded ordnance would be minor.

4.17.4.2.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts on FWA under Alternative 4 are expected to be similar to those listed under Alternative 3. End-state deployment miles associated with FWA would be higher (488,800) than those listed under Alternative 3 (481,600). In addition, convoy frequency would increase, with platoon-sized convoys to YTA occurring 160 times, and company or battalion-sized convoys to DTA occurring 44 times annually. Traffic impacts would be moderate. No additional impacts are expected at FWA.

4.17.4.3 Donnelly Training Area

4.17.4.3.1 Alternative 1 (No Action)

Under this alternative, no additional impacts are expected to human health and safety (Table 4.17.c). Potential impacts from unexploded ordnance on the impact areas would continue to exist. USARAK would store small quantities of petrochemicals necessary for training on DTA. Petrochemical use is expected to remain at current levels. USARAK continues to reduce the amount of waste generated on post, and no new types of hazardous wastes are expected to be generated at DTA. Overall impacts would be minor.

USARAK's existing programs, management plans, and regulations that govern 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.

Convoy traffic to DTA is expected to remain the same, with 31 company or battalion-sized deployments to DTA annually. Deployments miles to training area would remain at approximately 405,000 per year, and deployments could include air transport methods. This would continue to have a minor impact on human health and safety in the area.

4.17.4.3.2 Alternative 3 (Transform with New Infrastructure)

Under this alternative, impacts would occur at DTA (Table 4.17.c). Deployment miles to the training area are expected to increase from approximately 405,000 per year to 796,000 per year during the interim phase. End-state deployment miles would be lower, at approximately 677,000 per year. Company and battalion-sized deployments to DTA would increase to 53 times per year. Deployments would include air transport. The SBCT would incorporate 322 Strykers into the USARAK maneuver training regimen. These would be stationed at FRA and FWA Main Post, and would convoy with other vehicles to DTA. Winter and spring convoys could have a greater impact due to hazardous driving conditions or roadway degradation. Summer convoys would interfere with heavier tourist-season traffic loads. Convoy size and frequency increases are expected to have a moderate interim and end-state impact. Current and projected deployments and deployment miles are listed in Tables 4.17.a and 4.17.b.

Due to the increased number of vehicles, it is expected that petrochemicals would be utilized at a greater rate on DTA. The risk of petrochemical spills and site contamination is expected to increase under this alternative due to the need to transport fuel and perform refueling operations in the field to support training requirements. Due to existing Army procedures and controls, impacts would be minor.

4.17.4.3.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Alternative 4 may have greater impacts on DTA than those described under Alternative 3. The 1-501st Airborne Task Force to be stationed at FRA would conduct training on DTA. However, its maneuver footprint is small relative to the SBCT. Additional unexploded ordnance impacts may occur from airborne training exercises. However, these are expected to be minor. Risk from hazardous materials and contaminated sites would remain minor, as in Alternative 3.

Additional convoy traffic is possible under Alternative 4. The Airborne Task Force would conduct large-scale exercises on DTA. However, it is expected that the Airborne Task Force would utilize

aircraft to deploy for training, thereby alleviating some convoy traffic. Deployment miles to DTA would increase to approximately 1,042,000 during the interim phase, then drop to 937,600 at end state. Company and battalion-sized deployments to DTA would increase to 62 times per year. The difference in deployment miles under Alternative 4 in comparison to Alternative 3 is attributed to the Airborne Task Force. Overall convoy impacts are expected to be moderate.

4.17.4.4 Fort Richardson

4.17.4.4.1 Alternative 1 (No Action)

Under this alternative, minor impacts to human health and safety would continue (Table 4.17.d). USARAK would use various petrochemicals necessary for maintenance and training at current levels. USARAK continues to reduce the amount of waste generated on post, and no new hazardous waste types would be generated at FRA.

Munitions training involving explosive ordnance would continue on FRA. Approximately 65,000 rounds per year would be used on FRA, which would continue to lead to dudded ordnance risks (approximate dud rate of 3.5% for complete failure and approximately 0.3% for partial detonation (Dauphin and Doyle 2000, 2001). All explosive ordnance would occur on Eagle River Flats Impact Area, which is fenced and posted as a restricted access area. Unexploded ordnance impacts on Eagle River Flats Impact Area would be minor.

The existing programs, management plans, and regulations that govern the handling, use, storage, and disposal of both hazardous and non-hazardous materials would remain in place. Additionally, the Army has developed institutional controls to limit access to current contaminated sites. These controls would remain intact, and the Army would continue to track and control access to these areas.

The Army would continue to remediate lead-based paint and asbestos from buildings on post as necessary, which would provide a beneficial impact due to reduced risk of exposure to lead and asbestos. USARAK would implement the “green” initiative, which requires housing to be free from lead and asbestos health risks by 2007.

Deployment miles associated with FRA would remain at 212,400 miles per year and could include air and rail deployment. Convoy frequency and size is expected to remain the same, with 5 company or battalion-sized deployments per year to DTA. Traffic impacts would be minor.

4.17.4.4.2 Alternative 3 (Transform with New Infrastructure)

Under Alternative 3, impacts could occur to FRA (Table 4.17.d). Traffic is expected to increase because one of the three SBCT infantry battalions would be stationed at FRA and would convoy to DTA for exercises. Deployment miles associated with FRA are expected to increase to approximately 492,000 per year during the interim phase, then drop to 260,400 at end state. These miles could include air and rail transport. Convoy frequency would increase, to nine company or battalion-sized convoys per year. Winter and spring convoys are expected to have a greater impact due to hazardous driving conditions or possible roadway degradation. Summer convoys would exacerbate tourist-season traffic loads. Current and projected deployments and deployment miles are listed in Tables 4.17.a and 4.17.b. Interim impacts are expected to be moderate and would decrease to minor at end state.

Due to the increased number of vehicles, it is expected that petrochemicals would be utilized at a greater rate on FRA. In addition, cleaning solvent use is expected to increase due to maintenance and repair work. However, existing USARAK capacity for handling storage and disposal of hazardous wastes and materials is expected to be fully sufficient for any potential increase in generation. The risk of petrochemical spills is expected to increase under this alternative with the need to transport fuel and perform refueling operations in the field to support training requirements. Impacts are expected to be minor.

Munitions use on FRA would increase by 125% during the interim phase (approximately 146,000 rounds) and 70% (108,000 rounds) at end state under Alternative 3 (Chapter 2, Table 2.2.r). It is expected that unexploded ordnance occurrences on Eagle River Flats would increase as well. However, an increase in dudded ordnance could occur only on Eagle River Flats Impact Area, which is fenced and posted as a restricted access area. Impacts are expected to be minor (see Section 4.4, Soil Resources).

The need for additional housing may accelerate the abatement of lead paint and asbestos as buildings are renovated to provide modern accommodations. The current housing plan includes construction of new housing and renovation of existing housing units. As facilities are altered for construction of new facilities or to meet facility reduction requirements, lead-based paint and asbestos would need to be abated to meet regulatory requirements. New construction under transformation would likely increase the rate of building renovation. This is considered a beneficial impact due to reduced risk of lead and asbestos exposure.

4.17.4.4.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts under Alternative 4 are expected to be similar to those listed under Alternative 3. However, additional impacts can be expected from the transition of the 1st Battalion, 501st Parachute Infantry Regiment to an Airborne Task Force.

There would likely be an increase in the use of petrochemicals and solvents. The Airborne Task Force would require more vehicles. Ground transportation would primarily involve HMMWVs and MTVs, which would belong to the task force command structure. The overall impact is expected to be minor because the size of the force at FRA would increase by 1,000 personnel during the interim phase and by 300 at end state.

Munitions use on FRA would also increase by an estimated 225% (213,000 rounds per year) during the interim phase and by 165% (174,000 rounds) at end state under Alternative 4 (Chapter 2, Table 2.2.x). However, as with Alternative 3, an increase in unexploded ordnance could occur only on Eagle River Flats Impact Area. Impacts are expected to be minor (see Section 4.4, Soil Resources).

The need for more troop housing on FRA is expected to increase the rate of lead and asbestos abatement as buildings are renovated or demolished to provide room for new construction. This is particularly true for the interim phase during which FRA would house both the Airborne Task Force and one battalion of the SBCT. This is expected to have a beneficial impact due to the removal of hazardous materials.

Deployment miles under this alternative include air and rail and would increase to approximately 738,000 during the interim phase, then drop to 520,800 at end state (Table 4.17.b). Deployments to DTA would increase to 18 company or battalion-sized deployments annually. It is likely that

the Airborne Task Force would use both air and highway transport to deploy to DTA. Impacts are expected to be moderate.

4.17.5 Comparison of Alternatives Summary

4.17.5.1 Comparison of All Alternatives

Tables 4.17.a, 4.17.b, and 4.17.c present a summary of human health and safety impacts under each alternative. Definitions of the qualitative impact categories are provided in Section 4.17.4.

Table 4.17.d Summary of Impacts to Human Health and Safety at Fort Wainwright.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Traffic	Minor	Moderate	Moderate	Moderate	Moderate
Hazardous Materials	Minor	Minor	Minor	Minor	Minor
Asbestos	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Lead-based Paint	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Pesticides	None	None	None	None	None
Radon	None	None	None	None	None
Contaminated Sites	Minor	Minor	Minor	Minor	Minor
Unexploded Ordnance	Minor	Minor	Minor	Minor	Minor

Table 4.17.e Summary of Impacts to Human Health and Safety at Donnelly Training Area.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Traffic	Minor	Moderate	Moderate	Moderate	Moderate
Hazardous Materials	Minor	Minor	Minor	Minor	Minor
Asbestos	None	None	None	None	None
Lead-based Paint	None	None	None	None	None
Pesticides	None	None	None	None	None

Table 4.17.e cont. Summary of Impacts to Human Health and Safety at Donnelly Training Area.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Radon	None	None	None	None	None
Contaminated Sites	Minor	Minor	Minor	Minor	Minor
Unexploded Ordnance	Minor	Minor	Minor	Minor	Minor

Table 4.17.f Summary of Impacts to Human Health and Safety at Fort Richardson.

Impact Issue	Alternatives				
	1 No Action	3 Transform with New Infrastructure		4 Transform with New Infrastructure and Airborne Task Force	
		Interim	End State	Interim	End State
Traffic	Minor	Moderate	Minor	Moderate	Moderate
Hazardous Materials	Minor	Minor	Minor	Minor	Minor
Asbestos	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Lead-based Paint	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Pesticides	None	None	None	None	None
Radon	None	None	None	None	None
Contaminated Sites	Minor	Minor	Minor	Minor	Minor
Unexploded Ordnance	Minor	Minor	Minor	Minor	Minor

4.17.5.2 Comparison of Alternatives 3 and 4

Both alternatives would result in transformation from the Current Force to the SBCT. Alternative 4 would result in higher numbers of personnel and equipment, but construction projects would remain the same. Training intensity would be higher. Impacts to human health and safety could increase by 5-15% under Alternative 4 due to stationing, maneuver and weapons training. Impacts on FRA from Alternative 4 would be long-term, as compared to the short-term impacts from the interim phase of one SBCT infantry battalion.

The primary differences between Alternatives 3 and 4 would result from institutional matters. For Alternative 3, institutional matters relating to range management, the Integrated Training Area Management program, environmental management, and sustainable range management

would remain essentially the same as the No Action Alternative. Under Alternative 4, these programs would be fully funded and implemented. Institutional matters affecting human health and safety would also include full implementation of an impact area management program and an environmental management program, as well as soil and water quality monitoring. The result would be improved environmental management of USARAK lands.

4.17.6 Mitigation

4.17.6.1 Existing

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts. These mitigation measures are implemented as funding is available. Often funding only provides for partial implementation.

- Maintain the current institutional control policy that limits access to contaminated sites and maintain an active restoration program to clean up contaminated sites on USARAK lands. These policies reduce health and safety risks from exposure to contaminated areas.
- Continue environmental management programs listed in current Integrated Natural Resources Management Plans (USARAK 2002e, f, g), and continue to provide environmental awareness training to troops and civilians. The Integrated Natural Resources Management Plans list specific actions designed to alleviate human health and safety risks.
- Split convoys into smaller vehicle groups and stagger departure times, per Army Regulation 55-2. Splitting convoys into smaller, separated fragments eases traffic congestion problems.
- Continue to provide 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 process with Alaska Department of Transportation and Public Facilities.

4.17.6.2 Proposed

Proposed mitigation for Alternative 4 is to fully implement plans and projects that have already been identified by USARAK's Integrated Natural Resources Management Plans and ecosystem management. These projects and plans are further described in Appendix H. Additional mitigation measures are also listed below.

- Consider alternate travel routes and methods for military convoys, including line haul, airlift, and rail if available. This would help to avoid traffic risks and impacts.
- Expand public notification of imminent convoy activity, including specific days of convoy activity. This would allow the public to avoid highway travel concurrent with military convoys.

4.18 ENVIRONMENTAL JUSTICE

This section analyzes and compares the environmental justice impacts associated with proposed alternatives for SBCT transformation. Baseline data for this comparison was presented in Section 3.18.

4.18.1 Background

Environmental justice focuses on disproportionate and adverse effects of federal actions on minority 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 in relation to the reliance of many minority 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 properties of traditional, religious, and cultural significance (PTRCSs) 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 3.18.

4.18.2 Review of Impacts to Environmental Justice

Analysis of environmental justice in this Environmental Impact Statement (EIS) involves the effects of transformation on air quality, water resources, cultural resources, socioeconomics, subsistence, noise, and human health and safety.

4.18.3 Activity Groups That Affect Environmental Justice

The textbox below provides a list of activity groups that could affect environmental justice due to transformation.

Activity Groups with Impacts	Activity Groups Without Impacts
• Stationing	• Systems Acquisition
• Construction	• Institutional Matters
• Training	• Deployment

4.18.3.1 Stationing

Transformation would result in additional personnel stationed at Fort Wainwright (FWA) and Fort Richardson (FRA). This population increase could affect the cost of housing, especially around FWA, and create competition for fish and game resources.

4.18.3.2 Construction

Proposed construction projects associated with transformation include the company operations facilities at FWA; the unmanned aerial vehicle (UAV) maintenance support facility at Donnelly Training Area (DTA); and the mission support training facility, new barracks facilities, and development of the Port of Anchorage deployment staging area at FRA (Appendix D). Construction activities may temporarily increase noise levels, and ground-disturbing activities could potentially damage cultural resources associated with local Alaska Native Tribes.

4.18.3.3 Training

The frequency of maneuver and weapons training would increase under SBCT transformation (Table 4.1.a). This could affect local minority 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.

4.18.4 Comparison of Alternatives

4.18.4.1 Description of Methodology

The following definitions will be used to characterize potential impacts:

- None – No measurable disproportionate impacts are expected to occur.
- Minor – Minority or low-income populations will 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 significant adverse effects not felt by other communities.
- Beneficial – Minority or low-income populations may experience positive effects from activities that other communities will not.

Minority communities are defined as populations where the percentage of minorities significantly exceeds the average for the state of Alaska. “Significantly exceeds” is interpreted here as exceeding the state average by 5%. Since the percentage of persons in Alaska identified as minority under U.S. Census guidelines is 30.7%, any community with a minority population of 35.7% or above is considered a minority community for purposes of this analysis (see Tables 3.18a-e). The same method is used to define low-income communities: 11.2% of Alaskans are considered low-income, so any community where the percentage of persons living below the poverty level is 16.2% or higher is a low-income community for the purposes of this environmental justice analysis.

Environmental impacts from transformation are analyzed in previous sections of Chapter 4 and have been generally determined to be either minor or moderate. Potential impacts on air quality, water resources, socioeconomics, noise, and human health and safety would be experienced by all communities in the vicinity of the installations, and no disproportionate adverse impacts to minority or low-income populations are expected with respect to these resources. 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 Alaskan Native communities to cultural resources and subsistence practices, and the reliance of certain low income Alaskan communities on subsistence resources for sustenance, there is the potential for these communities to experience disproportionate 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.

Existing and proposed mitigation for impacts to environmental justice are presented in 4.18.6, Mitigation.

4.18.4.2 Fort Wainwright

The region of influence for transformation on FWA is the Fairbanks North Star Borough and the Southeast Fairbanks Census Area. The communities included within these census areas are within a 70-mile radius of FWA, a slightly larger area than the region of influence for air quality. None of these communities are considered to be minority or low-income populations under the criteria used in this analysis. However, the Native villages of Minto and Nenana, having subsistence interests in FWA, are both low-income and minority communities under this analysis. Potential impacts to subsistence activities and archaeological sites located near Birch Hill and Tanana Flats Training Area (TFTA) may disproportionately affect Alaska Native Tribes associated with those areas (Section 4.12, Cultural Resources and Section 4.15, Subsistence).

4.18.4.2.1 Alternative 1 (No Action)

As discussed in Section 4.15, Subsistence, minor adverse impacts to subsistence (in particular, for the communities of Nenana and Minto) would be expected under this alternative due to the effect of USARAK activities on access, resource availability, and off-post subsistence patterns. It is unlikely that military activities would affect Birch Hill prehistoric sites under this alternative, although the risks of adverse impacts to archaeological sites and potential PTRCSs in TFTA are possible with continuing military training and use (Section 4.12, Cultural Resources). In consideration of the importance of subsistence, PTRCSs, and archaeological sites to Alaska Native Tribes, minor environmental justice impacts could be expected under this alternative.

4.18.4.2.2 Alternative 3 (Transform with New Infrastructure)

Minor subsistence impacts under Alternative 3 are expected to result from increases in access closures and localized effects of training on wildlife (Section 4.15.4.2.2). These may affect tribal communities, due to the cultural importance of subsistence activities. Minor impacts to PTRCSs are expected under Alternative 3 since this type of site is expected to be related to traditional subsistence practices.

Low-income individuals and families may experience impacts such as increased costs of housing in the Fairbanks area. An increase in the recreational use of the Birch Hill area is not considered likely to impact cultural resources there. However, archaeological sites and possible PTRCSs near TFTA may be impacted (Section 4.12, Cultural Resources). Overall, impacts under this alternative are expected to be minor to low-income and Alaska Native groups.

Children – No construction or training activities would take place near schools, day care facilities or other areas with large populations of children.

Overall impacts are minor to Alaska Native communities. No impacts are expected to minority communities, low-income communities, or children.

4.18.4.2.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts under this alternative are expected to be identical to those expected under Alternative 3.

4.18.4.3 Donnelly Training Area

The region of influence for transformation activities occurring on Donnelly Training Area (DTA) includes seven minority or low-income communities: 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 PTRCSs. Initial consultation with Tribes suggest that PTRCSs that may exist on DTA will be associated with traditional subsistence practices.

4.18.4.3.1 Alternative 1 (No Action)

Under this alternative, USARAK would continue its current training uses on DTA without any disproportionate adverse effects on surrounding minority or low-income communities. However, continuing military activities at current levels may threaten areas with high potential to contain archaeological sites and PTRCSs. Due to disproportionate adverse impacts on Alaska Native Tribes associated with this area, minor impacts could be expected.

4.18.4.3.2 Alternative 3 (Transform with New Infrastructure)

Transformation under Alternative 3 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 caribou herd (Section 4.9, Wildlife and Fisheries), and accessibility of USARAK lands for subsistence activities (Section 4.15, Subsistence), an increase in personnel stationed at FWA would likely increase competition for wildlife resources between local subsistence users and sport hunters and anglers.

General – No disproportionate adverse impacts would be experienced by minority or low-income populations in relation to air quality, water resources, socioeconomics, noise or human health and safety effects.

Cultural Resources – There have been a number of cultural resources identified within DTA. Reports of undocumented PTRCSs have also been made, although none have been explicitly identified to date (Section 4.12, 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 Tribes associated with cultural sites may be expected.

Subsistence – There may be a slight positive impact on moose populations in the area (Section 4.15, Subsistence). Moose hunting is known to account for a large percentage of the harvest in interior Alaska (Alaska Department of Fish and Game 1991, 2000d). Although not all subsistence users qualify as minority or low-income populations, they will 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 Native and low-income communities.

Children – No construction projects or training exercises would take place near schools, day care facilities, or other areas with large populations of children.

Overall impacts are minor to low-income communities and moderate to Alaska Native communities. No impacts are expected to minority communities and children.

4.18.4.3.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts under this alternative are expected to be slightly higher than those under Alternative 3 due to increased stationing and training. Overall impacts would still be expected to be moderate for Alaska Native communities and minor for low-income groups.

4.18.4.4 Fort Richardson

The region of influence for transformation on FRA is defined by the potential effects on air quality (Section 3.18.4). Communities within a 70-mile radius of the installation are analyzed. Ten minority or low-income communities within the region have been identified: Buffalo Soapstone, Native Village of Eklutna, Houston, Lowell Point, Meadow Lakes, Point MacKenzie, Trapper Creek, Tyonek, Willow, and Y.

4.18.4.4.1 Alternative 1 (No Action)

Under this alternative, no environmental justice impacts are expected. USARAK would continue its current use of lands on FRA without any disproportionate adverse effects on surrounding minority or low-income communities.

4.18.4.4.2 Alternative 3 (Transform with New Infrastructure)

Transformation would involve additional construction at FRA, the use of new equipment, and increased levels of training.

General – No disproportionate impacts on minority or low-income communities are expected. All communities would be affected to the same degree by air quality, water resources, socioeconomics, noise, and human health and safety impacts.

Cultural Resources – Identified cultural resources on FRA consist of Nike Site Summit, a National Register of Historic Places listed property and a Cold War Historic District consisting of 51 buildings in the core cantonment area. Tribal representatives have indicated that Eagle River Flats is an important subsistence resource area and that there may be cultural sites associated with traditional subsistence activities that have yet to be identified. The possibility of SBCT activities impacting unidentified sites may have a minor disproportionate effect on Tribes affiliated with the area.

Subsistence – Rural subsistence activities would not be affected by transformation on FRA (see Section 4.15, Subsistence). Although FRA is not an official rural subsistence area, the area is still used for subsistence purposes by Alaska Native Tribes.

Children – Construction activities would not occur near schools, day care facilities, or other areas with large populations of children.

No measurable, disproportionate impacts are expected under this alternative.

4.18.4.4.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts under this alternative are expected to be identical to those expected under Alternative 3.

4.18.5 Comparison of Alternatives Summary

Table 4.18.a presents a summary of environmental justice impacts under each alternative. Definitions of the qualitative impact categories are provided in Section 4.18.4.

4.18.5.1 Comparison of All Alternatives

Table 4.18.a Summary of Impacts to Environmental Justice on USARAK Lands by Alternative.

Post	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Fort Wainwright			
Low-Income	None	Minor	Minor
Minority	None	None	None
Alaska Native	Minor	Minor	Minor
Children	None	None	None
Donnelly Training Area			
Low-Income	None	Minor	Minor
Minority	None	None	None
Alaska Native	Minor	Moderate	Moderate
Children	None	None	None
Fort Richardson			
Low-Income	None	None	None
Minority	None	None	None
Alaska Native	None	None	None
Children	None	None	None

4.18.5.2 Comparison of Alternatives 3 and 4

Both alternatives would result in transformation from the Current Force to an SBCT. In general, Alternative 4 would result in higher numbers of personnel and equipment, but construction projects would remain the same. Training intensity would be higher. The implications for environmental justice are that under Alternative 4 impacts could potentially increase by 5-10% due to stationing, maneuver and weapons training, and use of additional equipment (Table 4.1.a).

The primary difference between Alternatives 3 and 4 would result from the institutional matters. For Alternative 3, institutional matters relating to range management, the Integrated Training Area Management program, environmental management, and sustainable range management would remain essentially the same as the No Action Alternative. However, with Alternative 4, these four programs would be fully funded and implemented. Under Alternative 4, full implementation of alternate Army procedures to 36 CFR 800 cultural resources management programs would also result in improved resource management, benefiting tribes associated with cultural sites on USARAK lands (Section 4.12, Cultural Resources).

4.18.6 Mitigation

4.18.6.1 Existing

- Maintain USARAK website. This provides up-to-date information to members of local communities that may be affected by activities on USARAK lands.
- Continue publication and distribution of *Environmental Resources Newsletter and 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.
- Continue Restoration Advisory Boards as appropriate. Restoration Advisory Boards provide an established, effective strategy for communication between affected local communities and USARAK.
- Ensure 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.

4.18.6.2 Proposed

- Publish and distribute 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.
- Tribes establish government-to-government relationships with Alaska Native tribes whose interests may be significantly affected by USARAK activities. This would ensure efficiency and effective communication between both leadership and staff members of tribal governments and USARAK.

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4.19 INFRASTRUCTURE

This section analyzes and compares the impacts to U.S. Army Alaska (USARAK) infrastructure associated with proposed alternatives for SBCT transformation. Baseline data for this comparison was presented in Section 3.19.

4.19.1 Background

Infrastructure involves land use, transportation, housing, community facilities, installation support facilities, training ranges, and maneuver training lands. This section analyzes the potential impacts of transformation on USARAK infrastructure and facilities.

4.19.2 Review of Impacts to Infrastructure

Impacts to infrastructure include actions that would exceed the capacity for increased stationing or training. Proposed development that is considered incompatible with existing land uses would also be considered an impact to infrastructure.

4.19.3 Activity Groups That Affect Infrastructure

The textbox below lists activity groups that could affect USARAK infrastructure due to transformation.

Activity Groups with Impacts	Activity Groups Without Impacts
• Stationing • Construction • Training • Systems Acquisition • Deployment	• Institutional Matters

4.19.3.1 Stationing

Transformation would result in additional personnel stationed at Fort Wainwright (FWA) and Fort Richardson (FRA). The influx of personnel would affect transportation, housing, community and installation support facilities in addition to training ranges and maneuver training lands.

4.19.3.2 Construction

Proposed construction projects associated with transformation include the company operations facilities at FWA; the unmanned aerial vehicle (UAV) maintenance support facility at Donnelly Training Area (DTA); and the mission support training facility, new barracks facilities, and development of the Port of Anchorage deployment staging area at FRA (Appendix D). These construction projects could affect transportation, housing and installation support facilities.

4.19.3.3 Training

The frequency of maneuver and weapons training would increase under SBCT transformation (Table 4.1.a). Range and maneuver training requirements would increase and affect transportation, training and installation support facilities. MIMs on USARAK lands could

increase by approximately 400%. Maneuver space requirements could increase by approximately 100%.

4.19.3.4 Systems Acquisition

New equipment would be used under transformation, including the eight-wheeled 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) (Table 4.1.a). Systems acquisition would affect transportation, training, installation support facilities, and airspace use.

4.19.3.5 Deployment

Deployment would occur by air, land, or sea. Transformation would result in increased frequency of out-of-state and overseas deployments. Under current training doctrine, deployment would not increase on a unit basis (e.g., individual platoon unit deployments would remain at four times a year regardless of alternative). However, the number of units, to include platoon, company, and battalion, would increase under the proposed action. Therefore, the total number of unit deployments and miles would increase. These changes would affect transportation and installation support facilities.

4.19.4 Comparison of Alternatives

4.19.4.1 Description of Methodology

The primary variables of interest for this analysis include the various infrastructure categories listed in Section 3.19, Infrastructure. Range and training land facilities are further divided into training ranges and maneuver land with the subcategories of capability, capacity, and condition. Table 4.19.g contains a matrix of the alternatives comparing their consequences to USARAK infrastructure under the proposed alternatives. The qualitative terms used in the matrix are defined as:

- None – No measurable impact is expected to occur.
- Minor – Impacts are expected to occur; impacts would be measurable and may have slight impacts to infrastructure
- Moderate – Impacts are expected to occur; impacts would be noticeable and would have a measurable effect on infrastructure.
- Severe – Impacts are expected to occur; impacts would be obvious and would have serious consequences to infrastructure.
- Beneficial – Only beneficial impacts are expected to occur.

The first two qualitative impact categories (none and minor) are considered insignificant. The second two categories (moderate and severe) are considered significant. Mitigation measures have been developed to offset negative impacts. Existing and proposed mitigation for impacts to USARAK infrastructure are presented in 4.19.6, Mitigation.

4.19.4.2 Fort Wainwright

Existing rights-of-way, easements and leases at FWA would continue under all alternatives with no changes or additions proposed.

4.19.4.2.1 Alternative 1 (No Action)

Under the No Action Alternative, transportation facilities would not be upgraded other than for ongoing maintenance and repair. Planned housing programs include the whole barracks renewal, family housing revitalization, and unaccompanied personnel housing upgrades. Community facilities upgrades would occur. These projects would occur regardless of transformation (Appendix D). Current facility upgrades and routine maintenance would continue. Current airspace and airfield restrictions would remain in effect at FWA. Overall, the No Action Alternative is expected to result in improvements to housing, community facilities, installation support facilities and training ranges as compared to the current state. No impacts would be expected to USARAK maneuver training land, transportation, or airspace and airfield infrastructure.

Training Ranges

Training data typically include DTA as a training area of FWA. As a result, much of the discussion of the DTA's range facilities is included with FWA.

Capability – With current mission-essential construction projects (Table 2.2.b), range capability would be suitable for support of the Critical Training Task List requirements of the 172nd SIB by 2004. Construction of sniper ranges, multi-purpose training ranges, military operations on urbanized terrain facilities and range upgrades (squad battle course, platoon battle course, urban assault course, breach facility, and shoot house) at FWA, similar construction at FRA, and a combined arms collective training facility and battle area complex at DTA, would meet requirements identified in the 2001 Range and Training Land Development Plan (Nakata 2001). Impact areas are sufficient to support current range training.

Training Requirements vs. Capacity – Range capacity at FWA is considered in conjunction with training lands at DTA and is expected to be more than adequate to support the 172nd SIB under the No Action Alternative. Range training requirements for each weapon system are expressed in terms of the numbers of Soldiers using the range over one year (i.e., one Soldier required to fire four times per year counts as four Soldiers.) Some ranges may have less availability. This would be based on conflicts with other ranges or operations management practices rather than poor condition. Table 4.19.a shows range training requirements for the No Action Alternative.

Currently, small arms ranges are utilized to 19% of capacity, major weapons system ranges are used less than 1% of capacity, and non-live fire ranges are used to 7% of capacity. Munitions requirements under the No Action Alternative are based on current USARAK training requirements and are listed in Table 4.19.b. No capacity estimates for impact areas exist, but preliminary data from Palazzo et al. (2002) indicates local soil characteristics may help impact areas handle munitions firing and potential contaminants. The capacity for the impact area to degrade residues appears to be much higher than what it currently handles. Table 4.19.b describes munitions requirements for the No Action Alternative.

Condition – Current range condition at FWA and DTA is good for small arms ranges, major weapons systems and non-live fire ranges as classified by the USARAK Installation Status Report (USARAK 2002d). Current range training does not create significant impacts on the firing ranges.

The overall condition of impact areas is also good. Preliminary results from Palazzo et al. (2002) found minimal explosive residues and heavy metals as a result of munitions firing into Washington and Delta Creek impact areas at DTA. These impacts are discussed in detail in other

sections of this EIS (Sections 4.4, Soil Resources; 4.5, Surface Water; 4.7, Wetlands; and 4.8, Vegetation).

No impacts to FWA training range infrastructure would be expected under the No Action Alternative.

Maneuver Training Land

Capability – Maneuver training land at FWA is sufficient to support training requirements under the No Action Alternative.

Training Requirements vs. Capacity – Maneuver land capacity and maneuver land requirements can be expressed in terms of maneuver space (square kilometer days) and in terms of maneuver impact miles (MIMs). Square kilometer days (km^2 days) are calculated by combining the area required for each task, the number of units performing the task, the number of days the task requires, and the number of times each unit performs the task over the course of a year. Current maneuver space requirements utilize 12% of capacity (Table 4.19.c.).

Training load capacity, which is derived from Army doctrine, is a measure of the total capacity of a given parcel of land of land to support military training. The Army Testing and Training Area Carrying Capacity methodology measures training load in terms of maneuver impact miles (MIMs). Based on historic practices and the increased maneuver area accessible in winter, a significant portion of USARAK training will take place in winter. Readiness requirements do not specify what time of year the training must be conducted. The operating assumption for this EIS is that half of required training occurs in the summer and half occurs in winter. Current MIMs are 3% of summer capacity and less than 1% of winter capacity (Table 4.19.d). MIMs capacity is sufficient to support current maneuver training.

Condition – Land condition is an index of ecological integrity and is measured in terms of erosion status, vegetative cover, and disturbance. It is expressed in terms of percent, 100% being the best condition and 1% being the worst. Current land condition would remain the same under the No Action Alternative and is calculated from Land Condition Trend Analysis (LCTA) field surveys. Negligible impacts on training lands from maneuver training at FWA occur when impacts are averaged across the installation (99.8% land condition). Institutional matters would not change under the No Action Alternative, but existing measures would provide mitigation to minimize impacts to land condition resulting from maneuver training.

No impacts to FWA maneuver training land infrastructure would be expected under the No Action Alternative.

4.19.4.2.2 Alternative 3 (Transform with New Infrastructure)

Alternative 3 would have beneficial impacts to transportation, housing, and installation support facility infrastructure at FWA. Minor impacts would be expected to community facilities, training ranges, and maneuver training land infrastructure. No impacts to USARAK airspace and airfield infrastructure would be expected.

Transportation

Improvements to on-post transportation infrastructure may include expansion of the current road network and improvement of road surfaces.

Housing

Construction of new housing facilities and renovation of existing facilities to accommodate increased numbers of personnel would be a benefit to current FWA housing facility infrastructure.

Community Facilities

Proposed construction under Alternative 3 does not include improvements to community facilities. Increased numbers of personnel would use existing facilities, resulting in a minor impact.

Installation Support Facilities

Proposed construction includes two company operations facilities that would result in an improvement to the installation's support facility infrastructure.

Training Ranges

Capability – With current mission-essential construction (Table 2.2.b) and proposed SBCT construction projects (Table 2.2.p), range capability would be sufficient to support all proposed training. There are sufficient impact areas to support proposed training.

Training Requirements vs. Capacity – Increased utilization of ranges would be expected under Alternative 3 as compared to current. Small arms range utilization at FWA and DTA would increase from current levels to 24% of capacity. Major weapons systems would decrease slightly from current levels and would be utilized less than 1% of capacity. Use of non-live fire ranges would increase to be utilized at 9% of capacity. Collective range use would increase 52% as compared to current (capacity data is not available).

End state small arms munitions requirements would increase 40%, training and practice munitions requirements would increase 136%, and high explosive munitions requirements would increase 49% from current levels. Munitions requirements and impacts would be substantially less during the interim phase. Tables 4.19.a and 4.19.b display range training requirements and munitions requirements under Alternative 3.

Condition – Current range condition is good for small arms ranges, major weapons systems, and non-live fire ranges (USARAK 2002d). Although small arms and training practice rounds would increase, the effect on range condition would not be significant. Alternative 3 would result in minor impacts to the condition of firing ranges. It should be noted that high explosive rounds are only fired into the impact areas. The current condition of impact areas is good. The increased use of munitions proposed under this alternative would cause a minor impact.

Overall, proposed training requirements under Alternative 3 would produce minor impacts to FWA training range infrastructure.

Maneuver Training Land

Capability – Maneuver training land is sufficient to support training requirements proposed under Alternative 3.

Training Requirements vs. Capacity – Alternative 3 proposed maneuver space requirements are 13% of total capacity (Table 4.19.c). End-state MIMs would increase by approximately 500% from current levels at FWA (Table 4.19.d). Under the working assumption of this EIS that half of MIMs occur in summer and half in winter, this would reflect 17% of summer capacity and

less than 1% of winter capacity. During the interim phase requirements would be less – 11% of summer capacity and less than 1% of winter capacity.

Condition – Impacts on maneuver training lands from maneuver training would be minor when those impacts are averaged installation wide (98.3% land condition). Existing management programs such as the Integrated Training Area Management (ITAM) and the Training Area Recovery Plan would minimize impacts to land condition and impacts resulting from maneuver training (Appendix H).

Overall, proposed training requirements under Alternative 3 would produce minor impacts to FWA maneuver training land infrastructure.

Airspace and Airfields

Current airspace and airfield restrictions would remain in effect on all USARAK lands. Procedures established for existing restricted airspace would continue to apply to all aircraft, including UAV operations. No additional restricted airspace areas are proposed under SBCT transformation. However, due to increased training, closure of current, restricted airspace is expected to increase in frequency under Alternative 3. No impacts would be expected to USARAK airspace and airfield infrastructure. Impacts to recreational users of USARAK airspace are presented in Section 4.14, Public Access and Recreation.

Flight safety procedures as described in Section 2.3, Description of Proposed Action and Alternatives, and Section 3.19, Infrastructure, would apply to the UAV. Additionally, flight safety for airspace users would be accomplished by ensuring 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.

No impacts to USARAK airspace and airfield infrastructure would be expected under Alternative 3.

4.19.4.2.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts to transportation, housing, community facilities, installation support facilities, training ranges, and airspace and airfields would be similar to those under Alternative 3.

Maneuver Training Land

Capability – Maneuver training land is sufficient to support training requirements proposed under Alternative 4.

Training Requirements vs. Capacity – Maneuver space requirements would be 9% of total capacity, a 4% decrease from requirements under Alternative 3 (Table 4.19.c). End-state MIMs requirements would be slightly less than requirements under Alternative 3 and interim requirements would be the same. Impacts would be similar to those under Alternative 3 (Table 4.19.d).

Condition – Impacts on maneuver training lands from maneuver training would be similar to Alternative 3. Installation-wide impacts would be 98.3% land condition. Under Alternative 4, fully funded and implemented institutional matters would provide mitigation measures to minimize impacts to land condition and impacts resulting from maneuver training.

Overall, proposed training requirements under Alternative 4 would produce minor impacts to FWA maneuver training land infrastructure.

Table 4.19.a Fort Wainwright[1] Annual Range Training Requirements (Soldier User Days) Compared to Capacity.

Range Type	Alternatives			
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**	**Capacity**
Small Arms	45,797	56,880	56,880	236,696
Major Weapons Systems	15,110	14,331	14,331	1,959,501
Collective	15,018	22,896	22,896	*
Non-Live Fire	3,220	3,999	3,999	46,464
Total	79,145	98,106	98,106	*

[1] Includes FWA Main Post, TFTA, YTA, DTA, and Gerstle River.
* Data not available
Source: Nakata 2001

Table 4.19.b Fort Wainwright[1] Annual Munitions Requirements (Rounds per Year) Under Each Alternative.

Munitions Type	Alternatives				
	1 No Action	**3 Transform with New Infrastructure**		**4 Transform with New Infrastructure and Airborne Task Force**	
		Interim	**End State**	**Interim**	**End State**
Small Arms	6,104,075	7,640,500	8,547,774	7,640,500	8,547,774
Practice and Simulation	88,905	169,400	210,386	169,400	210,386
High Explosive	130,426	154,250	194,236	154,250	194,236
Total	6,323,406	7,964,150	8,952,396	7,964,150	8,952,396

[1] Includes FWA Main Post, TFTA, YTA, DTA, and Gerstle River.
Source: Nakata 2001

Table 4.19.c USARAK Maneuver Space Requirements (km² days) Compared to Capacity.

Post	Alternatives			
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**	**Capacity**
Fort Wainwright[1]	37,436	40,960	29,696	320,644
Donnelly Training Area[2]	15,046	65,074	69,126	547,577
Fort Richardson	14,610	14,610	39,478	19,621
Total	67,092	120,644	138,300	–

[1] Includes FWA Main Post, TFTA, and YTA.
[2] Includes Gerstle River.
Source: Collins 2002 and Nakata 2001

Table 4.19.d USARAK Maneuver Impact Miles Requirements Under Each Alternative Compared to Capacity[1].

Post	Alternatives					Capacity	
	1 No Action	**3 Transform with New Infrastructure**		**4 Transform with New Infrastructure and Airborne Task Force**		**Summer**	**Winter**
		Interim[1]	**End State[1]**	**Interim[1]**	**End State[1]**		
Fort Wainwright[2]	11,500	46,000	68,344	46,000	67,200	201,692	4,905,872
Donnelly Training Area[3]	16,800	86,100	86,356	86,100	86,100	62,517	3,552,315
Fort Richardson	3,300	10,570	3,500	10,570	8,000	109,075	203,455
Total	31,600	142,670	158,200	142,670	161,300	373,284	8,661,642

[1] Represents year-round MIMs. It is assumed half of the MIMs will occur in summer and half in winter.
[2] Includes FWA Main Post, TFTA, and YTA.
[3] Includes Gerstle River.
Source: Collins 2002 and Stout 2003a

4.19.4.3 Donnelly Training Area

Existing rights-of-way, easements and leases on DTA would continue under all alternatives with no changes or additions proposed.

4.19.4.3.1 Alternative 1 (No Action)

No major upgrades of transportation or installation support facilities infrastructure other than ongoing maintenance and repair are planned under the No Action Alternative. No housing or community facilities exist at DTA. Current airspace and airfield restrictions would remain in

effect on all USARAK lands. Current range and impact area condition at DTA is good. No impacts would be expected to DTA infrastructure under the No Action Alternative.

Training Ranges

Training data typically includes DTA with FWA. Impacts to DTA training range infrastructure under the No Action Alternative are described in 4.19.4.2.1. Tables 4.19.a and 4.19.b show range training requirements and munitions requirements.

Maneuver Training Land

Capability – Maneuver training land would continue to be utilized well below capacity at DTA under the No Action alternative. Gerstle River Training Area and Black Rapids Training Area would continue to be used. Maneuver training land at DTA is sufficient to support training requirements under the No Action Alternative.

Training Requirements vs. Capacity – Current maneuver space requirements are 3% of total capacity (Table 4.19.c). Under the working assumption of this EIS that half of MIMs occur in summer and half in winter, MIMs are currently 13% of summer capacity and less than 1% of winter capacity (Table 4.19.d).

Condition – Institutional matters would not change under the No Action Alternative, but existing measures would provide mitigation to minimize impacts to land condition resulting from maneuver training.

No impacts to DTA maneuver training land infrastructure would be expected under the No Action Alternative.

4.19.4.3.2 Alternative 3 (Transform with New Infrastructure)

No housing or community facilities construction is planned under Alternative 3.

Transportation

Expansion and improvement of roads could accompany transformation but the extent of improvement is not known. Overall expected impact would be beneficial.

Installation Support Facilities

Construction of the UAV maintenance facility is proposed under Alternative 3 (Appendix D). This project would be beneficial to the installation's support facilities.

Training Ranges

Impacts to DTA training ranges under Alternative 3 are described in conjunction with FWA. Minor impacts to training range infrastructure at DTA would be expected.

Maneuver Training Land

Capability – Maneuver training land is sufficient to support training requirements proposed under Alternative 3.

Training Requirements vs. Capacity – Maneuver space requirements would be 12% of total capacity (Table 4.19.c). MIMs requirements would increase by approximately 400% under this alternative. Under the working assumption of this EIS that half of MIMs occur in summer

and half in winter, this would be 69% of summer capacity and 1% of winter capacity. MIMs requirements would be approximately the same during the interim phase. Overall expected impacts would be minor to moderate.

Condition – Under this alternative, land condition could receive minor to moderate impacts in areas that are currently impacted. Current institutional matters such as the ITAM program would mitigate this impact. Additionally, the proposed implementation of institutional matters such as ITAM, INRMPs, ecosystem management, and the sustainable range management program would mitigate this impact (Appendix H).

Overall, proposed training requirements under Alternative 3 would produce minor to moderate impacts to DTA maneuver training land infrastructure.

Airspace and Airfields

Current airspace and airfield restrictions would remain in effect on all USARAK lands. Procedures established for existing restricted airspace would continue to apply to all aircraft, including UAV operations. No additional restricted airspace areas are proposed under SBCT transformation. However, due to increased training, closure of current, restricted airspace is expected to increase in frequency under Alternative 3. No impacts would be expected to USARAK airspace and airfield infrastructure. Impacts to recreational users of USARAK airspace are presented in Section 4.14, Public Access and Recreation.

Flight safety procedures as described in Sections 2.3, Description of Proposed Action and Alternatives and 3.19, Infrastructure would apply to the UAV. Additionally, flight safety for airspace users would be accomplished by ensuring 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.

No impacts to USARAK airspace and airfield infrastructure would be expected under Alternative 3.

4.19.4.3.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts to transportation, housing, community facilities, installation support facilities, training ranges, maneuver training land, and airspace and airfields would be similar to those under Alternative 3.

4.19.4.4 Fort Richardson

Existing rights-of-way, easements and leases on FRA would continue under all alternatives with no changes or additions proposed.

4.19.4.4.1 Alternative 1 (No Action)

No major upgrades of transportation facilities other than ongoing maintenance and repair are planned. Housing upgrades include the whole barracks renewal, family housing revitalization, and unaccompanied personnel housing. These improvements would occur regardless of transformation. Community facilities upgrades, construction of new vehicle maintenance facilities, and current and ongoing facility upgrades and routine maintenance activities would also continue (Appendix D). Current airspace and airfield restrictions would remain in effect at FRA. The No Action alternative is expected to result in improvements to housing, community,

installation support facilities, and training ranges as compared to the current state. No impacts would be expected to FRA transportation, maneuver training land, or airspace and airfield infrastructure.

Training Ranges

Capability – Current small arms range capability would be enough to support all the requirements of the 172nd SIB by 2004. Construction of sniper ranges, multi-purpose training ranges, military operations on urbanized terrain facilities and range upgrades at FRA would meet requirements identified in the 2001 Range and Training Land Development Plan (Nakata 2001). There are adequate impact areas to support current range training under the No Action Alternative.

Training Requirements vs. Capacity – Current range capacity would be adequate to support the 172nd SIB under the No Action Alternative (Table 4.19.e). Small arms ranges are currently utilized at 8% of capacity, major weapons system ranges are used at 3%, and non-live fire ranges are used at 2%. Munitions requirements under the No Action Alternative are based on current USARAK training requirements (Table 4.19.f). Although capacity estimates for impact areas are not available, preliminary data indicates contaminants from munitions firing would not be hazardous due to local soil characteristics (Palazzo et al. 2002). Sections 4.4, Soil Resources and 4.5, Surface Water contain further information on this subject. Munitions requirements under the No Action Alternative are shown in Table 4.19.f.

Condition – Current range condition is good for small arms ranges, major weapons systems and non-live fire ranges (USARAK 2002d). Studies conducted in 1988 at Eagle River Flats determined that there was no potential risk to human health as a result of munitions residues from firing into the Eagle River Flats impact area. USARAK implemented a prohibition on the firing of munitions containing white phosphorus in the early 90s. Remediation of white phosphorus in the Eagle River Flats Impact Area has been ongoing.

Training range areas would be expected to remain in good condition under the No Action Alternative. Planned improvements on training ranges would produce an overall beneficial impact to USARAK training range infrastructure.

Maneuver Training Land

Capability – Maneuver training land is sufficient to support training requirements under the No Action Alternative.

Training Requirements vs. Capacity – Current maneuver space requirements are 74% of total capacity (Table 4.19.c). Under the working assumption of this EIS that half of MIMs occur in summer and half in winter, MIMs are currently less than 2% of summer capacity and less than 1% of winter capacity (Table 4.19.d).

Condition – Impacts from maneuver training are minimal when those impacts are averaged across the installation (99.8% land condition). Existing institutional matters such as the INRMPs and ITAM programs provide mitigation measures to minimize impacts to land condition and impacts from maneuver training (Appendix H).

No impacts to FRA maneuver training land infrastructure would be expected under the No Action Alternative.

4.19.4.4.2 Alternative 3 (Transform with New Infrastructure)

Transportation

Construction of the Port of Anchorage Deployment Staging Area would improve transportation infrastructure. Expansion and improvement of road surfaces may be needed to accommodate use of the Stryker and other vehicles. Overall impacts would be beneficial to transportation infrastructure.

Housing

Proposed construction includes new barracks facilities which would be a beneficial impact to housing infrastructure.

Community Facilities

No plans for construction or improvements of community facilities would result from transformation. Increased numbers of personnel during the interim phase could result in a minor impact to community facilities infrastructure.

Installation Support Facilities

Proposed construction under Alternative 3 includes a mission support training facility that would benefit the installation's infrastructure. Impacts to administrative and maintenance facilities could be minor during the interim phase due to increased personnel.

Training Ranges

Capability – With current mission-essential construction (Table 2.2.b) and proposed SBCT construction projects (Table 2.2.p), range capability would be sufficient to support all proposed training under Alternative 3. There are adequate impact areas to support proposed training.

Training Requirements vs. Capacity – Range utilization would increase on each range type. Under Alternative 3, small arms range utilization would increase to 9% of total capacity. Major weapons systems and non-live fire ranges would each be utilized at less than 2% of capacity. Collective range use would increase 17% as compared to current (capacity data is not available). Impacts would be minor.

Interim small arms munitions requirements would increase 129%, practice and simulation requirements would increase 253%, and high explosive requirements would increase 124% from current levels. End-state munitions requirements would recede substantially from interim levels and result in an increase from current levels of 72% for small arms, 158% for practice and simulation, and 66% for high explosive munitions. Although no capacity estimates for impact areas exist, soil conditions appear able to mitigate contaminants (Palazzo et al. 2002).

Condition – Proposed changes in training as detailed under Alternative 3 would cause minimal impacts on training ranges. The current range condition is good for small arms ranges, major weapons systems, and non-live fire ranges (USARAK 2002d). The increased utilization as a result of Alternative 3 training requirements would cause a minor impact to firing range conditions. The current range condition of impact areas is also good. The increased use of munitions proposed under Alternative 3 would cause a minimal impact and would not be expected to significantly change the condition of impact areas.

Overall, proposed training requirements under Alternative 3 would produce minor impacts to FRA training range infrastructure.

Maneuver Training Land

Capability – Maneuver training land is sufficient to support training requirements proposed under Alternative 3.

Training Requirements vs. Capacity – Maneuver space would be the same as under the No Action alternative (74% of capacity) (Table 4.19.c). MIMs would be approximately the same as under the No Action Alternative at end state. During the interim phase, MIMs would increase to 5% of summer capacity and 3% of winter capacity, under the working assumption of this EIS that half of MIMs occur in summer and half in winter. End-state MIMs would be approximately the same as under the No Action Alternative (Table 4.19.d).

Condition – Impacts on maneuver training lands would be minimal when the impacts are averaged installation-wide (98.3% land condition). When impacts are averaged over the number of acres currently impacted by maneuver training, the average land condition would be 25.5%. Institutional matters would provide mitigation measures to help minimize impacts to land condition and impacts resulting from maneuver training.

Overall, proposed training requirements under Alternative 3 would produce minor impacts to FRA maneuver training land infrastructure.

Airspace and Airfields

Current airspace and airfield restrictions would remain in effect on all USARAK lands. Procedures established for existing restricted airspace would continue to apply to all aircraft, including UAV operations. No additional restricted airspace areas are proposed under SBCT transformation. However, due to increased training, closure of current, restricted airspace is expected to increase in frequency under Alternative 3. No impacts would be expected to USARAK airspace and airfield infrastructure. Impacts to recreational users of USARAK airspace are presented in Section 4.14, Public Access and Recreation.

Flight safety procedures as described in Sections 2.3, Description of Proposed Action and Alternatives and 3.19, Infrastructure would apply to the UAV. Additionally, flight safety for airspace users would be accomplished by ensuring 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.

No impacts to USARAK airspace and airfield infrastructure would be expected under Alternative 3.

4.19.4.4.3 Alternative 4 (Transform with New Infrastructure and Airborne Task Force)

Impacts to transportation, housing, community facilities, installation support facilities, and airspace and airfields would be similar to Alternative 3.

Training Ranges

Capability – With current mission-essential construction (Table 2.2.b) and proposed SBCT construction projects (Table 2.2.p), range capability would be sufficient to support all proposed training under this alternative. Impact areas would support proposed high explosive weapons training.

Training Requirements vs. Capacity – Range utilization would increase under Alternative 4 (Table 4.19.e). Small arms range use would increase to 18% of capacity, major weapons systems would increase to 3%, and non-live fire ranges would increase to 4% of capacity. Collective range use would increase 134% as compared to current (capacity data is not available).

Interim munitions requirements would increase from current levels to 322% for small arms, 454% for practice and simulation, and 326% for high explosive. At end state, munitions requirements would recede to 265% for small arms, 360% for practice and simulation, and 267% for high explosive as compared to current (Table 4.19.f).

Condition – Range condition would be the same as discussed under Alternative 3.

Overall, proposed training requirements under Alternative 4 would produce be minor impacts to FRA training range infrastructure.

Maneuver Training Land

Capability – Maneuver training land is sufficient to support training requirements proposed under Alternative 4.

Training Requirements vs. Capacity – Maneuver space required under Alternative 4 exceeds the maneuver space capacity at FRA by approximately 100% (Table 4.19.c). This is considered a moderate impact and can be managed by range use scheduling. Some training may be limited if other training events take place simultaneously. End-state MIMs requirements would increase approximately 140% compared to current levels. Under the working assumption of this EIS that half of MIMs occur in summer and half in winter, MIMs would be 4% of summer capacity and 2% of winter capacity. MIMs requirements and impacts during the interim phase would be the same as under Alternative 3 (Table 4.19.d).

Condition – Impacts on maneuver training lands would be similar to Alternative 3. When those impacts are averaged across the installation, land condition would be 98.3%. Institutional matters would provide mitigation measures to minimize impacts to land condition and impacts resulting from maneuver training.

Overall, proposed training requirements under Alternative 4 would produce moderate impacts to FRA maneuver training land infrastructure.

Table 4.19.e Fort Richardson Annual Range Training Requirements (Soldier User Days) Compared to Capacity.

Range Type	Alternatives			
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**	**Capacity**
Small Arms	23,645	27,756	55,513	311,094
Major Weapons Systems	4,935	2,640	5,280	162,019
Collective	2,190	2,558	5,116	*
Non-Live Fire	1,569	1,842	3,684	104,544
Total	32,339	34,796	69,593	*

* Data not available
Source: Nakata 2001

Table 4.19.f Fort Richardson Annual Munitions Requirements (Rounds per Year) Under Each Alternative.

Munitions Type	Alternatives				
	1 No Action	**3 Transform with New Infrastructure**		**4 Transform with New Infrastructure and Airborne Task Force**	
		Interim	**End State**	**Interim**	**End State**
Small Arms	2,987,710	6,838,218	5,128,664	9,628,201	7,918,647
Practice and Simulation	44,453	156,800	114,788	201,933	159,933
High Explosive	65,211	146,250	108,240	212,716	173,866
Total	3,097,374	7,141,268	5,351,692	10,042,850	8,252,446

Source: Nakata 2001

4.19.5 Comparison of Alternatives Summary

4.19.5.1 Comparison of All Alternatives

Table 4.19.g presents a summary of impacts to USARAK infrastructure under each alternative. Definitions of the qualitative impact categories are provided in Section 4.19.4.

Table 4.19.g Summary of Impacts to USARAK Infrastructure by Alternative.

Impact Issue	Alternatives		
	1 No Action	**3 Transform with New Infrastructure**	**4 Transform with New Infrastructure and Airborne Task Force**
Fort Wainwright			
Transportation	None	Beneficial	Beneficial
Housing	Beneficial	Beneficial	Beneficial
Community Facilities	Beneficial	Minor	Minor
Installation Support Facilities	Beneficial	Beneficial	Beneficial
Training Ranges	Beneficial	Minor	Minor
Maneuver Training Land	None	Minor	Minor
Airspace and Airfields	None	None	None
Overall Impact	*Beneficial*	*Minor*	*Minor*
Donnelly Training Area			
Transportation	None	Beneficial	Beneficial
Housing	None	None	None
Community Facilities	None	None	None
Installation Support Facilities	None	Beneficial	Beneficial
Training Ranges	None	Minor	Minor
Maneuver Training Land	None	Minor to Moderate	Minor to Moderate
Airspace and Airfields	None	None	None
Overall Impact	*None*	*Minor*	*Minor*
Fort Richardson			
Transportation	None	Beneficial	Beneficial
Housing	Beneficial	Beneficial	Beneficial
Community Facilities	Beneficial	Minor	Minor
Installation Support Facilities	Beneficial	Beneficial	Beneficial
Training Ranges	Beneficial	Minor	Minor
Maneuver Training Land	None	Moderate	Moderate
Airspace and Airfields	None	None	None
Overall Impact	*Beneficial*	*Minor*	*Minor*

4.19.5.2 Comparison of Alternatives 3 and 4

Both alternatives would result in transformation from the Current Force to an SBCT. In general, Alternative 4 would result in higher numbers of personnel and equipment but construction projects would remain the same. Training intensity would be higher. Impacts to infrastructure may arise from the stationing of additional personnel and increased use of existing facilities.

The primary differences between Alternatives 3 and 4 are the higher facility-use requirements and additional management objectives proposed under Alternative 4. For Alternative 3, institutional matters relating to range management, ITAM, environmental management, and sustainable range management would remain essentially the same as the No Action Alternative. However, under Alternative 4, these programs would be fully funded and implemented (Appendix H). The result would be improved environmental management of USARAK lands.

4.19.6 Mitigation

4.19.6.1 Existing

The following mitigation measures currently in place are continually revised and reviewed to respond to new or increasing impacts. These mitigation measures are implemented as funding is available. Funding often only provides for partial implementation.

- Continue to implement Range Development Plan, involving maintenance projects on all firing ranges such as target repair and replacement, target mechanism maintenance and repair, and maintenance of range buildings.
- Continue to implement ITAM Work Plan. The ITAM Work Plan includes projects to repair and revegetate maneuver land. Repair and revegetation improves the condition of the land and raises the land condition measurement. The ITAM work plan includes projects that help to match training requirements with capabilities of maneuver land, reducing impacts on sensitive habitats. Environmental awareness projects educate Soldiers to minimize unnecessary damage. The ITAM Work Plan also includes projects to assess the condition of the land through monitoring.
- Continue to implement INRMPs. The INRMPs contain projects designed to provide environmental stewardship and mitigate impacts from military training. Erosion control projects reduce the impacts from erosion. Soil and water quality monitoring protocols to detect the migration of contamination from impact areas are currently being developed at DTA.
- Continue environmental, conservation and cultural resources management programs.

4.19.6.2 Proposed

Some programs already propose measures that would mitigate many impacts to USARAK infrastructure. These programs are only partially implemented and funded. The proposed mitigation for Alternative 4 is to fully implement plans and projects that have already been identified by USARAK's INRMPs and other plans. These projects and plans are further described in Appendix H. Additional mitigation measures are also listed below.

- Implement a Training Area Recovery Plan. This would ensure sustainability of training areas.
- Implement the Range and Training Land Development Plan, ITAM Work Plan, Environmental Management Systems, the INRMP, Integrated Cultural Resources Management Plan, ecosystem management program, and sustainable range program.

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4.20 CUMULATIVE IMPACTS

The Council on Environmental Quality requires cumulative impacts analysis for National Environmental Policy Act (NEPA) documents, including environmental impact statements (40 CFR 1508.7). Cumulative impacts are defined as the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions."

Individually, different past, present, and future actions may contribute impacts to the environment. When many actions are considered together, however, the impacts could be significant. This section of the Environmental Impact Statement (EIS) includes a brief analysis of cumulative impacts concerning issues analyzed in this EIS, including the six issues of concern identified during scoping (Access, Traffic, Wildlife and Habitats, Maneuver Impacts, Fire Management and Cultural Resources). Past, present, and future actions within the geographic regions of influence are classified into types of cumulative impacts are analyzed for each resource and issue of concern.

4.20.1 Geographic Regions of Interest

This analysis considers two types of impacts: Army impacts and impacts from activities on surrounding lands. As a result, the geographic region of interest is different for different types of activities, which affect cumulative impacts in the region (Table 4.20.a). The geographic region of interest for Army impacts refers to the area influence by Army activities or projects. The geographic region of interest for cumulative impacts considers other projects, policies, and land uses outside of Army lands.

For this analysis four geographic scales are considered:

Highly localized – Physical impacts are on-site or are limited to areas within 1/2 mile of activity or project.

Semi-local – Impacts extend beyond area of activity or project > 1/2 mile to approximately 3 miles.

Dispersed – Impacts extend beyond area of activity or project by > 3 miles to approximately 10 miles.

Regional – Impacts extend >10 miles to approximately 100 miles or more.

Table 4.20.a lists the resources and issues discussed in this EIS, and categorizes the geographic region of interest that is considered in this cumulative impacts analysis.

Table 4.20.a Geographic Regions Influenced by Army Activities and Other Projects.

Resource	Army Impacts Region of Interest[1]	Cumulative Impacts Region of Interest[2]
Air Quality	Regional (airshed)	Regional (airshed)
Geology	Highly localized	Regional
Soils **(Issue D)**	Highly localized	Regional
Surface Water	Dispersed	Regional (watershed)

Table 4.20.a cont. Geographic Regions Influenced by Army Activities and Other Projects.

Resource	Army Impacts Region of Interest[1]	Cumulative Impacts Region of Interest[2]
Groundwater	Dispersed	Dispersed
Wetlands **(Issues C and D)**	Highly localized	Regional (ecosystem)
Vegetation	Highly localized	Regional (ecosystem)
Fisheries and Wildlife **(Issue C)**	Highly localized to regional	Regional (ecosystem)
Threatened or Endangered Species and Species of Concern	Highly localized to regional	Regional (ecosystem)
Fire Management **(Issue E)**	Semi-local to dispersed (contiguous forest tracts)	Dispersed
Cultural Resources **(Issue F)**	Highly localized	Regional
Socioeconomics	Regional (borough-wide)	Regional
Public Access and Recreation **(Issues A and C)**	Dispersed	Regional
Subsistence	Dispersed, possibly regional	Regional
Noise	Localized	Dispersed
Human Health and Safety **(Issue B)**	Highly localized to regional	Regional
Environmental Justice	Regional (borough-wide)	Regional (borough-wide)
Land Use/Infrastructure	Semi-local to dispersed	Semi-local to dispersed

[1] Area influenced by Army activities or projects.

[2] Area analyzed for cumulative impacts analysis (including other projects, policies, and land uses outside of Army lands).

4.20.2 Issues Included in Cumulative Impacts Analysis

This EIS has evaluated impacts of three alternatives on 18 environmental categories (Sections 4.2 to 4.19). U.S. Army Alaska (USARAK) considers all major categories examined in this EIS to be important, and cumulative impacts will be assessed for each of those categories. Nevertheless, the six issues of concern that were identified during scoping will be analyzed in greater detail because these issues are highly important to the public.

The scoping issues of concern include access for recreation (Issue A), traffic (Issue B), wildlife and habitats (Issue C), maneuver impacts to soils and wetlands (Issue D), fire management (Issue E), and cultural resources (Issue F). In addition, the other resources or issues included in the cumulative impacts analysis are air quality, geology, surface water, groundwater, vegetation, threatened or endangered species (and species of concern), socioeconomics, subsistence, noise, human health and safety, environmental justice, and infrastructure.

4.20.2.1 Organization of Cumulative Impacts Analysis

This section will identify past, present and future actions within two regions of interest: interior Alaska, including lands surrounding Fort Wainwright (FWA), Donnelly Training Area (DTA), and Gerstle River and Black Rapids training areas; and south-central Alaska, lands in the proximity of Fort Richardson (FRA). Then the impacts will be analyzed according to resource or issue of concern. For each issue of concern, impacts from military activities, infrastructure, land management, use of renewable natural resources, and communities will be analyzed. These categories were selected because they provide a comprehensive classification of factors that affect cumulative impacts within the regions of influence. For other resources (i.e., those not classified as issues of concern) the most salient of these sub-categories will be analyzed.

4.20.3 Identification of Past, Present, and Future Actions within Regions of Interest

This analysis evaluates cumulative impacts within two regions of interest: interior Alaska and south-central Alaska. These regions of interest are not formally delineated because cumulative impacts are not necessarily bounded by arbitrary lines. Some resources or issues have a vast region of interest, and others are very site specific (Table 4.20.a). Nevertheless, for interior Alaska the analysis focuses on lands within the upper Tanana River Basin (Appendix A, Figures 4.20.a and 4.20.b). The south-central region includes the Anchorage Bowl and surrounding lands (Appendix A, Figures 4.20.c and 4.20.d). Note that the region of interest in south-central Alaska does not extend as far beyond FRA as does the region of interest in interior Alaska. This is because FRA is only 61,000 acres compared to 1.5 million acres of Army lands in interior Alaska.

This section (4.20.3) introduces the major projects, activities and land uses from the past, present and expected future within the respective regions of interest. The methodology of this analysis is presented in Section 4.20.4. Discussion of impacts to the resources and issues of concern in interior and south-central Alaska are presented in Section 4.20.5.

4.20.3.1 Interior Alaska

USARAK facilities located in interior Alaska and considered in this analysis are: FWA Main Post, Tanana Flats Training Area (TFTA), Yukon Training Area (YTA), DTA, and the Gerstle River and Black Rapids training areas.

4.20.3.1.1 Military Activities

Past Actions on Army Lands

The lands at FWA Main Post were used by the U.S. Air Force during the 1940s and 1950s (USARAK 1979c). Most lands at TFTA, YTA, DTA, Gerstle River, and Black Rapids were withdrawn for Army use in the 1950s and 1960s (USARAK 1999a).

Fort Wainwright Main Post

Much of the development at the Main Post occurred from the 1940s to the 1970s. Primary development features include the cantonment area, Ladd Airfield, training areas north of the Chena River, a golf course, and Birch Hill Ski Area. The area between the Richardson Highway and Tanana River was developed into small arms range and artillery firing points.

Tanana Flats Training Area

Primary uses of TFTA have been for infantry training for bombing/artillery ranges. Due to the high proportion of wetlands in this area, most infantry training has been conducted during winter. The Alpha Impact Area has been used for artillery training by the Army and Blair Lakes by the U.S. Air Force. During the 1970s these areas were used on about 16% of available training days (USARAK 1979a).

Yukon Training Area

YTA has been used as a maneuver and training site since the 1970s (USARAK 1980). Special use areas included Stuart Creek Impact Area, Husky Drop Zone, and bivouac areas. Approximately 22,000 acres of YTA have been used by the U.S. Air Force and the Army as the Air Force Technical Application Center. The remainder of YTA has been used for maneuver training and infantry field exercises. According to USARAK (1979c), YTA was used about 200 days per year by 4,000 to 5,000 troops. After 1971, vehicle maneuvers were limited to existing roads.

Donnelly Training Area

The military used DTA lands for training by the Army Air Transport Command during the 1940s, and it was designated as Fort Greely in 1955 (USARAK 1979b). During the 1970s and 1980s the primary use of the lands at Fort Greely included the Cold Regions Test Center, the Northern Warfare Test Center, and training for the 172nd Infantry Brigade. The Cold Regions Test Center was used to test weapons and equipment in arctic conditions. Artillery was fired from the east side of the Delta River into impact areas west of the river (i.e., Mississippi, Washington, and Texas ranges). Tanks were tested west of the Delta River, and Oklahoma Impact Area was used by the U.S. Air Force. According to USARAK (1979b), most ordnance was air detonated.

Up to 14,000 troops used DTA, as well as FWA, for Joint Readiness Operations (e.g., Operation Jack Frost), which lasted approximately 14-20 days.

In addition, battalion-sized operations (lasting approximately 7-10 days) occurred regularly. About 600 Soldiers would deploy within areas of about one square mile. Weapons use would range from small arms to 105mm howitzer, but only designated areas were used for live fire. Movements included approach marches, reconnaissance, and infantry tactical maneuvers.

Summary of Past Military Actions on Army Lands in Interior Alaska

According to the Integrated Natural Resource Management Plans for FWA and DTA (USARAK 2002e, g), the withdrawal of land (through BLM) for FWA had a long-term positive effect on natural resources, as the area likely would have otherwise been enveloped by the expansion of Fairbanks and North Pole. Most of the land outside of the Main Post was left undeveloped, affected only by training impacts. At DTA impacts from the Army have been mostly localized (USARAK 2002e). The most extensive impacts included construction of the landing strip and cantonment area at Fort Greely. Most lands outside of the cantonment area are undeveloped.

Past impacts to natural resources on interior Alaska's Army lands include:

- Munitions
- Maneuvers
- Use of drop zones
- Noise
- Disturbance or hazards to wildlife

- Construction of roads or use of trails
- Stream crossings
- Wildfires
- Natural resources management

Additional detail of past impacts will be discussed in appropriate subsections of this cumulative impacts section.

Impacts to natural resources on FWA and DTA have been consistent with trends at other DOD holdings. The Unit Leader's Handbook for Environmental Stewardship (USARAK 2002e, f, g) lists six primary consequences of intensive and continuous use of Army training lands:

- The loss of historical sites, vegetation, water resources, and wildlife.
- Diminished quality of available realistic training areas.
- Diminished operational security.
- Ineffective tactical operations.
- The creation of safety hazards to personnel and equipment.
- An increase in training, maintenance costs, and litigation.

The most adverse mission impact is the development of supporting infrastructure throughout FWA and DTA. Permanent loss or alteration of wetlands, wildlife habitat, vegetation, timber, water resources and cultural resources has occurred. This process also involved removing soil and native vegetation and replacing them with gravel. Most land outside the Main Post area was left undeveloped, affected only by localized training impacts. TFTA is relatively unaffected by military developments with the exception of clearings for airstrips and targetry. YTA is more affected by development, including roads on tops of ridges, a combat landing strip, old bunker and missile sites, and targetry clearings. Impacts at DTA have resulted from development of the cantonment area and airfield, and ranges or use of impact areas. In 1996, USARAK began efforts to counteract the cumulative effects of military training impacts by establishing an Integrated Training Area Management (ITAM) program.

USARAK Mission-Essential Projects

USARAK has planned several mission-essential construction projects at FWA and DTA. The total projected program amount is estimated at $377.6 million for the interior Alaska region. Projects at FWA include buildings on the cantonment area and ranges (Appendix A, Figures 4.20.e and 4.20.f). None of the alternatives available to the decision-maker with respect to determining whether or not to transform U.S. Army Alaska forces, or in what manner transformation should be accomplished, would serve to affect the options available for planned mission-essential projects; nor would transformation of U.S. Army Alaska forces obligate Army officials to a course of action that would prevent them from being able to consider undertaking no course of action as a viable alternative to these planned projects.

Buildings on the Cantonment Area at Fort Wainwright

Mission Support Training Facility
A mission support training facility will serve as a digital training facility linking live, virtual, and constructive training environments and will provide individual and collective training support through battlefield visualization utilizing appropriate simulations and command, control, communications, computers, intelligence, surveillance, and reconnaissance stimulations to support training events and mission execution.

Library/MOS/Education Center
The education center will provide facilities for battalion classrooms, Military Occupational Specialty study section, and main library functions on FWA. The facility will include classrooms, scientific laboratory, vocational-technical and automotive training repair shops, library reference rooms, audio-visual areas, book collection shelving areas, computer areas and related space and capabilities.

Barracks Complex
The Whole Barracks Renewal Program will construct one three-story barracks building; one Soldier community building; and two medium-sized, two-story battalion headquarters buildings on FWA.

Ammunition Supply Point Upgrade
This project will provide a facility for conducting pre-deployment functions. This project is required to process military munitions (Class 1.1 and 1.2) loaded onto 600-700 tactical vehicles in preparation for rapid strategic air deployment.

Family Housing
Existing family housing will be upgraded. This project will provide adequate family housing for FWA soldiers and their families.

Vehicle Maintenance Facility
The facility will be located in the area of post that currently supports other tactical maintenance facilities. These facilities include hardstands, administrative and shop control areas, storage areas, and arms rooms and vaults.

Alert Holding and Pallet Facilities
These projects will be constructed in the FWA cantonment area in 2003. The alert holding area will provide a facility for conducting pre-deployment functions to include vehicle processing functions. The pallet processing facility will build and process palletized cargo in preparation for strategic deployment within rapid deployment time lines.

These projects are discussed in further detail in Appendix D.

Range Upgrade and Expansion Projects at Fort Wainwright

Mission Operations on Urbanized Terrain
This is a live-fire facility that provides venues for the training and practice of tactics and techniques for urban/suburban operations under simulated combat conditions. The ranges will include the urban assault course, shoot house and a breach facility (located in the small arms complex of FWA).

Multi-purpose Training Range
A standard modified record fire range with automated target system will upgrade the existing record fire range in the FWA small arms complex in 2003. The standard range has 16 lanes so that two squads can use it at the same time.

Sniper Range
The Sniper Field Fire Range Project is an upgrade of an existing range in the small arms complex of FWA for day and night time sniper training, as well as advanced rifle marksmanship training. The sniper field fire range is to be constructed in 2003.

Fencing Project
USARAK is considering installation of a boundary fence for the cantonment area at FWA to further Current and Future Force protection requirements and to ensure public safety. Design and placement alternatives are being developed. Any decision to pursue FWA fencing will require NEPA documentation and analysis, and necessarily consider the cumulative impacts of fencing which might result.

Range Upgrade and Expansion at Donnelly Training Area

Projects at DTA include range upgrade and expansion and development of the Cold Regions Test Center Automotive Test Complex (Appendix A, Figure 4.20.g).

Battle Area Complex and Combined Arms Collective Training Range
These projects are currently being considered for development. The battle area complex (BAX) and combined arms collective training facility (CACTF) were the subject of a June 2003 Environmental Assessment and Finding of No Significant Impact wherein DTA's Eddy Drop Zone Study Area was identified as the development site. Subsequently, the City of Delta Junction sued the Army, challenging the NEPA analysis supporting site selection, and USARAK has committed to suspending its range development activities pending a review of the NEPA process as it relates to the placement of the BAX and CACTF. As this NEPA analysis is underway, and while a reasonable range of alternatives for site selection undergoes further study and refinement, DTA has been identified as containing sites responsive to the Army's purpose and need of the range upgrades. (In other words, alternative sites within DTA represent a reasonable range of alternative locations to be considered in subsequent NEPA analysis.)

Accordingly, this EIS generally addresses those cumulative impacts to resources associated with range upgrades within DTA. However, because the BAX and CACTF NEPA process has not been completed and consideration of a range of alternatives, including the No Action Alternative, is underway, site specific cumulative impacts cannot be analyzed in this EIS. Final NEPA analysis for the BAX and CACTF will necessarily include a discussion of site specific cumulative impacts which may result.

Collective Training Range
The collective training range is being constructed in the vicinity of the Texas Range within DTA. The collective training range fulfills collective live-fire training requirements for current and future force protection requirements. These cumulative impacts are discussed as part of the overall DTA range upgrades analysis for each impacted resource area, categories, and issues of concern.

Cold Regions Test Center Automotive Test Complex
The cold weather/automotive test complex probably would be sited to the east of Jarvis Creek and immediately south of the Space and Missile Defense System facility on Fort Greely (Appendix A, Figure 4.20.g). The automotive test courses and facilities would comprise 4-5-miles featuring various road or test surfaces along the perimeter. The entire complex would cover an area of about 1.00 x 1.75 miles.

The primary test building and maintenance complex would be fenced (chain link) to provide security. Roads would be gated. There would be no boundary fence for the general complex. Buildings would likely be sited in the northwestern corner of the complex to be closest to power and utility sources, which would be routed to the site through Space and Missile Defense System property. Golden Valley Electrical Association is expected to supply the electrical needs of the project via the Fort Greely power plant.

Space and Missile Defense System

Construction of the Space and Missile Defense System began at Fort Greely and Clear Air Force Station during the summer of 2002. Construction of the Space and Interceptor and the Battle Management Control has also begun at Fort Greely, on land that was exchanged from the former cantonment area at DTA (Figure 4.20.g). The early warning radar system is being renovated at Clear AFS, which is located along the Nenana River, approximately 80 miles southwest of Fairbanks.

U.S. Air Force (Eielson AFB)

Eielson AFB is located southeast of Fairbanks and just east of YTA. The base mission includes support of combat aircraft, mid-air refueling, logistics support, and arctic survival training. Approximately 5,000 personnel and dependents live on the 57,000-acre base. Approximately 20,500 acres of the base are open for recreation, including fishing, hunting, trapping, and other activities. The remaining 36,500 acres are used as bombing range, which is closed to the public. The conservation program includes ecosystem management, forestry, fish and wildlife management, and recreation.

Projects include runway repair, parking ramp, weapons and release systems facility, consolidated munitions, and a squad operations facility. Other recent or continuing projects include a hazardous materials storage facility, dormitory, joint mobility complex, and utility upgrades (USACE 2001).

4.20.3.1.2 Infrastructure

Appendix A, Figure 4.20.a, depicts the location and distribution of major infrastructure in interior Alaska that could exert cumulative impacts to the environment or resources in the region. A synopsis of these activities, programs, and projects are listed below.

Oil and Natural Gas

Trans-Alaska Pipeline System

The Trans-Alaska Pipeline System (TAPS) runs approximately 230 miles through the region of interest. The pipeline was constructed from 1972-1977 and has been in operation since 1977. It passes approximately one mile from the northeast corner of FWA Main Post, and within two or three miles of portions of Tanana Flats and YTA. The pipeline passes through Delta Junction and DTA East. Portions of the pipeline are both above and under the ground. The system includes the pipeline itself, pump stations, and access roads (BLM 2002a). The Final EIS for 30-year renewal of the pipeline was completed in 2002.

Oil and Gas Refining and Storage

Two oil refineries are located in North Pole, Alaska, within five miles of TFTA. The Trans-Alaska pipeline provides the oil for these refineries (BLM 2002a). A jet fuel terminal also exists at Fairbanks International Airport (BLM 2002a).

Natural Gas Transportation

Although no definitive plans have been implemented, the probability of establishing a natural gas pipeline through interior Alaska exists. The gas pipeline would probably follow the existing oil pipeline, from Prudhoe Bay to Fairbanks, and then east through Delta Junction and Canada. Construction would take three to five years, and the pipeline would be buried (BLM 2002a).

Oil and Natural Gas Exploration

The Nenana and Tanana Basins have potential for subsurface oil and natural gas. An exploration plan for approximately 1.3 million acres of state and Native land has been completed in the Nenana Basin on lands adjacent to the western portion of TFTA (Alaska Department of Natural Resources 2002). Potential for vast oil reserves does not appear to be high, but the area appears to have potential for natural gas. Exploration and development could have impacts to the communities, economics in the area, and the environment.

Minerals and Mining

Fort Knox Gold Mine

The Fort Knox Gold Mine is an open pit mine located about 25 miles northeast of Fairbanks in the Fish Creek drainage of the Fairbanks Mining District. The construction on the mine began in 1995 and is expected to last for 12 to 16 years (Kinross Gold Corporation 2002). The mine produces about 350,000 ounces of gold a year.

True North Gold Mine

The True North Gold Mine is an open pit mine about 30 miles north of Fairbanks. Three new mining pits, in addition to the existing two, are planned. The expansion would increase the mine's operations by about 600 acres and extend its life to a total of four years or more (Alaska Journal of Commerce 2002). Noise and light pollution from mine operations has been expressed as a concern by the public (Alaska Journal of Commerce 2002).

Pogo Gold Mine

A gold mine is proposed approximately 38 miles northeast of Delta Junction, immediately adjacent to the Goodpaster River. It would be an underground mine with a surface mill producing up to 500,000 ounces of gold each year (Baker 2000). Tek-Pogo, Inc has applied for a National Pollutant Discharge Elimination System (NPDES) permit and a wetlands fill permit from the U.S. Army Corps of Engineers. The Final EIS was completed in 2003 (EPA 2003).

Other Mining Activity

In addition to the larger mines described above, three medium and 50 small gold mines also exist in interior Alaska (BLM 2002a). Other mining activities in the region include extraction of peat, sand or gravel, and the Usibelli Coal Mine near Healy.

Transportation

Alaska Highway

This 1,422-mile (302 miles in Alaska) highway from Dawson Creek, British Columbia to Delta Junction, Alaska, was built in 1942 by the U.S. Army Corps of Engineers for World War II military transport. The highway was originally called the Alaska-Canada Military Highway and was opened to the public in 1948. It is open and maintained year-round. The Alaska Highway passes through nearly 50 miles of the region of interest, from the Johnson River area to Delta Junction.

Richardson Highway

The Richardson Highway is 368 miles long, from Valdez to Fairbanks, and leads through the Alaska Range and Chugach Mountains. The Richardson was a wagon road in the early 1900s but was upgraded to accommodate automobile traffic in the 1920s. The highway passes through about 170 miles of the interior Alaska region of interest, from the junction of the Denali Highway to Fairbanks.

Parks Highway

The Parks Highway runs 324 miles from the junction with the Glenn Highway near Palmer and Wasilla to Fairbanks. The highway closely parallels the Alaska Railroad for most of its length. The Parks Highway passes through about 110 miles of the region of interest, from Healy to Fairbanks.

Other Paved Roadways

The Elliott Highway from Fairbanks to Livengood is about 60 miles. The Steese Highway is about 110 miles in length and about 50 miles of that is located within the region of interest for this EIS.

Alaska Railroad Corporation

In the Fairbanks area, construction of a Fairbanks intermodal facility and depot is planned. Additionally, a Fairbanks/North Pole rail realignment project is proposed to relocate its mainline track. Fairbanks and Anchorage are connected by a railway that provides important transportation between these cities.

Golden Valley Electrical Authority Northern Intertie

Construction of a 230kV transmission line from Healy to Fairbanks is currently underway. Approximately 30 miles of the chosen route crosses the northwestern portion of TFTA and an additional 50 miles pass through the region of interest. The Final EIS was released in 1998 (BLM 1998).

Fairbanks International Airport

The Fairbanks International Airport, located four miles west of downtown Fairbanks, was constructed during 1948-51, and it opened in 1951. The airport has four runways, including an 11,800 ft general aviation runway. It also has smaller runways of 6,500 ft, 5,400 ft, and 3,500 ft. The terminal was expanded in 1984. An average of 365 aircraft/day (about 133,000/year) use the airport.

4.20.3.1.3 Land Management

See Appendix A, Figure 4.20.b, for the distribution, location, and ownership of major land units in the interior Alaska region of interest. Below are brief descriptions of these land units.

State Lands

Tanana Valley State Forest

The Tanana Valley State Forest, which encompasses 1.78 million acres, was established in 1983 as a multiple use management area. The management focus is timber management (Alaska Department of Natural Resources 2001). Other uses include fish and wildlife habitat, recreation, mining and mineral extraction, agriculture, soil conservation, water quality, and watershed management. Details of the management plans for respective sub-units are described in Appendix F.

Tanana Basin Area Management Plan

The Tanana Basin Area Plan, which encompasses approximately 14.3 million acres of state land along the Tanana River Basin, was written in 1985 and updated in 1991 (Alaska Department of Natural Resources 1991). The plan outlines land use designations for seven large sub-regions, six of which overlap the region of interest for this cumulative impact analysis (Table 4.20.b and Figure 4.20.b). The Upper Tanana sub-region lies mostly outside of the region of interest.

Primary land uses include agriculture, settlement, forestry, minerals, recreation, wildlife habitat, high and low-value resource management (Table 4.20.b; additional details of the land use designations are summarized in Appendix F).

Table 4.20.b State Land Use Designation for Tanana Valley Basin.

Land Use Designation	Area Designated (millions of acres)
Agriculture	0.5
Fish and Wildlife	11.5
Forestry	1.4
Recreation	4.8
Settlement	8.2
Minerals	13.8

Chena River State Recreation Area

The Chena River State Recreation Area was established in 1967, with about 15,000 designated acres. In 1975, the recreation area was enlarged to approximately 254,000 acres. The Chena River State Recreation Area provides recreational opportunities for about 150,000 visitors each year. Human activities include fishing, wildlife viewing, kayaking and boating, and winter activities (Alaska Department of Natural Resources 2003).

Other State Recreation Areas

Harding Lake is located 45 miles southeast of Fairbanks, and Quartz Lake is a 600-acre recreation area 10 miles north of Delta Junction. These recreation areas provide camping and access to outdoor recreation.

Native Lands

Under the Alaska Native Claims Settlement Act (ANCSA), passed in 1971, Alaska Tribes relinquished their claims to aboriginal title of most of the state of Alaska. In exchange, they received financial compensation and land selection rights to 44 million acres within the state. Individual village corporations formed and chartered under state law received title to the surface estate of all lands in their specified townships, with additional lands allocated based on village populations. In addition, 12 regional corporations were formed to hold subsurface rights to village corporation lands, and six of these regional corporations were entitled to select an additional 16 million acres of land. Native lands are considered private lands for ownership purposes.

Doyon, Inc. is the regional corporation for interior Alaska. With a land entitlement of 12.5 million acres, it is the largest private landowner in the state. The corporation's strategic plan includes managing lands for tourism, real estate activities, and mineral and oil exploration and development *(www.doyon.com)*.

Within the Nenana Basin, ownership of approximately 78,200 acres is shared between the regional corporation, Doyon, and the village corporations of Nenana (Toghottehle Corporation) and Minto (Seth de Ya-Ah Corporation). Doyon and Andex Resources, L.L.C. are parties to a lease agreement for natural gas exploration on Nenana Basin lands (Alaska Department of Natural Resources 2002).

Federal Lands

Bureau of Land Management Lands

The White Mountains National Recreation Area, established in 1980, is located approximately 30 miles north of Fairbanks. This recreation area encompasses 1.2 million acres. It is managed in a relatively pristine state. The 1.2 million-acre Steese National Conservation Area is located about 100 miles northeast of Fairbanks. These lands were established through the Alaska National Interest Lands Conservation Act of 1980 and are managed for multiple use and sustained yield and maintenance of environmental quality.

4.20.3.1.4 Use of Renewable Natural Resources

Recreational and Subsistence Hunting

Hunting activities are important economically and ecologically. The State issues over 550,000 fishing and hunting licenses each year. The 2000-2001 hunting season involved the harvest of 7,000 moose, 14,000 deer, and 32,000 caribou. Regulations and bag limits are established by Alaska Department of Fish and Game, and these are set based on game population trends. Subsistence hunting is also important in parts of Alaska, including the interior region of interest. Between 50% and 75% of rural residents in Alaska harvest wildlife.

Recreational and Subsistence Fishing

The State of Alaska issues over 550,000 hunting and fishing licenses each year. Catch limits vary according to species, but generally do not exceed 10 per person per day. Approximately 75% to 98% of Alaska's rural residents harvest fish for subsistence purposes. Recreational and subsistence fishing account for a total of only 3%, or 18 million pounds, of Alaska's annual fish harvest. Salmon is by far the most popular fish, followed by halibut, trout, and other species.

Timber Harvesting

The majority of logging in the region occurs on state lands, particularly the Tanana Valley State Forest. Management policies allow for commercial as well as personal harvest of timber in the Tanana Valley State Forest, primarily for fuel and saw timber. The Goldstream Valley, Chena, and Nenana Ridge management units include high value timber stands. In addition, other state lands within the Tanana River Basin are designated for forestry (Alaska Department of Natural Resources 1991). Of these, 91,000 acres of state lands have forestry designated as the primary land use. Forestry is listed as a co-land use on an additional 1,080,000 acres in the region, with other land uses including wildlife habitat, minerals, and recreation. See Appendix F for additional descriptions and locations of land units with logging as the primary land use.

4.20.3.1.5 Communities

Fairbanks & Fairbanks North Star Borough

Fairbanks was established in 1867, and the Fairbanks North Star Borough encompasses over 7,400 sq. miles of land. The population of Fairbanks North Star Borough grew from 53,983 in 1980 to 82,840 in 2000. According to the Alaska Department of Community and Economic Development (2002), the community had 29,777 occupied housing units in 2000. Fairbanks is accessed by four major highways (the Richardson, Parks, Steese, and Elliott highways), the Fairbanks International Airport, and by rail. The borough is expected to grow by about 15,000 residents by the year 2018, to 98,000.

Delta Junction and Big Delta

Delta Junction and Big Delta, with a combined population of about 1,600, are situated approximately 80 miles southeast of Fairbanks. Delta Junction was originally a construction camp during the building of the Richardson Highway. It is located at the junction of two major highways (Alaska and Richardson) and services are provided by numerous businesses. Delta Junction is near DTA and Fort Greely, and is also the site of a permanent maintenance station for the Trans-Alaska pipeline. Approximately 70,000 acres of cultivated land are located around Delta Junction. Barley is the main crop, although others are grown. Big Delta is located 15 miles north along the Richardson Highway, at the confluence of the Tanana and Delta rivers. Like Delta Junction, Big Delta provides services for the community, and the area is surrounded by forest and some agricultural land.

Nenana

Nenana lies 55 miles southwest of Fairbanks along the Parks Highway, at the confluence of the Nenana and Tanana rivers. The current population of Nenana is 444. Nenana was originally an Athabascan village, which grew with the Fairbanks gold rush and subsequent infrastructure improvements such as the Parks Highway and the Alaska Railroad. Most of the local economy involves infrastructure maintenance and river supply transport. Most residents practice subsistence lifestyles.

Anderson

Anderson lies 6 miles west off the George Parks Highway, 76 miles southwest of Fairbanks. The 2000 census population was 359. The town formed and grew with the completion of the Clear Air Force Station early warning system, which was completed in 1961. The Air Force station is the primary economic driver. The town also houses a state fish hatchery.

4.20.3.2 South-Central Alaska/Anchorage Area

Fort Richardson (FRA) is the USARAK facility located in south-central Alaska and considered in this analysis.

4.20.3.2.1 Military Activities

Past Actions on Army Lands

Lands that are now used by FRA were initially withdrawn for military use in 1939. During World War II, approximately 150,000 acres were withdrawn for the military but after the war 85,000 acres were returned. The post's boundaries have remained relatively stable since 1966 (USARAK 2002f). The cantonment area developed during the 1950s and 1960s.

Over the years, mechanized infantry, artillery, special forces, and assault aircraft personnel have trained at FRA (USARAK 2002f). Damaging effects of military missions resulted from munitions impacts and maneuvers. Munitions damage has occurred within 2,195 acres of designated impact area in Eagle River Flats. Munitions damage soil, vegetation, and wildlife upon impact. Other sources of damage from impact include proliferation of shrapnel and toxic residues. Military munitions fired into Eagle River include: 107mm, 81mm, and 60mm mortar rounds, 155mm and 105mm howitzer rounds, 90mm recoilless rifle rounds, 66mm light anti-tank weapons, 40mm grenades, Shillelagh missiles (isolated), flares, and small arms rounds (USARAK 2002f). White phosphorus rounds are no longer used at FRA.

Maneuver training on FRA has involved the use of heavy cargo trucks, high mobility multi-purpose wheeled vehicles (i.e., Humvees), armored personnel carriers, light-weight tracked vehicles known as small unit support vehicles, and snow machines in winter. The most severe and widespread damage from maneuvers has occurred under conditions where soil has become saturated either by excessive rainfall during summer or during and immediately after break-up (usually in April). Damage includes rutting and vegetation destruction from cross-country travel.

In bivouac areas, damage has occurred from ruts form under wet conditions where vegetation has been removed or destroyed. Impacts associated with maneuver training in winter result from using heavy equipment to clear snow from trails and bivouac areas. Often grader and dozer blades are lowered beneath the snow, scraping topsoil and vegetation into berms, which take several years to become revegetated. The resulting unsightly mounds and rough terrain remain evident for many years.

USARAK Mission-Essential Projects

USARAK has planned several mission-essential projects at FRA. The projected cost for these projects is $54.6 million. None of the alternatives available to the decision-maker with respect to determining whether or not to transform U.S. Army Alaska forces, or in what manner transformation should be accomplished, would serve to affect the options available for planned mission-essential projects; nor would transformation of U.S. Army Alaska forces obligate Army officials to a course of action that would prevent them from being able to consider undertaking no course of action as a viable alternative to these planned projects.

Cantonment Area Projects at Fort Richardson

Rapid Deployment Facility
The rapid deployment facility is a facility for conducting consolidated pre-deployment functions. This project will renovate existing warehouse building 806 to house the facility that will consolidate the alert holding area and contingency pallet processing/storage operations.

Ammunition Supply Point Upgrade
The ammunition supply point (ASP), accommodates munitions requirements prior to deployment. The ASP will be upgraded in 2003 to process approximately 150 short tons (2000 lbs) of munitions (Class 1.5) packaged from the ammunition depot to be uploaded onto 600-700 tactical vehicles in preparation for strategic air deployment.

Whole Barracks Renewal
The Whole Barracks Renewal Project replaces aging substandard living and community facilities and provides housing and associated support facilities for the unaccompanied personnel assigned to FRA. The project includes demolition of five buildings and construction of one barracks building, one dining facility, three large-sized company operations facilities, and five medium-sized company operations facilities, and other site improvements.

Range Upgrade and Expansion Projects at Fort Richardson

Mission Operations on Urbanized Terrain (MOUT)
The modified military operations in urban terrain (MOUT) facility is a live-fire facility that provides venues for the training and practice of tactics and techniques for urban/suburban operations under simulated combat conditions. The ranges included in the modified MOUT facility include the infantry platoon battle course, infantry squad battle course, urban assault course, shoot house and a breach facility (located on the south post of FRA).

Sniper Range
The Sniper Field Fire Range Project is an upgrade of the existing Grezelka Range on the south post of FRA for day and night time sniper training, and advanced rifle marksmanship.

Multi-purpose Training Range
The multi-purpose training range (MPTR) is a live-fire range on the north post of FRA. The MPTR will provide crew qualification for direct fire small arms weapons and will allow dismounted platoons or the opportunity to conduct fire and maneuver exercises. The MPTR will provide state-of-the-art feedback that allows unbiased analysis of the unit's readiness.

Fence Project
In September 2003, the Army extended its NEPA analysis to review public comments and to consider alternative courses of action. Fence installation was proposed to address Current and Future Force protection requirements, and, at the time of this EIS printing, USARAK is considering public comment received in response to USARAK's Draft NEPA analysis. Any further development of a fence project, if it occurs, will be supported by additional NEPA analysis with public review and comment. Such NEPA analysis would necessarily consider a No Action Alternative in addition to any other fencing placement or design alternatives. Additionally, any and all cumulative impacts to resources resulting from these alternatives would also be analyzed in conjunction with that NEPA analysis.

Depending on the design, implementation of the fence could affect certain resources, including vegetation, wetlands, and wildlife. In this EIS the fence will be considered as a possible foreseeable future action, with the caveat that the design has not been selected. However, specific and detailed analyses are not possible at this time.

U.S. Air Force (Elmendorf AFB)

The Elmendorf Air Force Base site covers approximately 13,130 acres to the west of FRA and north of the Municipality of Anchorage. More than half of the area at the site is undeveloped, including 1,416 acres of wetlands, lakes and ponds. The remaining area has been developed for airfield operations, base-support operations, housing, and recreational facilities. Elmendorf AFB is an active military installation that regularly has construction projects to improve facilities or housing. The Air Force has identified 33 parcels for investigation under the Superfund (EPA 2002a).

4.20.3.2.2 Infrastructure

Appendix A, Figure 4.20.c, depicts the major infrastructure in the south-central Alaska/Anchorage area.

Transportation

Glenn Highway

The Glenn Highway extends 180 miles from downtown Anchorage to the junction with the Richardson Highway. The highway runs through Anchorage, FRA, Eagle River, Chugiak, Birchwood, and Palmer. The Glenn Highway passes through approximately 50 miles of the region of interest.

Parks Highway

The Parks Highway runs 324 miles from the junction with the Glenn Highway near Palmer and Wasilla to Fairbanks. The highway closely parallels the Alaska Railroad for most of its length. The Parks Highway passes through about 20 miles of the region of interest, from the Glenn Highway junction to Houston.

Seward Highway

The Seward Highway runs 125 miles from Seward through Anchorage. The highway leads south from Anchorage to the Kenai Peninsula. It runs through approximately 30 miles of the region of interest.

The Alaska Railroad Corporation

The Alaska Railroad Corporation was issued a right-of-way (ROW) to realign 10 miles of railroad track across Elmendorf Air Force Base and FRA. This decision involved mitigation measures that include a restoration and remediation plan dealing with the new line outside the existing ROW, and disposal of track and roadbed within the abandoned ROW segments (BLM 2002b). The restoration and remediation plan will address impacts to vegetation, wetlands, soils, and moose strikes (due to increased train speed) (BLM 2002b).

The South Anchorage Double Track project, once completed, will add approximately 5 miles of new mainline track between 120th Avenue (near Klatt Road) crossing and Minnesota Drive overpass. The new track will be east of the existing track and within the 200-foot-wide right-of-

way. The double track will connect to a south leg to allow southbound travel from the new airport rail station.

Ted Stevens Anchorage International Airport

Operations of Anchorage's international airport began in 1951 and the airport has undergone numerous expansions since then. The airport now has three major runways, each at least 10,600 feet long. Currently, the terminal is undergoing renovation and expansion. Since the early 1990s the airport has handled between 500,000 and 650,000 flights a year (601,651 in 2002).

Various projects are planned or are currently underway at the airport. Parking relocation, taxiway reconstruction, terminal redevelopment projects, drainage improvement, and other reconstruction and improvement projects are listed on the airport's website. (*http://www.dot.state.ak.us/anc/aiawlcm.html*)

Merrill Field

Merrill Field is one of the busiest airports for private aircraft in the world. The airfield, located one mile east of downtown Anchorage, was established in 1930 and encompasses 436 acres.

Knik Arm Bridge

The proposed Knik Arm Bridge crossing would form a traffic link between the Municipality of Anchorage and the Matanuska-Susitna Borough, southwest of Wasilla. The bridge would divert traffic from the Glenn Highway and increase traffic flow to Wasilla, presumably from Kink-Goose Bay Road.

Electrical Transmission

The Southern Intertie will provide electrical transmission between Anchorage and Homer, on the Kenai Peninsula, over a distance of approximately 57 miles. This project will provide improvements in electric transport capabilities between Anchorage and the Kenai Peninsula. Possible impacts include damage to vegetation and plant species of concern, and wildlife habitat loss, especially on Kenai National Wildlife Refuge, and visual impacts.

4.20.3.2.3 Land Management

Appendix A, Figure 4.20.d, shows land use location, ownership and distribution in the south-central Alaska /Anchorage area of interest.

Chugach State Park

The 495,000-acre Chugach State Park lies to the south and east of FRA (Appendix A, Figure 4.20.c). The park encompasses mountainous terrain with glacial valleys. The 1980 park plan designates three management zones: recreation development, natural environment, and wilderness (Alaska Department of Natural Resources 1980). Approximately 3% of the park is designated for recreational development, about 35% is managed as natural environment, and the remainder is wilderness. In addition, the park is divided into five planning units, which are described in Appendix F.

Native Lands

Cook Inlet Region, Incorporated (CIRI) is the regional Native corporation in the Anchorage area, and it holds title to approximately 605,509 acres of land surface and 1,330,024 acres of the subsurface estate. Land management and investment strategies of CIRI include oil, gas and mining exploration, tourism, and real estate development *(www.ciri.com)*.

The Village of Eklutna lies just north of the Anchorage metro area. The village corporation, Eklutna Incorporated, is the largest private landowner in Anchorage. Eklutna Inc. leases lands to the Municipality of Anchorage, but land management objectives consist primarily of residential development projects in the Eagle River area, including the Powder Reserve subdivision, Fire Eagle condominiums, and the Denali subdivision. Eklutna's residential developments often include land for open spaces and as highway buffers *(www.eklutnainc.com)*.

4.20.3.2.4 Use of Renewable Natural Resources

Hunting and Fishing

Recreational hunting and fishing are popular activities in south-central Alaska. Hunting primarily occurs outside of the borders for the Municipality of Anchorage, although some hunting does occur on FRA. Given its coastal location and the number of anadromous waterways, this region experiences a large annual fish harvest. There is no subsistence practice within this region. See Section 4.20.3.1.4 for more information regarding state fish and game harvests.

4.20.3.2.5 Community

Anchorage

Anchorage grew from 174,000 in 1980 to 260,000 in 2000 (Community Database Online 2002). The 2020 plan expects an additional 80,000 residents by 2020 (Municipality of Anchorage 2001). The nearby communities of Eagle River/Chugiak have grown from 12,000 residents in 1980 to nearly 30,000 in 2000. This population is expected to double by 2020. Due to the terrain and ocean, the amount of available land is limited. Much of the available space in the nearby vicinity of Anchorage probably will be developed during the next few decades. The preferred growth plan includes increased development of existing areas in downtown, midtown, and in established neighborhoods in Anchorage. Future outward growth plans have stipulated the possibility of establishing a bridge or ferry service across Knik Arm to Point Mackenzie.

Palmer/Wasilla

Palmer and Wasilla are approximately 40 miles north of Anchorage, in the Matanuska and Susitna valleys. The combined population for this area is 11,500. Palmer lies along the Glenn Highway and the Matanuska River, and Wasilla lies along the Parks Highway, between Lucille Lake and Wasilla Lake. The local economies are diverse, including retail services, government, and agriculture.

4.20.4 Methodology of Analysis

The cumulative impacts in this EIS are analyzed within the framework of the principles of cumulative impacts described by the Council on Environmental Quality (1997a). In this analysis the respective resources and issues discussed in Chapters 3 and 4 will be classified into types of cumulative impacts. When available, quantitative data will be used, but when quantitative data are lacking, a qualitative analysis will be used.

4.20.4.1 Classification of Cumulative Impacts

The Council on Environmental Quality (1997a) provided examples of cumulative impacts. The guidelines provide a useful framework to analyze the complexities of cumulative environmental impacts.

In the analysis for the transformation of USARAK, the resources and issues of concern are first classified by the seven cumulative impacts categories (sustainability, time lags, space crowding, cross boundary, fragmentation, compounding effects, and indirect effects). Table 4.20.c. provides a brief description of the characteristics for each category and a general example that is pertinent to the Alaskan environment. Table 4.20.d provides a description of the categories of cumulative impacts that are relevant to the resources analyzed in this EIS.

Table 4.20.c Categories of Cumulative Effects and Relevant Examples.

Category	Characteristics	General Example
Sustainability	Repetitive effects on an environmental system	Maneuver impacts exceed ability of soils, wetlands, or vegetation to regenerate.
Time lags	Delayed effects	Permafrost damage from construction, maneuvers, or recreation.
Space crowding	High spatial density of effects on an environmental system	Sedimentation affects spring-fed streams.
Cross boundary	Effects can occur away from the source	Effects occur away from source; air pollution travels miles away from source.
Fragmentation	Change in landscape pattern	Development fragments a historic district or wildlife habitat.
Compounding effects	Effects from multiple sources or pathways	Increased troop size and development of infrastructure at Army posts could result in multiple positive economic benefits to surrounding community.
Indirect effects	Secondary effects	Erosion from construction causes sedimentation in streams, possibly reducing habitat quality for fish, which could result in negative effects to recreational and subsistence to fishing.

Source: Modified from Council on Environmental Quality 1997a

Table 4.20.d List of Resources and Issues Relevant to USARAK Transformation EIS and Descriptions of Cumulative Impacts Categories.

Resource	Categories
Air Quality	*Space Crowding* – Low amounts of pollutants do not affect environment or health, but higher levels do. *Cross Boundary* – Air pollutants affect environment away from source.
Geology	*Fragmentation*–Mining activities fragment resources and habitats.
Soils **(Issue D)**	*Sustainability* – Repetitive use of military vehicles, foot traffic, and ORVs may impact sustainability of soil regeneration. *Time-lag* – Impacts results when winter vegetation disturbance leads to reduced groundcover in spring. Bare ground results in increased warming and potential melting of permafrost.
Surface Water	*Sustainability* – The ability of surface waters to absorb pollutants (e.g., sedimentation) can decrease with repeated influx of pollutants. *Space Crowding* – Changes in concentrations can affect surface water quality and chemistry. *Cross Boundary* – Impacts to surface waters may migrate away from the impact source and affect downstream environment.
Groundwater	*Time Lags* – Leaching of pollutants may occur days, weeks, or months after pollutants are introduced to environment. *Space Crowding* – Changes in concentrations can affect groundwater quality and chemistry. *Cross Boundary* – Impacts to groundwater may migrate away from the impact source and affect areas down gradient.
Wetlands **(Issues C and D)**	*Sustainability* – Wetlands may degrade if rates of damage are greater than the ability of the wetlands to return to normal function. *Time Lag* – Damage to vegetation could reduce groundcover and result in warmer soil temperature and loss of permafrost.
Vegetation	*Sustainability* – Vegetation can be affected by disturbance if damage rates are greater than the ability of plant communities to return to normal function. *Time Lags* – Winter damage may result in plant failure during growth season and ultimately loss of permafrost.
Fisheries and Wildlife **(Issue C)**	*Cross Boundary* – Species that are highly mobile or those with a large home range could be affected by cross boundary impacts. *Fragmentation* – The distribution and movements of many wildlife species can be affected by habitat fragmentation.
Threatened or Endangered Species & Species of Concern	*Cross Boundary* – Species that are highly mobile or those with a large home range could be affected by cross boundary impacts. *Fragmentation* – The distribution and movements of many wildlife species can be affected by habitat fragmentation.
Fire Management **(Issue E)**	*Time-lag* – The impacts of fire to the ecosystem can last many decades. *Cross Boundary* – Fires can travel many miles beyond original source. *Fragmentation* – Fires create patchy and fragmented habitats.
Cultural Resources **(Issue F)**	*Sustainability* – Cultural resources can sustain very little impact before being severely impacted or destroyed. *Fragmentation* – Resources such as cohesive historic districts and traditional cultural properties can be impacted by fragmentation.

Table 4.20.d cont. List of Resources and Issues Relevant to USARAK Transformation EIS and Descriptions of Cumulative Impacts Categories.

Resource	Categories
Socioeconomics	*Compounding Effects* – Increased population and development of infrastructure due to industrial or government activities could result in multiple, positive economic benefits to surrounding communities.
Public Access and Recreation **(Issues A and C)**	*Sustainability* – Over-harvest or overuse can cause degradation in resources such as wildlife and fisheries populations, habitats, or recreation sites. *Space Crowding* – Influx of people or use restrictions can result in overuse of resources. *Fragmentation* – Recreational resources, including sites for recreation or wildlife or fisheries habitats, are susceptible to impacts from fragmentation. *Compounding Effects* – Access and recreation are closely tied with other interrelated issues such as human population growth, land use, and management of ecosystems or resources within those ecosystems.
Subsistence	*Sustainability* – Resources and habitats can sustain a certain amount of impact, after which long-term degradation may occur. *Fragmentation* – Impacts to habitats or access may affect the ability of subsistence users to harvest resources. *Compounding Effects* – Subsistence could be affected by other interrelated issues including human population growth, land use, and management of ecosystems or resources within those ecosystems.
Noise	*Cross Boundary* – Noise levels can affect humans or wildlife several miles away from noise source.
Human Health and Safety **(Issue B)**	*Time Lags* – Delays between health concerns and introduction of pollutants to environment may occur. *Space Crowding* – Concentration issues affect human health and safety with respect to water quality, air quality, and traffic. *Cross Boundary* – Potential impacts to human health and safety, such as pollutants, can occur at a distant source and migrate over time to human populations. *Compounding Effects* – Increased human population can result in increased traffic levels, air pollution, and demand for waste management.
Environmental Justice	*Cross Boundary* – The impacts of pollution from a source can adversely impact minority or poor communities. *Fragmentation* – Subsistence can be impacted by fragmentation of access or wildlife habitat. *Compounding Effects* – Environmental justice issues are interrelated with actions that affect the environment; increased human population growth can affect many aspects relevant to environmental justice.

In addition, cumulative impacts will be classified according to the processes that affect specific resources or issues. Since transformation involves many projects and activities, the analyses in this EIS considers impacts from multiple sources. Processes can either be additive or interactive.

Additive effects or processes accumulate over time and space. Although the actions and impacts may be small or incremental, they may become significant if many actions occur over time or when many impacts overwhelm a particular environmental system.

Interactive processes occur when the cumulative impacts are greater than the sum of the actions that cause them. Table 4.20.e provides a typology and general examples of cumulative impacts relevant to this EIS, and the respective resource categories and scoping issues of concern are classified according to whether they are subject to additive or interactive processes or both.

Table 4.20.e Types of Cumulative Impacts.

Additive Process	**Interactive Process**
Effects result from multiple sources that affect resources additively.	Effects arise from multiple sources that affect resources interactively in a positive or negatively synergistic fashion to the point where the resulting impacts are greater and/or different than the impacts of the sum of the individual actions.
General Example: The effects of military training, recreation, and urban development all contribute to loss of wetlands.	*General Example:* Caribou avoid high quality habitats because of disturbance and development, leading to poor nutrition. Predators utilize road corridors and rights-of-way to facilitate travel and search for prey. The caribou populations decline due to lower nutrition and higher rates of predation.
Resources and issues affected by transformation: • Access (Issue A) • Traffic (Issue B) • Wildlife (most species) (Issue C) • Soils (Issue D) • Wetlands (Issues C and D) • Fire (Issue E) • Cultural Resources (Issue F) • Air Quality • Groundwater • Surface Water • Vegetation • Noise • Human Health • Environmental Justice	*Resources and issues affected by transformation:* • Wildlife, possibly caribou, grizzly bear, wolverine (Issue C) • Socioeconomics • Fire (Issue E) • Subsistence

Source: Modified from Council on Environmental Quality 1997a

4.20.5 Cumulative Impacts Analysis by Resources and Issues

4.20.5.1 Interior Alaska

4.20.5.1.1 Air Quality

Military Activities

Past Actions on Army Lands

According a 1980 environmental impact statement for FWA, the air quality concerns for the area, including CO, PM^{10}, and ice fog, were similar to those of today. Major point emission sources included the power plants, standby power generating facilities, exhaust emissions from vehicle

maintenance shops, small space heaters, and dry cleaning and petroleum storage facilities. Mobile emissions at FWA were described as contributing to less than 1% of all mobile emissions in the Fairbanks area (USARAK 1979a).

Major emission sources at Fort Greely (DTA) included vehicles and the burning of fuels, including wood, gasoline, diesel oil, and fuel oil. Fugitive dust, forest fire smoke, and the occasional use of helicopters and aircraft were also cited as sources of emissions at DTA (USARAK 1980).

Current and Future Actions

Other currently planned USARAK mission-essential projects at FWA contribute only short-term and relatively small cumulative impacts to air quality.

Mission-essential construction projects planned for DTA include the construction of a battle area complex and combined arms collective training facility and would result in the generation of temporary emissions (Stout 2002b).

Estimates of baseline air emissions from aircraft operations were calculated for Eielson AFB. Pollutant concentrations from aircraft operations would be a small percentage of the National Ambient Air Quality Standards (NAAQS), thus no appreciable impacts to air quality would result (USAF 1995).

Construction of the Cold Regions Test Center Automotive Test Complex would result in temporary release of air pollutants from the combustion of fuel and from dust (Stout 2003b). Use of test facility buildings and testing of vehicles on the paved track would also result in increased emissions; however, the need for additional air quality permits is not expected.

The addition of new permanent, stationary air emission sources by the Space and Missile Defense System on the Fort Greely cantonment area would impact the overall ambient air quality within the air shed (Space and Missile Defense Command (SMDC) 2000). This project has been issued a construction permit by the Alaska Department of Environmental Conservation (ADEC), and construction is underway. The air quality impacts may increase if the test bed evolves into a full missile defense system.

Infrastructure

The Trans-Alaska Pipeline (TAPS) Renewal Project could affect ambient air quality (BLM 2002a). The maximum estimated concentrations of criteria air pollutants associated with the TAPS activities have been found to be below applicable NAAQS. Hazardous air pollutants (HAP) concentrations would contribute little to the background concentrations already found in residential areas. There are no predicted adverse impacts to visibility expected to occur as a result of TAPS.

4.20.5.1.2 Geology

Small mining operations are located throughout the state. USARAK has not identified any impacts to geology associated with transformation activities (Section 4.3, Geology Resources), so it would not contribute to any regional cumulative impacts to geology.

4.20.5.1.3 Soil Resources (Issue D: Maneuver Impacts)

Military Activities

Past Actions on Army Lands

Past impacts to soils on Army lands in Interior Alaska included munitions, maneuvers with tracked and wheeled vehicles, construction of roads or use of trails, and stream crossings, but disturbances were localized (USARAK 1979a). On FWA Main Post, permanent loss or alteration of wetlands and vegetation occurred. This involved removing soil and native vegetation and replacing them with gravel. Most land outside the Main Post area was left undeveloped, affected only by localized training impacts. Clearing of areas for active military training resulted in loss of vegetative communities, melting of permafrost, and a reduction in wildlife habitat on approximately 10,000 acres by 1979 (USARAK 1979a). TFTA was relatively unaffected with the exception of clearings for airstrips and targetry. YTA was more affected by development (USARAK 1979a).

Military vehicles have been required to keep on roads since 1971, and in 1996 USARAK began efforts to counteract the cumulative effects of military training impacts by establishing the ITAM program. This includes monitoring and preventing erosion on training areas.

At DTA, soil disturbances were usually restricted to sites cleared for roads, vehicle training test loops, trails, clearings for airstrips and drop zones, and impact areas (USARAK 1980). Disturbances generally remained confined to already disturbed areas. By 1980, the commonly used areas had not experienced widespread wind or water erosion (USARAK 1980).

Current and Future Actions

USARAK mission-essential range improvement and upgrade projects could cause negative impacts to soils at FWA and DTA (Stout 2002a,b). Two additional ranges at YTA could be developed as well. Additional impacts from USARAK's mission essential and Air Force activities are expected to have minimal impacts to regional soil and permafrost. Most planned projects will occur on already disturbed areas, such as the cantonment area or impact areas. These projects are sufficiently separated (in time and location) from transformation activities to prevent additive or synergistic impacts to soil.

The area where construction is expected to occur for the Cold Regions Test Center Automotive Test Complex is underlain by shallow silty loams on terraces with approximately 25-50% permafrost, and construction would be designed to avoid permafrost as best possible (Stout 2003b). Soils under the construction sites (two buildings that cover about 8,000 square feet, 4.5 mile test track, and parking areas) would be disturbed. Soils could be polluted from spills of oils, lubricants and other materials, but any spill would be remediated.

Deployment of the Space and Missile Defense System at Fort Greely could result in cumulative impacts to soil resources. Construction activities will be located in the cantonment area, which has previously disturbed soils. Additional soil impacts may include compaction and erosion. Disturbance to soil and permafrost during construction would be minimized (SMDC 2000).

Infrastructure

Oil and Natural Gas

The continuation of Trans-Alaska Pipeline System operations would likely cause reduced vegetative cover, erosion, and siltation. Some melting of permafrost could also occur (BLM 2002a). Impacts would be localized and not result in synergistic regional effects. Future natural gas pipeline construction would disturb area soil and permafrost. Other gas and oil exploration projects would also negatively impact soil resources.

Electrical Transmission

Golden Valley Electric Association's construction of a new power line from Fairbanks to Healy would create cumulative impacts to soils, especially in the wetland areas of Tanana Flats. The soil disturbance from the project could change vegetation and hasten permafrost melt on Tanana Flats (Anchorage Daily News 2002).

Transportation and Communications

The construction of highways and roads has historically impacted soil and permafrost in the region. Development of highways would be expected to continue. Although engineers once built roads on permafrost without considering the impacts of melting, various insulation methods are now used to prevent warming from road use. However, the methods are not always successful. Future permafrost melting from road construction and use, in addition to the climate warming trend, is expected in the region.

Minerals and Mining Activities

Mining activities in the region are expected to contribute to regional soil impacts, based on the large scale of the projects. The development of the Pogo Gold Mine, approximately 35 miles north of DTA East, would involve the construction of mines and access roads, which may include disturbance to soil and permafrost (Baker 2000; EPA 2003). Other mines in the area include the Fort Knox and True North gold mines. Both are open pit mines. Large-scale vegetation removal and permafrost damage from these projects is assumed, and erosion is likely to result until areas are revegetated.

Land Management

State

A management guideline identified in the Tanana Valley State Forest Plan states that soil erosion will be minimized by restricting the removal of vegetation adjacent to streams and by stabilizing disturbed soil as soon as possible (State of Alaska 2001). The plan states that best management practices have been established to prevent adverse impacts from forestry operations on fish habitat and water quality. In addition, the portion along the Tanana River is designated as a special management zone specifically to protect waterways from erosion.

Federal

The BLM lands within the region of interest are relatively remote, and development is unlikely in these areas. However, these areas are subject to multiple use management and recreational impacts. These may contribute to measurable impacts to soil resources.

Use of Renewable Natural Resources

Soil resources could be susceptible to damage from timber harvest activities. The extent of past damage from these activities is not known. Use of ORVs has impacted area soils and permafrost in the form of erosion and rutting. The extent of past damage has not been quantified, but increased damage is expected.

Communities

Recreational Impacts

Soil resources in the region have been damaged from use from outlying communities. Recreational use on FWA may be damaging soils. There are over 100 km of ORV trails with open-water, stream-like channels on which all of the emergent vegetation and about 50% of the underlying mat have been destroyed (Racine et al. 1998). This effect on vegetation impacts soil and permafrost, compounding any damage USARAK may cause on Tanana Flats through training.

There is good evidence that if airboat trails are not used for a period for a few years, the mat will regrow, but since use begins in early summer and continues into the late fall, there is little chance for recovery in some areas. USARAK's new recreational use policy announced in the recent Integrated Natural Resources Management Plan states that much of the disturbed areas in Tanana Flats will be closed to motorized use unless frozen. Open waterways will remain open for use. These measures are meant to reduce recreational impacts on the area.

Urban Development

Growth of the Fairbanks North Star Borough is expected and increased urban development would result. Construction would impact soil until vegetation is reestablished. Permafrost may melt if development occurs in permafrost-rich areas, resulting in an irretrievable loss of vegetation and soils.

4.20.5.1.4 Surface Water

Military Activities

Past Actions on Army Lands

USARAK maneuver training has involved stream crossings on YTA, DTA, and TFTA (USARAK 1979a, b). TFTA training has occurred in winter, which prevents direct sedimentation impacts due to streambed disturbance. However, erosion at the crossing points may have led to sedimentation through runoff. In addition, weapons training involving explosive munitions may also have had impacts to surface water quality. However, water quality tests have shown no detectable quantities of munitions constituents in studies recently conducted. This indicates that any impacts would be ephemeral at the point and time of impact. Localized contamination from inadvertent chemical releases, such as petroleums, organics, and lubricants, may also have occurred (USARAK 1979a).

Current and Future Actions

Surface waters in interior Alaska are likely to be impacted from military activities, including USARAK, U.S. Air Force, Cold Regions Test Center Automotive Test Complex, and the Space and Missile Defense System. These all have the potential to alter surface water quality. The Cold Regions Test Center Automotive Test Complex would be designed to avoid impacts to Jarvis

Creek and its floodplain (Stout 2003b). In addition, some resource extraction, such as timber harvesting and mining, can alter surface flow or increase sedimentation. These impacts are generally short term.

Infrastructure

Infrastructure projects, including the Alaska, Richardson, and Parks highways and the Northern Intertie project, can affect surface flow by channelizing flow patterns or altering surface runoff rates by installing impermeable surfaces such as roadway. These impacts are long-term. Resource extraction projects, including the TAPS, Knox, True North, and Pogo gold mines all have an increased potential to significantly affect surface water quality

Use of Renewable Natural Resources

Some management practices do improve surface waters, such as managing for fish and game, or for public recreation. The state recreation areas and the White Mountains National Recreation Area all serve to maintain good water quality in those areas.

Communities

Community development can also affect surface waters. Community growth in the Fairbanks area leads to increased overland flow and direct runoff. Fairbanks growth may also decrease water quality due to non-point source pollution. These impacts are considered long-term due to the ongoing nature of such impacts.

4.20.5.1.5 Groundwater

Military Activities

Past Actions on Army Lands

Past impacts to groundwater on Army lands have involved weapons training (USARAK 1979a, b). Explosive munitions training on the TFTA and YTA impact areas has led to the presence of unexploded ordnance on USARAK impact areas. Chemical constituents from unexploded ordnance have the potential to leach through the soil to the aquifer, thereby affecting groundwater quality. However, studies conducted (Houston 2002; Ferrick et al. 2001) indicate that ambient conditions sharply curtail the probability of groundwater contamination from munitions constituents.

Current and Future Actions

Groundwater resources in interior Alaska may be affected by military activities, including activities and projects by USARAK, U.S. Air Force, the Cold Regions Test Center Automotive Test Complex, and possibly the Space and Missile Defense System. Construction by any of these can alter groundwater recharge regimes, and such impacts are local and long-term. In addition, disturbance and loss of permafrost can also alter local groundwater flow by increasing connectivity to lower groundwater sources. Military activities also have the potential to affect groundwater quality through munitions practice. These impacts can be long-term. The development and use of the Cold Regions Test Center Automotive Test Complex would not impact groundwater quality, although two wells (approximately 400 feet deep each) would be drilled.

Infrastructure

Infrastructure impacts to groundwater include extractive practices such as oil and gas exploration, extraction, transport, and mining and timber activities. The TAPS, Knox, True North, and Pogo gold mines all have an increased potential to significantly affect local groundwater quality. In addition, some resource extraction, such as timber harvesting and mining, can alter groundwater flow and recharge. These impacts may be short-term or long-term.

Additional infrastructure projects, including the Alaska, Richardson, and Parks highways and the Northern Intertie project, can affect groundwater flow by altering permafrost or altering surface recharge rates. These impacts are long-term.

Communities

Community development can also affect groundwater. Fairbanks community growth can lead to increased groundwater diversion for surface use, as well as decreased surface recharge to groundwater. Community growth might also affect groundwater quality due to increased pollution of groundwater. These impacts are considered long-term due to the ongoing nature of such impacts.

4.20.5.1.6 Wetlands (Issue C: Wildlife and Habitats, Issue D: Maneuver Impacts)

Military Activities

Past Actions on Army Lands

Military vehicles on interior USARAK lands have been required to remain on roads since 1971, but ORVs and snowmobiles often deviated from trails, leaving temporary trails. Scars from these trails were long-lasting in some areas (USARAK 1980) presumably due to damage to wetland areas. Military vehicle use was largely restricted to winter use because of impracticality, mechanical difficulties, and wetland damage. Any damage that did occur from vehicles on TFTA was long-lasting due to discontinuous permafrost (USARAK 1979a).

Current and Future Actions

U.S. Army range improvement and upgrade projects could cause negative impacts to wetlands at FWA and DTA (Stout 2002a,b). Approximately 324 acres of non-sensitive wetlands could be affected by the range upgrade on Main Post. Two additional ranges at YTA could be developed as well. Activities of the U.S. Air Force probably would not affect wetlands beyond the impact areas (USAF 1995).

Development of the Cold Regions Test Center Automotive Test Complex could impact wetlands, but the extent of impact will not be known until a specific site is selected (Stout 2003b). Note that the study area for the facility is covered by less than 10% wetlands (192 acres total wetlands). Impacts would be localized to roads, skid areas, and buildings, which would be a small fraction of the 192 acres.

Development of the Space and Missile Defense System at Fort Greely could result in cumulative impacts to wetlands (SMDC 2000). Wetland impacts could include filling, draining, and trenching of wetlands. Disturbance to wetlands would be avoided if possible. Such disturbance would be limited to the cantonment area of Fort Greely and lands at Clear AFS (SMDC 2000).

Most (79%) of Eielson AFB's 57,000 acres are classified as wetlands. Management policies and regulations ensure that wetlands permits are acquired before construction. Construction is designed so as not to damage wetlands at Eielson AFB.

Infrastructure

Oil and Natural Gas

The Trans-Alaska Pipeline System caused localized loss of wetlands during its construction. The continuation of pipeline operations would probably cause localized impacts to wetlands, but the extent of impacts would not spread (BLM 2002a).

Electrical Transmission

The Northern Intertie Project would impact about 980 acres of wetlands (BLM 1998).

Transportation and Communications

The construction of highways and roads has historically impacted wetlands in the region. Development of highways could be expected to continue, which would result in adverse impacts to wetlands. Mitigations and wetland regulations would help lessen wetland impacts.

Minerals and Mining Activities

Some wetlands have been affected by mining activity at Fort Knox and True North gold mines, although the extent of impact is not known. The development of the Pogo Gold Mine could cause disturbance to wetlands, especially due to construction of a 50-mile access road (EPA 2003).

Land Management

State

Goals of the Tanana Valley State Forest Management Plan and the Tanana Basin Area Plan are essentially identical: "maintain the hydrologic, habitat, and recreational functions of public wetlands." Land management decisions minimize or mitigate wetland impacts.

Federal

The BLM lands within the region of interest are relatively remote, and development is unlikely in these areas. However, these areas are subject to multiple use management and recreational impacts.

Use of Renewable Natural Resources

Wetlands could be susceptible from damage due to timber harvest activities and recreation, particularly through the use of off-road vehicles. The extent of damage from these activities is not known.

Communities

Recreational Impacts

Wetlands in the region are also damaged from development and activities from outlying communities. Recreational use on FWA is damaging sensitive wetlands. There are over 100 km

of ORV trails with open-water, stream-like channels on which all of the emergent vegetation and about 50% of the underlying mat have been destroyed (Racine et al. 1998). These activities could have negative cumulative impacts to wetlands on TFTA.

Urban Development

The Fairbanks North Star Borough is expected to grow by approximately 20% over the next 15 years. A proportional increase in urban development could be expected.

4.20.5.1.7 Vegetation

Military Activities

Past Actions on Army Lands

Prior activities on Army lands have impacted vegetation, primarily through maneuver training exercises, and construction of ranges and cantonment buildings.

By the late 1970s, roads and trails encompassed approximately 2,900 acres of these lands. In 1977, in preparation for a winter large training operation, about 1,500 acres were altered in order to clear areas for roads, drop zones, and camp sites (USARAK 1980). By the end of the decade approximately 10,000 acres had been cleared for drop zones and landing strips.

At DTA the impacts from military training and maneuvers were as great or greater than current levels. For example, by the late 1970s, DTA East had a system of permanent roads covering approximately 884 acres (USARAK 1980). Soldiers were required to stay on permanent roads beginning in 1971, which greatly curtailed further vegetation impacts from maneuvers. Drop zones encompassed about 1,900 acres, and 56,000 acres were designated as impact areas (USARAK 1980).

Total cantonment area acreage includes approximately 10,230 acres of USARAK lands, 4,470 of which are at FWA. Vegetative structure within cantonment has been heavily altered to accommodate construction of buildings, roads, and other infrastructure. In addition, training ranges on interior Army lands occupy approximately 6,500 acres, which require ongoing vegetative modification. Drop zones and assault strips occupy approximately 4,900 acres on interior lands. These areas must remain free of high-standing vegetation, which prevents the areas from progressing through successionary stages.

Current and Future Actions

Range improvement and upgrade projects and construction at the cantonment area cause some adverse impacts to vegetation at FWA (e.g., Stout 2002a, b). However, natural communities were altered previously during the 1940s and 1950s when the cantonment area was first developed (Nakata Planning Group 1987). Although additional construction projects would affect vegetation, the impacts to natural vegetation would be negligible.

Development of the two new ranges at YTA would result in altered vegetation and loss of forest community. The effects would be localized. Proposed range expansion projects at DTA would affect approximately 2,200 to 2,600 acres, primarily in low scrub or shrub-tussock vegetation. Taller vegetation within firing lanes would eventually die and be replaced by lower-standing growth forms (e.g., grasses and shrubs). Composition of plants at the ranges would not be altered significantly.

The Cold Regions Test Center Automotive Test Complex would affect lowland, low scrub vegetation. The impacts would occur at the construction sites of the test track, skids, and buildings, which would require clearing of vegetation and paving.

Establishment of the Space and Missile Defense System at Fort Greely would contribute about 100 to 120 acres of vegetation loss, but the effects would be localized (SMDC 2000).

The various improvement projects slated at Eielson AFB would affect small portions of the base, but the effects would be localized. Approximately 15,500 acres (27%) of Eielson AFB is designated as sustainable forest management, and degenerating impacts are not expected.

Infrastructure

Oil and Natural Gas

Construction of the Trans-Alaska Pipeline System in the 1970s caused alteration of plant communities. Additional future impacts could include erosion and cause changes in the structure and function of plant communities or higher levels of fugitive dust. Vehicular traffic during maintenance could result in soil compaction or maintenance of plant communities in a non-natural state.

Transportation

Major highways traverse approximately 450 miles of the interior Alaska region of interest. Assuming a 60-foot zone of impact, approximately 3,300 acres of land in interior Alaska have been removed due to highway development.

Electrical Transmission

Construction of the GVEA Intertie on Tanana Flats would affect about 600 acres of upland habitat in addition to 980 acres of wetlands (BLM 1998). The impacts are expected to be localized, and the preferred route would not affect extensive tracts of forested habitat (BLM 1998).

Minerals and Mining Activities

Several thousand acres of vegetation have been affected by mining activity at Fort Knox and True North gold mines. The development of the Pogo Gold Mine would cause disturbance to vegetation due to construction of a 50-mile access road and the mine itself. The Pogo Gold Mine Final EIS was made public in September 2003 (EPA 2003).

Land Management

State

The primary objective of the Tanana Valley State Forest is for multiple use management and utilization of timber resources. In addition to timber management, the guidelines for the forest include provisions for wildlife habitat management, grazing, and riparian area management. Forest, wildlife habitat, and watershed management are also strongly inherent in the Tanana Basin Area Management Plan (Appendix F). Some impacts to vegetation probably occur at Chena River State Recreation Area, which receives 150,000 visitors each year. Most impacts would result from snow machine and ORV use. Most of the area south of the Chena Hot Springs Road is closed to all vehicle use.

Federal

The BLM lands within the region of interest, including the Steese National Conservation Area and the White Mountain National Recreation Area, are multiple-use areas where some damage to vegetation occurs. The impacts are usually from off-road vehicles. However, these areas are relatively rugged and remote, and vehicle access is not widespread.

Use of Renewable Natural Resources

Vegetation could be susceptible from damage due to timber harvest activities and recreation, particularly through the use of off-road vehicles. The extent of damage from these activities is not known.

Communities

Recreational Impacts

Vegetation in the region is also damaged from development and activities from outlying communities. Recreational use on FWA is damaging vegetation and wetlands. There are over 100 km of ORV trails with open-water, stream-like channels on which all of the emergent vegetation and about 50% of the underlying mat have been destroyed (Racine et al. 1998). These activities could have negative cumulative impacts to vegetation on TFTA.

Urban Development

The Fairbanks North Star Borough is expected to grow by approximately 20% over the next 15 years. A proportional increase in urban development could be expected.

Other Issues

Invasive or pest species have the potential to result in widespread impacts to vegetation resources in the region. Fire is an important influence on plant communities. The risks and effects of fire are discussed in Section 4.8, Vegetation.

4.20.5.1.8 Wildlife and Fisheries (Issue C: Wildlife and Habitat)

Military Activities

Past Actions on Army Lands

Wildlife on USARAK lands, including FWA Main Post, TFTA, YTA and DTA, has been affected by military activity for decades. For example, during large operations such as “Jack Frost,” as many as 14,000 Soldiers would be in the field for Joint Training Exercises that involved choreographed weapons training, foot and vehicle maneuvers, and bivouac (USARAK 1980). The preparations and conduct of the operation would last nearly a full month. Large-scale training such as this would have affected the wildlife on Army lands. Although impacts were not quantified, the EIS states that moose, small mammals, and ptarmigan were probably impacted. Moose were observed to move away from troops, “then gradually move back into the area after the training exercise” (USARAK 1980).

By the late 1970s roads and trails encompassed approximately 2,900 acres of these lands. In 1977, in preparation for a winter large training operation, about 1,500 acres of habitat were cleared for roads, drop zones, and camp sites (USARAK 1980). By the end of the decade approximately 10,000 acres had been cleared for drop zones and landing strips. During training

exercises wildlife were disturbed by vehicles, helicopters and aircraft, people on foot, and noise from use of weapons and explosives.

At DTA the impacts from military training and maneuvers were as great or greater than current impacts. For example, by the late 1970s, DTA East had a system of permanent roads covering approximately 884 acres (USARAK 1980). Soldiers were required to stay on permanent roads beginning in 1971. Drop zones encompassed about 1,900 acres, and 56,000 acres were designated as impact areas (USARAK 1980). Wildlife were also disturbed by noise and disturbance from helicopters and explosives.

Current and Future Actions

USARAK mission-essential construction projects planned at the cantonment area of FWA may affect certain individuals or groups of urban wildlife, but probably would not affect any priority species at the population level (Stout 2002a, b). Likewise, the range upgrade and expansion on the Main Post would not impact priority species (Ellen Clark, personal communication 2003).

Of the priority species discussed in Section 4.9, range improvement projects at FWA, YTA, and DTA would not impact grizzly bear habitat, but could compromise about 1% of the preferred habitats of wolverines, wolves, and olive-sided flycatchers. Although 1% to 2% of current moose habitat could be impacted, range construction could create additional habitat. Range development could compromise about 3% of trumpeter swan habitat in these areas (Ellen Clark, personal communication 2003).

The range improvement projects and subsequent artillery firing at DTA could negatively affect bison that migrate through the battle area complex area, but maintenance of the battle area complex in an early seral state may also benefit bison. The noise could impact waterfowl and other birds in nearby ponds, but the effect of such training is not known. Development and use of the collective training range could affect portions of grizzly bear and sandhill crane habitat in North Texas Range. This area is already used for weapons training. No additional impacts are expected from use of this range to grizzly bears, sandhill cranes, or other species of wildlife (Stout 2002b).

Ongoing USARAK activities could negatively impact fisheries primarily due to habitat degradation or loss of water quality.

Development of the Cold Regions Test Center Automotive Complex could affect approximately 2,500 acres of early seral habitat (disturbed lowland scrub), much of which was burned in the 1999 fire at DTA. The site is within bison migration routes, moose concentration areas, and grizzly bear special interest area (Stout 2003b). However, effects of construction or operation of the proposed test complex on populations of mammals, birds, fish, or amphibians are not expected to be significant. There is the possibility of vehicle-wildlife accidents during testing, particularly high speed testing.

Infrastructure

Oil and Natural Gas

The Trans-Alaska pipeline affects wildlife populations by contributing to habitat fragmentation, alteration of natural habitat, increase of accessibility to remote areas, and obstruction of movements of animals (BLM 2002a). Exploration and development of oil and natural gas reserves in the Nenana and Tanana river basins could cause the loss, fragmentation, or pollution of habitat for birds such as waterfowl and raptors. Moose could be affected from habitat loss. The Trans-

Alaska pipeline could affect localized populations of fish, especially if oil spills were to occur on major rivers.

Electrical Transmission

Development and maintenance of the GVEA Intertie could affect migration routes of caribou as well as moose calving and concentration areas (BLM 1998). The project could affect fisheries habitat due to sedimentation and loss of water quality.

Transportation and Communications

Many species can be negatively affected from highways. The impacts range from avoidance due to habitat fragmentation or disturbance to direct mortality from vehicles. Traffic levels on the region's highways are relatively low (Section 4.17, Human Health and Safety). Construction of additional roads or highways could affect water quality and fish habitat.

Minerals and Mining Activities

Operation and development of the gold mines, including Pogo, Fort Knox, and True North, could result in cumulative impacts to wildlife populations. Issues of concern include habitat fragmentation and impacts to caribou and peregrine falcon nesting habitat. Likewise, localized fish populations could be impacted due to degradation of water quality.

Use of Renewable Natural Resources

Wildlife is managed by the Alaska Department of Fish and Game or the U.S. Fish and Wildlife Service (migratory birds and threatened/endangered species). The interior Alaska region of interest lies within Game Management Unit 20. A general background on the relative abundance of species and management for interior Alaska is provided in Section 3.9, Wildlife and Fisheries.

Land Management

State

According to the Tanana Basin Area Plan, over five million acres of state lands are designated primarily as wildlife habitat (Alaska Department of Natural Resources 1991). An additional six million acres have wildlife habitat as a co-designated resource category.

The 90,000-acre Delta Junction Bison Range lies south of the Alaska Highway and directly east of the DTA (Appendix A, Figure 3.9.d). The range was established in 1979 with the objectives of maintaining a free-ranging bison herd and altering bison movements to protect nearby agricultural lands (DuBois and Rogers 2000).

Federal

Maintaining wildlife habitat remains a priority on multiple use areas and conservation areas such as Steese Mountains Conservation Area and the White Mountains National Recreation Areas.

Communities

Recreational Impacts

The primary impacts occur from recreational hunting and off-road vehicles (ORVs). Hunting has an impact on the behavior and populations of wildlife. However, populations of game animals are managed for sustainability. If wildlife populations decline, then managers would alter the harvest

to ensure that populations are sustainable. ORVs can impact certain species (including priority species such as moose, caribou, and waterfowl), especially during critical breeding and rearing seasons or migration. Monitoring of fisheries populations reduces the likelihood of over-harvest and resulting declining fish populations.

Urban Development

The Fairbanks North Star Borough is expected to grow by approximately 20% by 2020. Development of housing and infrastructure will be required, and this could impact some wildlife and fish populations in the area.

4.20.5.1.9 Threatened or Endangered Species and Species of Concern

Military Activities

Past Actions on Army Lands

The peregrine falcon was an endangered species in Alaska during the 1970s (it was delisted in 1999.) Helicopter noise at FWA was identified as a possible cause of disturbance to peregrine falcon nests on Salcha Bluff (USARAK 1979a). On Fort Greely, noise from helicopters, live fire, and equipment testing was identified as a possible impact to peregrine falcons that feed in the marshes and along the waterways of the withdrawal area. No confirmed nesting or feeding grounds were identified although two eyries were believed to be located between Big Delta and Fairbanks (USARAK 1980).

While bald and golden eagles were not endangered in Alaska, they were protected by federal law. Nesting bald eagles and nesting golden eagles were found in the areas of FWA and Fort Greely, and excessive aircraft noise could frighten nesting birds or cause aggressive responses (USARAK 1979b, 1980).

Current and Future Actions

There are no known federally endangered or threatened species on USARAK lands. However, management policies exist and are outlined in the Integrated Natural Resources Management Plans for each post (USARAK 2002e,f,g). Use of Army lands could contribute to cumulative impacts to plants and animal species of concern. Mission-essential construction projects would not affect any species of concern (Stout 2002a, b, d). The range upgrade and expansion projects could compromise habitats of forest-dwelling bird species of concern at YTA and DTA.

Activities of the U.S. Air Force could affect some species of concern, although low-flying aircraft do not appear to affect the reproductive rates of forest birds (Bartecchi 2002). Development of the Space and Missile Defense System could affect localized populations of wildlife, including the olive-sided flycatcher, but the impact would be minimal at the regional or ecosystem level (SMDC 2000).

Infrastructure

The Trans-Alaska pipeline may impact plants and wildlife due to habitat fragmentation, alteration of natural habitat, increase of accessibility to remote areas, and obstruction of movements of animals (BLM 2002a). However, the impacts are localized and are not likely to affect species of concern at the population level.

The exploration and development of natural gas resources could impact some plant and animal species of concern. Types of impacts include habitat loss and nest/breeding area avoidance (Alaska Department of Natural Resources 2002). However, mitigations exist to reduce impacts.

Highways and roads also contribute to habitat loss and fragmentation; however, the density of roads and highways in interior Alaska is relatively low.

Development and maintenance of the Golden Valley Electric Association Intertie could cause some adverse impacts to wildlife species of concern, including raptors and the olive-sided flycatcher (BLM 1998). Impacts to plant species of concern are unlikely.

Development or operation of large gold mines (e.g., Pogo, Fort Knox, and True North mines) could result in cumulative adverse impacts (EPA 2003). Issues of concern include impacts to peregrine falcon nesting habitat near mines.

Land Management

The state's policy is to manage lands in a manner that is consistent with federal and state threatened and endangered species acts, and the state recognizes the status of species of concern in Alaska (Alaska Department of Natural Resources 1991, 2001). Likewise, federal land agencies manage their lands to ensure protection of threatened, endangered, and species of concern.

Use of Renewable Natural Resources

See Land Management, above. State and federal land management agencies protect threatened and endangered species, and employ management practices to conserve and monitor plant and wildlife species of concern.

Communities

Continued growth and development in interior Alaska could affect some populations of plants and wildlife, including species of concern. Likewise, disturbance and habitat loss from recreational activities could affect some populations, although the extent of the impact is not known.

4.20.5.1.10 Fire Management (Issue E: Impacts to Fire Management)

Military Activities

Past Actions on Army Lands

Large fires that have occurred on FWA and DTA are listed in Appendix E. The 1980 FWA EIS describes the use of the National Fire Danger Rating System to restrict military activities when the fire danger was high (USARAK 1980). The decision to "control" or "let burn" was made on a case-by-case basis. The importance of fire for the Alaskan interior ecosystems was recognized; however, military fires were usually quickly controlled.

Current and Future Actions

USARAK mission-essential construction, including the multi-purpose training range and infantry squad battle course, are planned for FWA. They would be located between Main Post and the Tanana River. These ranges are described as having risk due to the availability of fuels and past fire behavior (Stout 2002a). The ranges are expected to be an additive cumulative impact to fire management in the area.

On DTA, the proposed combined arms collective training facility and battle area complex locations have not yet been selected. If prescribed burning is proposed under mitigation for the DTA range expansion projects, short-term adverse impacts to air quality would result and a permit from ADEC would be required if burning would exceed the annual permit limit of 40 acres.

The Ground Base Missile Defense EIS did not identify fire management as an issue of concern or as a potential impact.

Infrastructure

Electrical Transmission

The GVEA Intertie is considered to be an additive minor impact. Since TFTA is classified as a Limited management option area, the main concern is not keeping the land from burning but protecting structures the military has there. The 2001 Survey Line Fire was caused by the construction of the power line corridor (Appendix A, Figure 3.11.d).

Highways and Railways

Transportation corridors break up contiguous stretches of forest and could act as fire breaks for small fires. They also provide access for fire management personnel. The extension of road networks, however, encourages development farther away from town centers. This new development increases the need for fire suppression and increases the risk to personal property.

Land Management

Fire management on public land in Alaska is guided by the fire management plans developed by the Alaska Interagency Fire Management Council. The Alaska Wildland Fire Management Plan, which is reviewed each year, designates wildland fire management areas and allows land managers and owners to establish fire management options according to land use objectives and constraints. The Alaska Wildland Fire Management Plan also established four fire management options: Critical, Full, Modified, and Limited. Land managers may select among these options for different parcels of land based on evaluation of legal mandates, policies, regulations, resource management objectives, and local conditions, and areas may be reclassified based on annual review (Alaska Wildland Fire Coordinating Group 1998). This interagency coordination recognizes the cumulative impacts affecting fire management and ensures resources will continue to receive an appropriate level of protection with available firefighting resources.

Use of Renewable Natural Resources

While timber harvesting in general would not necessarily reduce the risk of fire, proposed thinning and prescribed burn projects designed to reduce dense fuel buildup would be a beneficial impact to area fire management.

Communities

Growing communities increase wildfire risk because more people and property are at risk. The Fairbanks area population has increased 6.18% from 1990 to 2000, with more people moving into the wooded areas around Fairbanks. This creates a larger urban-wildland fire interface problem. Existing and proposed housing sub-divisions border FWA's Main Post area. Some areas contain highly flammable black spruce and would need to be treated. This may be considered a synergistic impact because of an exponential increase in impact.

4.20.5.1.11 Cultural Resources (Issue F: Training Impacts to Cultural Resources)

Military Activities

Past Actions on Army Lands

Past activities on USARAK lands may have impacted cultural resources. Land-disturbing activities such as range construction and modification, maneuver training, and creation of roads and trails for maneuver training may have disturbed or destroyed undocumented or undiscovered archaeological sites. This includes past disturbance to gravesites and other cultural resources on and around Donnelly Dome. Unsympathetic uses of the buildings and structures that make up the Ladd Field National Historic Landmark, including modification or demolition of relevant structures, would also have impacted the integrity of the landmark.

Current and Future Actions

USARAK activities and projects such as training practices and mission-essential construction have a high potential to affect cultural resources, including the Ladd Field National Historic Landmark (NHL). Any demolition of contributing buildings to the landmark, construction of buildings within the landmark, or unsympathetic renovation or alteration of those buildings that contribute to the landmark, would cause impacts to the NHL, possibly leading to loss of the landmark designation.

Cultural resource impacts from Eielson Air Force Base, if any, will probably have already occurred with construction of the base. Given its location between the Yukon-Tanana Uplands and the Tanana River, it is possible that the site contains or contained prehistoric cultural sites. However, most of Eielson's area is classified as wetlands, which are less likely to contain such sites. Previous archaeological surveys have not found sites within Eielson Air Force Base. Upon completion of an ongoing buildings survey, a Cold War historic district will be defined along the base's flight line.

Development and construction relating to the Space and Missile Defense System at Fort Greely has a slight potential to impact cultural resources. Most of the cantonment area of the fort has been surveyed or previously impacted. A Cold War historic district does exist and is presently covered by a Memorandum of Agreement. However, that agreement will expire shortly and any new undertakings to the district will need to address affects it may have on the historic characteristics that make the district eligible for listing in the National Register of Historic Places. Construction in the southeast corner of the designated missile defense area probably has the highest chance of leading to cultural resource impacts.

Infrastructure

Oil and Natural Gas

Given its length and the variety of terrain it crosses, the Trans-Alaska Pipeline System impacted cultural resources during its construction stage. Ongoing maintenance and use are unlikely to lead to cumulative impacts to cultural resources. Exploration for and extraction of oil or natural gas, such as within the Nenana Basin, could impact cultural resources in that area. While direct impacts would be localized, they would affect the understanding of cultural resources on a regional scope.

Transportation and Communications

The construction of the Parks, Richardson, and Alaska highways, as well as the Alaska Railroad, probably impacted regional cultural resources, given the overall acreage affected by construction of these corridors. Further development of highways and roads is expected, and these have the potential to impact the region's cultural resources.

Minerals and Mining Activities

Mining activities have a potential to affect cultural resources. Depending on the type of mine and the amount of road necessary to access each, mines vary in their likelihood of affecting cultural resources. Mining activities may affect older mining landscapes and resources that are eligible for listing in the National Register of Historic Places. Location and acreage of surface disturbance are the factors most likely to influence cultural resources impacts.

Land Management

State

The Tanana State Forest Plan and the Tanana Basin Area Plan both have the potential to impact cultural resources. Extractive activities such as timber harvest or mining would probably require resource surveys to evaluate project areas and identify cultural resource sites. Management for other purposes, such as fish and wildlife or possibly limited recreation, could serve to protect cultural resources across large areas of these properties.

Federal

The BLM lands within the region of interest are remote and are considered to be at or close to pristine. Therefore, cultural resources are well protected in these areas when such areas are not leased for mineral extraction activities.

Use of Renewable Natural Resources

Timber harvesting, as with other large-scale ground disturbances, has the potential to affect cultural resources within the region of interest, as stated above. Hunting and fishing activities have a very slight potential to impact cultural resource sites, as such activities may involve use of off-road vehicles to access hunting or fishing areas. Fishing activities centered around lake margins offer the highest potential for disturbing cultural resources.

Communities

Fairbanks, Big Delta, and Delta Junction growth and development have the potential to impact cultural resources. Population growth would lead to increased use of the surrounding lands, increasing the risk of damaging undocumented cultural resource sites. In addition, agricultural practices requiring ground disturbance, such as farming, may impact cultural resource sites. Theft of items from cultural resource sites can become an issue when such sites become known. Urban development also has a great potential to disturb and destroy cultural resource sites, both historic archaeological sites and historic buildings/structures, with no required documentation of any such sites.

4.20.5.1.12 Socioeconomics

There are numerous construction projects planned that would benefit the interior regional economy through employment, direct material expenditures, and non-personnel expenditures.

These construction expenditures would significantly affect the region through direct employment, the payment of wages, and purchase of materials. It is expected that construction would also provide significant indirect economic development.

Military Activities

Past Actions on Army Lands

At its height, the total population at Fort Greely was roughly 3,000, including military and civilian employees and dependents, in the 1970s. The economy of Delta Junction was closely tied to that of the base (USARAK 1980). As part of the Base Realignment and Closure process, the number of uniformed military personnel was dramatically reduced in the late 1990s to 55 civilians and 11 military (Department of the Army 1999). Troops were transferred to FWA while training exercises continued to be conducted on DTA. The aggregate loss of uniformed and non-uniformed personnel significantly impacted the region's economy.

In the late 1970s, the total population at FWA was 7,600, including military and civilian employees and dependents on and off post. In general, town-post relations were considered excellent by both sides. At the time, the total population of Fairbanks was 45,000, representing more than 15% of the state's population. FWA employed over 3,200 people, including 500 civilians (USARAK 1979a). The 172nd Infantry Brigade and elements of the 222nd Aviation Battalion were moved from FRA to FWA to make room for 7,400 new military personnel at FWA between the years 1985-1987. Including dependents, this increased the total population of Fairbanks by about 16,670 (Department of the Army 1984). The region experienced increased employment and resulting increases in personal income. However, increased demand placed stress on housing, schools, public services, and social services until the region's economy was able to stabilize.

Current and Future Actions

Planned mission-essential construction activities would provide significant beneficial impacts to the regional economy. The projected program amount is estimated at $377.6 million for the interior Alaska region. Construction would begin in 2002 and is expected to be complete in 2007.

The interior region (including Clear, Nenana, Fairbanks and Delta Junction) will significantly be affected by construction of the Space and Missile Defense System, currently underway. The total construction cost for the projects is estimated to be $1.2 billion over the five-year construction period.

Delta Junction in particular will benefit from the conversion of the old Fort Greely base to the Space and Interceptor and Battle Management Control. Construction will span a five-year period beginning in 2002, employ 400 workers, and cost $125 million per year. The construction expenditures will significantly affect the Delta region through direct employment and purchase of materials. The project is also expected to have an indirect effect through the generation of an additional $62 million per year during the construction period. Once the site is operational, it is expected to provide year-round employment for 360 workers.

Construction at Clear Air Force Station is projected to have a duration of five years, employ 400 workers and cost $122 million per year. These construction expenditures will significantly affect the region through the payment of wages and purchase of materials. It is expected that the project will also provide indirect economic development of $60 million per year of construction. After the site becomes operational it will employ 255 workers year-round.

Infrastructure

There are also several non-military construction projects planned. In the oil and natural gas industry this includes the planned Trans-Alaska Pipeline System (TAPS) Renewal and proposed natural gas pipeline; in the mining industry, the Pogo Gold Mine; and in the transportation industry, the planned Alaska Railroad Corporation intermodal facility and depot, and the Golden Valley Electrical Authority Northern Intertie transmission line (currently underway).

Energy Demand

The present central heating and power plant rated plant output at FWA is 22 megawatts (MW). Coal is delivered to the plant by rail from the Usibelli Coal Mine. The coal usage is reported as approximately 450 tons per day in the summer, and 800 tons per day in the winter. Turbine generators deliver power to a 12.47 kilovolts (kV) electrical distribution system. The 12.74 kV system consists of two switchgear line-ups, 10 outgoing distribution circuits, one tie circuit to Golden Valley Electric Association's 7.5 MVA transformer, and three circuits supplying the plant auxiliary loads at 2400-volt and lower voltages. This output would be expected to meet the demand for power for SBCT and other future actions on or near FWA.

The central heating and power plant at DTA is located on the Main Post of Fort Greely, which has been transferred to National Missile Defense. DTA facilities requiring central heating are supplied by the existing infrastructure at Fort Greely. Electrical power requirements at DTA are met through a combination of power supplied by the Golden Valley Electric Association (GVEA) and on-post generators run by National Missile Defense personnel. This output would be expected to meet the demand for power for SBCT and other future actions on or near DTA.

Natural Gas Pipeline

By far the largest economic development project in Alaska's future is the proposed natural gas pipeline that would most likely follow the existing oil pipeline from Prudhoe Bay to Fairbanks and then east through Delta Junction and on into Canada. The peak construction period should be concentrated in a two year window. This project has had widely varying cost estimates but will be in excess of $15 billion and employ 10,000 pipeline workers at its peak.

Construction of the pipeline would result in a booming economy, especially if it occurred during any transition to higher levels of military employees. While nowhere near the impacts associated with the original oil pipeline are expected, wages and prices of virtually all commodities would be increased in comparison to present levels. Increased pressure on housing and public services would be observed, but a booming economy would bring much greater benefits than costs.

TAPS Right-of-Way Renewal

The regions surrounding the pipeline corridor are expected to continue to be significantly impacted by TAPS. The identified impacts include two general areas: continued moderate economic growth for communities near the pipeline corridor and a general decline in State of Alaska income derived from TAPS operations.

Pogo Gold Mine

Tek-Pogo Inc. has planned to develop a large gold mine in a remote area 38 miles northeast of Delta (EPA 2003). The mine would include on-site vat leaching milling processes producing 500,000 ounces of gold per year for approximately 12 years. The Pogo gold mine is currently in the initial staging process. Its EIS indicates an estimated construction cost of $250 million,

resulting in an estimated total economic impact to the Delta and Fairbanks communities of $495 million. During the production stage, the mine will employ 385 personnel.

Communities

Recreational Impacts

Recreational demands will probably increase in proportion to population growth. Fish and game are managed in Alaska such that cumulative impacts will not bring about reductions in the total quantity of fish and game available for harvest. Instead, increases in the numbers of sport fishers and hunters could cause diminished success rates for existing sportsmen. The more important factor for recreation is continued access to military lands as discussed in Section 4.14, Public Access and Recreation. Additional cumulative affects on access are not anticipated.

Economic Development

Due to the maturation of the Fairbanks economy, the relative cost of living has moderated greatly in comparison to previous decades. The arrival of larger retail stores has provided more choices and lower prices for consumers. Much of this market transition has already taken place but further gains are expected as more years of stable economic activity pass, especially in the interior region.

4.20.5.1.13 Public Access and Recreation (Issue A: Access, Issue C: Wildlife and Habitat)

Military Activities

Past Actions on Army Lands

Past military activities have impacted public access and recreation due to permanent closure of some areas such as impact areas, which are off-limits to access, and temporary closures of USARAK lands for maneuver training purposes (USARAK 1980). These activities, which continue to impact public access and recreation, would have curtailed public use. In the past, construction of roads and trails on Army properties would have led to beneficial impacts to public access and recreation by increasing the amount of Army lands feasibly accessible for recreational purposes. In addition, damage to high-value wetlands within TFTA from non-military vehicles has led to creation of the Recreational Impact Study Areas, which are closed to all access for the duration of the study period.

Current and Future Actions

Ongoing USARAK activities, including training and range construction and expansion, are expected to impact public access and recreation. Military training requires access closures to ensure training viability and public safety. Impact areas must remain permanently off-limits to public access. In addition, USARAK's new policy regarding public access on wetlands will impact off-road vehicle access on much of TFTA during non-winter months.

Other military activities may also impact public access and recreation in the area. Eielson Air Force Base may close access to or through its property, which would affect access routes to YTA.

The Space and Missile Defense System at Fort Greely is unlikely to affect public access and recreation in the area. The area designated for the missile defense system contains the cantonment area and very little surrounding land. Access along 33-Mile Loop will not be affected.

Infrastructure

Oil and Natural Gas

Activities involving oil and natural gas exploration and transport are not likely to affect public access and recreation. Recreational values may decrease with the presence of transport systems such as TAPS. However, such impacts are minor and local. In addition, such activities may involve creation of new roads or trails, which would allow for broader public access and recreation.

Electrical Transmission

The Northern Intertie Project is not expected to significantly affect public access and recreation. Access may become easier along the intertie right-of-way, expanding the viable access and recreation area.

Transportation and Communications

The Parks, Richardson, and Alaska highways all serve to improve public access throughout the region. These provide the most efficient ground transport to and through interior Alaska. Further development of roads and highways is expected to continue and will improve public access.

Minerals and Mining

Mining activities, due to their remote location, tend to improve public access within the interior region. Most mining projects require construction of a road to access the project site. These roads increase the amount of wild space potentially available for public access and recreation.

Land Management

State

The Tanana Valley State Forest Plan and the Tanana Basin Area Management Plan both include management policies and areas designated for public access and recreation. However, both also contain management areas and policies that may conflict with public access and recreation, such as agriculture, fish and wildlife habitat, and other priorities. These plans may limit some forms of public access and recreation, and it may limit all access within certain areas.

The state recreation areas are specifically managed to improve public access and recreation within the region. These provide over 260,000 total acres for public use.

Federal

The White Mountains National Recreation Area is managed by the BLM for recreational purposes and is considered to be in almost pristine condition. The Steese National Conservation Area is open to low-impact human activities, including public access and recreation. These areas comprise a total of 2.4 million acres.

Use of Renewable Natural Resources

Public access and recreation are affected by renewable resource extraction. Hunting and fishing are considered activities related to public access and recreation. Management of public lands within the region will promote long-term fish and game stability. Timber harvest practices have

the potential to negatively affect wildlife while at the same time creating new access trails for public use.

Communities

Community growth and development may adversely affect public access and recreation. Private land ownership and development may lead to decreased access and recreational opportunities. The population of the Fairbanks North Star Borough is expected to increase by 20% over the next 15 years. Fairbanks area development, including the outlying areas, is likely to lead to increased numbers of recreationalists, which can lead to crowding in some areas and may force access and recreation farther out to more remote areas. In addition, population and community growth may lead to decreased wildlife populations in that area.

4.20.5.1.14 Subsistence

Military Activities

Past Actions on Army Lands

Since 1980, subsistence has been protected by federal law under the Alaska National Interest Lands Conservation Act (ANILCA). Section 810 of ANILCA requires all federal agencies to evaluate the effects of their actions of subsistence uses and needs. A Section 810(a) analysis was completed for the Legislative Land Withdrawal EIS (USARAK 1999a). The analysis found no significant adverse effects on the customary or traditional subsistence uses of withdrawn lands on FWA and Fort Greely (now DTA).

Current and Future Actions

Ongoing USARAK activities, including training and range construction and expansion, are expected to impact access. Military training requires access closures to ensure training viability and public safety. Impact areas must remain permanently off-limits.

Other military activities may also impact access in the area. Eielson Air Force Base may close access to or through its property, which would affect access routes to YTA.

The SMDC activities at Fort Greely are unlikely to affect access outside of the cantonment area. Access along 33-Mile Loop would not be affected by SMDC.

Infrastructure

Infrastructure projects and extractive practices that may affect fish and wildlife populations in the area also therefore affect subsistence. The TAPS, oil and gas exploration, and mining activities all have the potential to impact subsistence through impacts to fish and game species.

Additional transportation development may also influence game populations by fragmenting the ecosystems. Caribou are most likely to be affected by habitat fragmentation.

Use of Renewable Natural Resources

Use of renewable natural resources, including hunting, fishing, and timber harvests, may affect subsistence. Non-subsistence hunting and fishing place increased pressure on existing fish and game populations, essentially thinning the number available for sustainable harvest by subsistence practitioners. Timber may affect fish and game habitat.

Communities

Community issues, such as population growth, urbanization, and development, may also affect subsistence. Greater populations lead to greater impacts to local resources, including fish and game species. Habitat fragmentation, increased predation, and decreased habitat area are all possible with growth of the Fairbanks area.

4.20.5.1.15 Noise

Military Activities

Past Actions on Army Lands

Noise impacts have occurred on Army lands in interior Alaska for decades (see USARAK 1980). Typical background noise in these areas ranges from 20 to 30 dBA. Use of weapons can temporarily increase noise levels to 112 to 190 dBC. Helicopters at 250 feet in elevation are about 95 dBA. Nearby vehicles would create 71 to 95 dBA. Most construction occurred on cantonment areas at FWA Main Post or DTA. Long-term noise levels (day-night levels) could range from 67 to 71 dBA, depending on the size of the project. Records of noise complaints were not maintained.

According to USARAK (1980) noise impacts from large training exercises such as operation "Jack Frost" were short term and did not cause a large impact to humans or wildlife. During the actual week of the exercise, approximately 660 flights from fixed-wing aircraft were recorded, 2,200 helicopter flights, 700 user days of snowmobiles, 7,000 user days of vehicles, and 48 user days of tractors/caterpillar vehicles (assuming six hours/day of use).

Current and Future Actions

Construction of ranges and structures at FWA or DTA will contribute to short-term impacts to the noise environment. Noise from these projects would be heard off post, but the decibel level would not be sufficient to create an unsafe noise environment.

Noise contours around the Collective Training Facility would expand, but would not extend off post. Noise levels would be "consistent with current noise levels" (Stout 2002b).

Noise levels from U.S. Air Force training would occur from aircraft landing and taking off at Eielson Air Force Base, low flights while approaching impact areas, and weapons use in impact areas. Eielson Air Force Base does receive off-post complaints regarding noise (USAF 1995). In 1993, approximately 20% of 216 people who lived within the 65-69 dBA zone adjacent to the base had complained about noise levels. However, the Air Force has implemented mitigation measures that reduce the impacts of noise to the environment (USAF 1995).

Development of Cold Regions Test Center Automotive Test Complex would create temporary construction noise and testing operations noise (Stout 2003b). During construction, noise levels would increase in the immediate vicinity of the construction. Noise would also be created by the operation of vehicles being tested. This noise would be similar to that generated on the Richardson Highway by vehicle traffic. Noise from the facility would not significantly affect lands off DTA. The area would remain a Zone I. Construction of the Space and Missile Defense System at Fort Greely will cause short-term, highly localized effects, and any effects following construction will be negligible (SMDC 2000).

Infrastructure

Oil and Gas

The Trans-Alaska pipeline contributes to noise levels, mostly from the use of airplanes and helicopters used to monitor the pipeline (BLM 2002a).

Electrical Transmission

The Golden Valley Electric Association's Intertie contributes minimally to noise levels during the construction phase. The effects will be short term.

Transportation and Communication

Noise from transportation (highways and airports) contributes to the noise levels in the communities of Alaska. Noise levels at Fairbanks International Airport are probably the most noticeable. Considering the expanse of interior Alaska and the relatively short distance that sound is carried, noise impacts from highway activities are not severe.

Communities

Noise from recreational activities (especially snow machines and off-road vehicles) also contributes to noise levels in the region. The most pronounced effects could occur to certain wildlife species that might be sensitive to noise (e.g., ungulates, bears, and some furbearer species).

4.20.5.1.16 Human Health and Safety (Issue B: Traffic)

Military Activities

Past Actions on Army Lands

Past human health and safety impacts on interior USARAK lands would involve use of explosive munitions, convoy use of public roadways, and inadvertent releases of hazardous materials (USARAK 1979a). Unexploded ordnance would have occurred at roughly the same or higher relative frequency as current day (i.e., at or above 3.5% of ordnance fired). Unexploded ordnance would have been fired onto the existing impact areas; therefore, past human health and safety risks from unexploded ordnance are considered low due to the access restrictions placed on the impact areas as off-limits.

Convoy use of Alaska highways and other public roadways would have had human health and safety impacts due to traffic congestion and accident risks. Troops would have convoyed from cantonment areas to training areas, particularly from FWA and FRA to YTA and Fort Greely (now DTA). Finally, inadvertent releases of hazardous materials, including petroleums, oils, lubricants, and solvents, would have had the potential to impact human health and safety if such releases affected locally populated environments or drinking water. Contaminated sites, primarily within the FWA cantonment area, indicate the location of past releases (Appendix A, Figure 3.17.a).

Current and Future Actions

USARAK activities are expected to affect human health and safety. Ongoing training activities are expected to require military convoys to training areas, and these would continue to affect local traffic during convoy operation. Selection of Alternatives 3 or 4 would lead to greater convoy frequency and size. Training activities also include use of ordnance, which would continue to lead

to unexploded ordnance risks. However, all unexploded ordnance is contained within the impact areas, which are off-limits to public and most military access.

Establishment of the Space and Missile Defense System at Fort Greely might also increase the risk to human health and safety in that area, due to the wartime risk associated with housing an intercontinental defense site.

Infrastructure

Oil and Natural Gas

Oil and gas transport and refining activities have a slight potential risk to human health and safety in the area, due to the potential to impact local surface water and groundwater. Inadvertent releases from TAPS could release oil into the local environment.

Transportation and Communications

The Parks, Richardson, and Alaska highways significantly affect human health and safety. As the primary ground-based transportation network in the region, these highways serve to ameliorate human health issues by allowing ambulance service between hospitals and remote areas. However, traffic risks increase along these highways, particularly during winter months.

Minerals and Mining Activities

Mining activities, such as the Fort Knox, True North, and Pogo gold mines, have a very slight potential to affect regional human health and safety. Although mining operations often utilize quantities of hazardous materials, given their often remote locations, any inadvertent release into the environment would be diluted or dispersed before nearing human habitation.

Land Management

State, federal, and native land management policies within interior Alaska are not expected to directly affect human health and safety.

Use of Renewable Natural Resources

Human health and safety risks are associated with some renewable resource use, such as hunting and fishing. However, risks are often assumed voluntarily and thus are not analyzed as significant impacts to regional human health and safety.

Communities

Population growth and development within the Fairbanks North Star Borough may affect human health and safety. Increases in pollution, such as carbon monoxide and particulate matter, as well as formation of ice fog from heat and power generation, can all contribute to increased levels of human health and safety impacts, such as decreased regional health and poor driving visibility. Area surface water and groundwater may also experience increased pollution. Increases in population and development also lead to increased traffic levels on existing roadways.

4.20.5.1.17 Environmental Justice

Military Activities

Past Actions on Army Lands

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was signed on February 11, 1994, directing federal agencies to identify and address any disproportionate environmental effects of federal programs or activities to minorities and low-income populations. The EO identifies the importance of data collection, research, and analysis, particularly with respect to cumulative exposures to environmental hazards. Although the EO also provides for agencies to collect, maintain, and analyze information on patterns of subsistence consumption of fish, vegetation, and wildlife, the U.S. Army has only recently begun implementing programs to evaluate environmental justice impacts.

Current and Future Actions

Ongoing mission-essential USARAK activities such as construction of ranges and structures, as well as continued use of training lands, may threaten cultural resources associated with Alaskan Native groups.

No environmental justice issues have been identified with the development of the Space and Missile Defense System at Fort Greely (SMDC 2000) or ongoing Air Force activities.

Infrastructure

Oil and Gas

Andex Resources has been granted license by the Alaska Department of Natural Resources to begin explorations for oil and gas resources in the Nenana Basin. The license to explore state-owned lands covers approximately 483,000 acres, but the area explored will include lands owned by Doyon, Inc. and two village corporations (Alaska Department of Natural Resources 2002). Although it is difficult to predict the success of the exploration activities, both positive and adverse impacts from exploration itself may be felt by the Native villages of Nenana and Minto. However, these communities, which may experience the impacts to subsistence activities and cultural resources, are not within the region of influence for USARAK transformation.

An environmental impact statement for the Pogo Gold Mine has not yet been released, but due to its location, this project may create minor to moderate impacts to traditional subsistence and cultural areas of local Tribes.

Communities

Steady population growth in the Fairbanks area may increase the level of recreational hunting and fishing activities, thereby putting pressure on minority and low-income populations dependent on subsistence.

4.20.5.2 South-Central Alaska/Anchorage Area

4.20.5.2.1 Air Quality

Military Activities

Past Actions on Army Lands

In 1984, emission sources on FRA included a central heating and power plant consisting of four coal-fired stand-by boilers and four natural gas-fired boilers; an auxiliary generation plant with five diesel engines; vehicular exhaust from on-post traffic, motor parks, airfield operations, and several other minor sources. Half of the boilers on FRA were in compliance with state and federal standards and were upgraded (Department of Army 1984).

Current and Future Actions

Currently planned mission-essential projects at FRA would contribute either minor negative or beneficial impacts to air quality. All projects are found to be below PSD thresholds (Section 4.2, Air Quality.) The Honeywell Heating Plant Decentralization Project would benefit air quality because it would reduce NO_x, SO_x, and CO emissions.

Figure 3.2.a, Appendix A, shows that CO concentrations have been declining in Anchorage and this trend is expected to continue (Municipality of Anchorage 1999). Eagle River has not exceeded NAAQS for particulate matter since 1987. If this trend continues, then overall cumulative impacts would be beneficial to air quality.

Infrastructure

Construction of the Knik Arm Bridge could affect local air quality, both during the construction phase as well as after completion. Increased traffic and development in the Matanuska-Susitna Borough, as well as the Anchorage area, could lead to a slight, long-term decrease in air quality.

4.20.5.2.2 Geology

Small mining operations are located throughout the state. USARAK has not identified any impacts to geology associated with transformation activities (Section 4.3, Geology Resources), so it would not contribute to any regional cumulative impacts to geology.

4.20.5.2.3 Soil Resources (Issue D: Maneuver Impacts)

Military Activities

Past Actions on Army Lands

Effects of military missions on soils primarily have resulted from munitions impacts and maneuvers. In 1994, USARAK began efforts to counteract the cumulative effects of military training impacts by establishing an integrated ITAM program.

Impact damage occurs within 2,195 acres of designated impact area in Eagle River Flats (ERF). The most severe and widespread damage from maneuvers has occurred under conditions where soil has become saturated either by excessive rainfall during summer or during and immediately after break-up (usually in April) when the winter snow pack is melting.

Damage has included rutting and vegetation destruction from cross-country travel. On secondary roads, damage has resulted from deep rutting and liquefaction of silty materials underlying roadbeds. Damage on combat trails has been primarily due to rutting.

In bivouac areas, ruts form under wet conditions where vegetation has been removed or destroyed. Other less severe damage in maneuver areas resulted from training activities that involve routine ground disturbance and damage or destruction of vegetation. Repeated use of firing points and bivouac sites often resulted in almost complete removal of shrub vegetation by heavy vehicular traffic. Earthmoving activities associated with training often resulted in areas denuded of vegetation that have been difficult to restore. Some examples of these are open foxholes and tank traps.

Impacts associated with maneuver training in winter have resulted from using heavy equipment to clear snow from trails and bivouac areas. Often, grader and dozer blades were lowered beneath the snow, scraping topsoil and vegetation into berms, which take several years to become revegetated. The resulting unsightly mounds and rough terrain remain evident for many years.

Current and Future Actions

USARAK construction projects in the cantonment area, including the rapid deployment facility, are expected to result in minor, short-term impacts to soil. The range expansion project could result in adverse impacts to soils as well (Stout 2002d). Impacts from development and recreation on military land also contribute to cumulative impacts. Air Force construction activities would likely remain in previously developed areas; therefore, impacts to natural soils are not expected.

Infrastructure

Electrical Transmission

The Southern Intertie would impact about 550 acres of vegetation and wetlands in the region of interest. This would likely result in impacts to soil, particularly in wet areas where rutting can occur. Permafrost is not likely to be present in the area.

Highways and Railways

Due to the rapid growth in the region, expansion of existing highways or development of new highways is likely. This could result in disturbance to soil, although mitigation measures to ensure erosion control would likely be implemented.

Land Management

Soils are mostly conserved in Chugach State Park, where most lands are maintained in semi-primitive or wilderness state. Some recreation impacts would be expected on popular trails and campsites.

Use of Renewable Natural Resources

Recreational impacts and use of off-road vehicles contribute to adverse soil and permafrost impacts in the region; however, the extent of the impacts is not known.

Communities

Recreation

Outdoor recreational vehicle (ORV) use on FRA is a negative impact to soil. This impact would be minimized due to USARAK's new ORV policy, which places the same restrictions on ORV vehicle use as it has on military vehicle use, including restricting use in environmentally sensitive areas. Recreational demands will probably increase in proportion to population growth, which would cause negative impacts to soil resources.

Urban Development

Communities of the Anchorage Bowl can be expected to grow from approximately 300,000 residents in 2000 to over 400,000 by 2020. Nearby communities such as Palmer and Wasilla are also expected to grow substantially. New housing and infrastructure will need to be developed. Soil will be impacted by construction until vegetation becomes established.

Any impacts from the USARAK mission-essential construction projects in the cantonment area of FRA, including the rapid deployment facility, are expected to result in minimal impacts to soil. Impacts would be localized to the area of construction and would not create cumulative impacts with other Army actions.

4.20.5.2.4 Surface Water

Military Activities

Past Actions on Army Lands

USARAK maneuver training has involved stream crossings on FRA. Maneuver trails on FRA are provided with bridges rather than fording sites. Sedimentation from direct stream crossings would not have occurred under such conditions. In addition, weapons training involving explosive munitions may also have had impacts to surface water quality on the Eagle River Flats impact area. Studies conducted on the impact area indicate that unexploded munitions constituents decompose rapidly in the anaerobic conditions present there. This indicates that any impacts would be short term in nature. One chemical used in training on the impact area, white phosphorus, did not decompose rapidly and was linked to increased waterfowl mortality on the flats. USARAK commenced a cleanup operation and no longer uses white phosphorus in weapons training.

Current and Future Actions

Cumulative impacts to south-central Alaskan surface waters strongly resemble those impacts listed above for interior Alaska. Military activities, including activities and projects on FRA and Elmendorf Air Force Base, are all likely to affect surface water resources. However, such impacts are expected to be local and short term in nature. Compared to interior Alaska, south-central Alaska has far less surface water impacts from extractive resource due to fewer such activities in the south-central region.

However, impacts from community growth and development in and around Anchorage far exceed those of Fairbanks. Growth of Anchorage and the surrounding area has led to changes in overland flow and runoff, and surface waterways have demonstrated decreased water quality following urbanization of their watersheds. In addition, the Glenn, Parks, and Seward highways all alter surface flow patterns and contribute slightly to decreased water quality.

Knik Arm Bridge

Construction of the Knik Arm Bridge could eventually lead to reduced surface water quality across the Knik Arm due to increased human habitation, use and disturbance following subsequent development.

4.20.5.2.5 Groundwater

Military Activities

Past Actions on Army Lands

Past impacts to groundwater on Army lands could involve weapons training. Explosive munitions training on Eagle River Flats Impact Area has led to the presence of unexploded ordnance on USARAK impact areas. Chemical constituents from unexploded ordnance have the potential to leach through the soil to the aquifer, thereby affecting groundwater quality. However, monitoring studies indicate that constituents decompose rapidly under ambient conditions on the impact area. This sharply curtails the possibility of groundwater contamination from munitions constituents.

Current and Future Actions

Cumulative impacts to south-central Alaska groundwater are similar to those listed for interior Alaska. Military activities may affect groundwater resources in the same way, although permafrost alteration is not an issue in this region of interest. In addition, groundwater quality impacts from munitions practice are less likely to occur, given the location and estuarine nature of the Eagle River Flats Impact Area.

Communities

However, impacts from Anchorage area growth and development are far greater than those for interior Alaska. Much of the region has been developed, including installation of impermeable barriers that may reduce surface and groundwater interaction and recharge. Associated activities may lead to decreased water quality due to the introduction of pollutants to area groundwater.

4.20.5.2.6 Wetlands (Issue C: Wildlife, Fisheries and Habitats, Issue D: Maneuver Impacts)

Military Activities

Past Actions on Army Lands

The withdrawal of land (through BLM) for FRA had a long-term positive effect on wetlands, as the area likely would have otherwise been enveloped by the expansion of Anchorage. Most of the land outside of the cantonment area was left undeveloped, affected only by training impacts. Damaging effects of military missions primarily resulted from munitions impacts and maneuvers. Impact damage occurs within 2,195 acres of designated impact area in Eagle River Flats (ERF).

In 1980, USARAK personnel on FRA noticed an unusually high mortality of waterfowl in the ERF Impact Area. This discovery led to a series of investigations that spanned 14 years and a study of military impacts on a scale unprecedented on other installations. In 1990, live firing into ERF was suspended pending further study. It was reinstated two years later under USARAK-imposed conditions. In addition, as a result of this study the Pentagon issued a nationwide memorandum prohibiting the firing of white phosphorus munitions in wetlands. In 1994, ERF was included on the U.S. Environmental Protection Agency's National Priorities List. USARAK is now pursuing strategies for remedial solutions to white phosphorus contamination.

Aerial surveys for wetlands disturbance have been conducted since the 1970s. The U.S. Army Engineer Waterways Experiment Station (WES) completed a wetlands inventory in 1996 (Lichvar and Sprecher 1998b). This inventory, combined with a functions and values analysis (also done by WES), was used to prepare the first wetlands management action plan in 2001. LCTA has been monitoring disturbance in wetlands since 1997.

The presence of wetlands has shaped the existing development on FRA and will continue to affect future development. Wetland areas have required and will continue to require special consideration for development.

Current and Future Actions

USARAK construction projects in FRA's cantonment area, including the rapid deployment facility, are not expected to result in impacts to wetlands. However, the range expansion project could result in adverse impacts to wetlands (Stout 2002d). Impacts from development and recreation also contribute to cumulative impacts.

Infrastructure

Electrical Transmission

The Southern Intertie will impact about 550 acres of vegetation and wetlands in the region of interest.

Highways and Railways

Due to the rapid growth in the region, expansion of existing highways or development of new highways is likely. This could result in removal of wetlands, although mitigation measures exist to ensure no net loss of wetlands.

Knik Arm Bridge

Construction of the Knik Arm Bridge would probably lead to loss of wetlands in the Matanuska-Susitna Borough. It is expected that the crossing would lead to development of the areas southwest of Wasilla, along Point Mackenzie Road and Knik-Goose Bay Road. Much of this area is wetlands, which could be degraded or destroyed due to subsequent development and urbanization.

Land Management

Wetland resources are conserved in Chugach State Park, where most lands are maintained in semi-primitive or wilderness states.

Use of Renewable Natural Resources

Recreational impacts and use of off-road vehicles possibly contribute adverse wetland impacts in the region; however, the extent of the impacts is not known.

Communities

Recreation

Recreational demands will probably increase in proportion to population growth. This could cause negative impacts to wetland resources.

Urban Development

Communities in the Municipality of Anchorage can be expected to grow from approximately 300,000 residents in 2000 to over 400,000 by 2020. Nearby communities such as Palmer and Wasilla are also expected to grow substantially. New housing and infrastructure will need to be developed. The Municipality of Anchorage (2001) indicates that priority wetland sites will be protected and conserved as practicable.

4.20.5.2.7 Vegetation

Military Activities

Past Actions on Army Lands

Prior activities on Army lands have impacted vegetation, primarily through maneuver training exercises and construction of ranges and cantonment buildings.

By the late 1970s roads and trails encompassed approximately 2,900 acres of these lands. In 1977, in preparation for a winter large training operation, about 1,500 acres were altered in order to clear areas for roads, drop zones, and camp sites (USARAK 1980). By the end of the decade approximately 10,000 acres had been cleared for drop zones and landing strips.

Total cantonment area acreage includes approximately 10,230 acres of USARAK lands, 5,760 of which are on FRA. Vegetative structure within the cantonment area has been heavily altered to accommodate construction of buildings, roads, and other infrastructure. In addition, training ranges on FRA occupy approximately 860 acres, which require ongoing vegetative modification. Drop zones and assault strips occupy approximately 840 acres on FRA. These areas must remain free of high-standing vegetation, which prevents the areas from progressing through successionary stages.

Current and Future Actions

USARAK construction projects in FRA's cantonment area, including the rapid deployment facility, are not expected to result in impacts to natural vegetation. However, the range expansion project could result in slightly negative impacts to vegetation. Approximately 2,100 acres of vegetation would be affected. Of that, about 1,900 acres of relatively undisturbed areas, mostly forested, would be cleared for the multi-purpose training range and infantry squad battle course. Overall, the impacts would be localized (Stout 2002d).

Infrastructure

Electrical Transmission

The Southern Intertie will impact about 550 acres of vegetation and wetlands in the region of interest.

Highways and Railways

Approximately 100 miles of major highway, including portions of the Glenn, Parks, and Seward highways, are located within the region of interest. Assuming a 100-foot right-of-way for these highways, approximately 1,200 acres of vegetation have been altered due to development.

Land Management

Timber in some private areas or Native lands could be sold. Development of private land would impact vegetation, although the extent is not known.

Use of Renewable Natural Resources

Vegetation could be susceptible from damage due to timber harvest activities and recreation, particularly through the use of off-road vehicles. The extent of damage from these activities is not known.

Community

Recreation

Recreational demands will probably increase in proportion to population growth. This could cause negative impacts to vegetation resources.

Urban Development

Communities in the Municipality of Anchorage can be expected to grow from approximately 300,000 residents in 2000 to over 400,000 by 2020. Nearby communities such as Palmer and Wasilla are expected to grow substantially. New housing and infrastructure will need to be developed, and this could affect several hundred to several thousand acres of natural vegetation. Note, however, that the preferred plan for the region is to further develop on sites that have already been built, not develop new areas (Municipality of Anchorage 2001).

Pest Infestations

Infestations from spruce bark beetles have had a large influence on forests in south-central Alaska. This will continue to be an important factor affecting vegetation in the region.

4.20.5.2.8 Wildlife and Fisheries (Issue C)

Military Activities

Past Actions on Army Lands

According to USARAK (2002f), impacts to wildlife have occurred from development of infrastructure and resulting loss of habitat, training activities, and from pollutants. Many species are affected by loss of habitat and habitat fragmentation. Wildlife has been affected from munitions contaminants (Section 3.9, Wildlife and Fisheries) or from exposure to other toxic materials. Training has disrupted natural wildlife movement patterns. People on the post have either intentionally or inadvertently harassed or caused harm to wildlife. Regulations such as USARAK Regulation 350-2 have helped alleviate many of these impacts.

The noise of military training may have also affected wildlife. Numerous studies have indicated that the introduction of noise into previously undisturbed areas can initially cause behavioral changes and stress in some species of wildlife (Appendix F, Section 4.9). But over an extended period of time these effects wane as wildlife becomes accustomed and habituated to the recurring disturbance.

Current and Future Actions

The construction projects in FRA's cantonment area could impact urban-dwelling species of wildlife (Stout 2002c). The range upgrades would be slightly beneficial to moose and edge species. However, the project would probably cause adverse effects to forest-dwelling birds (including raptors), black bear, and at least one of the resident wolf packs (Kellie Peirce, personal communication 2002).

Noise from aircraft would continue to be the primary impact to wildlife at Elmendorf AFB and nearby lands. Aircraft noise from training by the U.S. Air Force and the Alaska Air National Guard could affect some species. In particular, the Dall sheep using the upper Snowhawk Valley during summer could be susceptible to disturbance from low-flying helicopters. The frequency of such disturbances and impacts are not known.

The cumulative impacts of increased weapons and maneuver training due to transformation could affect wildlife populations, especially large mammals such as moose and bear. Noise impacts would not likely cause a panic response to animals. Movement of troops on foot and vehicles on training areas could cause animals to flee. However, disturbance from maneuvers would be transitory and would probably not affect moose or bears at the population level.

Future construction of additional fencing along the border of FRA could impact movement of larger mammal species. The impact will depend upon the design of the fence. FRA officials are currently considering a variety of fence designs, each having varying degrees of impact on the larger species inhabiting FRA. Also see Section 4.20.3.2.1.

The proposed construction of the Knik Arm Bridge could affect wildlife populations on Elmendorf Air Force Base, which could indirectly affect populations on FRA. However, the greatest impact to wildlife would occur on the northwest side of the Knik Arm. In particular waterfowl breeding areas and other wildlife habitats would be lost or fragmented from the development of roads, communities, and infrastructure.

Infrastructure

Electrical Transmission

The Southern Intertie could affect birds and mammals. Possible effects to birds include disturbance during nesting or migration periods and habitat fragmentation. Although this could affect local populations, it would not impact birds regionally. Black bears and brown bears could be impacted from disturbance, especially during the construction phase. Increased access to recreationists could also result in long-term impacts to these species.

Transportation and Communications

Large highways such as the Glenn, Parks, and Seward highways will continue to impact wildlife, primarily from habitat fragmentation and from collisions. Moose-vehicle collisions are common along these highways (Section 4.17, Human Health and Safety). The impacts to populations of other mammals and birds are not well documented, but vehicle-wildlife collisions are common and probably impact some populations.

Land Management

The south-central Alaska/Anchorage area region of interest consists of a juxtaposition of state, federal, Native, municipal, and private lands (Appendix A, Figure 4.20.d). In Chugach State Park, riparian areas are protected to conserve habitat of furbearers. Although hunting is allowed in the park, use of motorized vehicles is not. In the Municipality of Anchorage, greenbelts and open space are managed to provide habitat for wildlife and fish. At the same time, the Municipality manages wildlife and people to reduce wildlife-human conflicts.

Renewable Natural Resources

Wildlife is managed by the Alaska Department of Fish and Game or the U.S. Fish and Wildlife Service (migratory birds and threatened/endangered species). The interior south-central Alaska region of interest lies within Game Management Unit 14. A general background on the relative abundance and management for interior Alaska is provided in Section 3.9, Wildlife and Fisheries.

Communities

Urban Development

Much of the area surrounding FRA, including Anchorage and Eagle River, will continue to develop and grow over the next 20 to 30 years. In the next 15 to 20 years the human population in the Anchorage Bowl could increase by as much as 33%, from about 300,000 to over 400,000.

Recreation

Increased human population could cause an increased demand for recreational use on FRA, and this could impact many species of wildlife.

4.20.5.2.9 Threatened or Endangered Species and Species of Concern

Military Activities

Past Actions on Army Lands

The peregrine falcon was an endangered species in Alaska during the 1970s (it was delisted in 1999.) In 1984, it was not identified on FRA either by the state or federal wildlife agencies (Department of the Army 1984). Peregrines were observed during field studies at Eagle River Flats in 1991-1992, and birds have been documented passing through the area (USARAK 2002g). Although the bald eagle was a federally listed threatened species, its threatened status did not apply in Alaska. However, it is afforded special protection by USARAK.

Current and Future Actions

There are no known federally endangered or threatened species on USARAK lands. However, management policies exist and are outlined in the Integrated Natural Resources Management Plans for each post (USARAK 2002e,f,g). Use of Army lands would continue to contribute to cumulative impacts to plants and animal species of concern. The mission-essential construction projects planned at the FRA cantonment area would not affect any species of concern (Stout 2002c). The range upgrade and expansion projects could compromise habitats of forest-dwelling bird species of concern.

Activities of the USAF could affect some species of concern, although low-flying aircraft do not appear to affect the reproductive rates of forest birds (Bartecchi 2002).

Infrastructure

Highways and roads contribute to habitat loss and fragmentation and loss of wildlife due to mortality from vehicles.

Development and maintenance of the Southern Intertie could cause some adverse impacts to wildlife species of concern, including raptors such as the bald eagle. Widespread impacts to plant species of concern are unlikely.

Land Use

The State's policy is to manage lands in a manner that is consistent with federal and state threatened and endangered species acts, and the State recognizes the status of species of concern in Alaska (Alaska Department of Natural Resources 1991, 2001). Likewise, federal land agencies manage their lands to ensure protection of threatened, endangered, and species of concern.

Use of Renewable Natural Resources

State and federal land management agencies protect threatened and endangered species, and employ management practices to conserve and monitor plant and wildlife species of concern.

Communities

Continued growth and development and recreational impacts in south-central Alaska could affect some species of concern, perhaps at the population level.

4.20.5.2.10 Fire Management (Issue E)

Military Activities

Past Actions on Army Lands

Fire probably had a more important influence on ecosystem functions in the Anchorage area during presettlement times than it does today. Wildfires were found to be prevalent in the 1800s and early 1900s. 48% of FRA over the past 200 years has been affected by fire (Jorgenson et al. 2002). Although fires were relatively small and localized due to the weather and climate, settlement resulted in fire suppression and the development of road systems (firebreaks) that further reduced natural fire frequency at FRA.

Although wildfires are a concern at FRA, they are rarely a significant problem. Numerous fires have been recorded in the Matanuska-Susitna Valley to the north, but no major fires have occurred on FRA since 1950 (Jorgenson et al. 2002). Severe drought conditions occur about once every 20 years, and, in normal years, there is an average of less than five wildfires. These fires are usually mission-related, small, and easily contained.

The FRA Fire Department provides the initial response for wildfire suppression, which has traditionally been confined to areas behind the small arms complex. Because of the extensive mortality of white spruce in the area, fire prevention activities were conducted in 1999 and 2000 to reduce fuel loads adjacent to the small arms ranges (USARAK 2002b).

Current and Future Actions

Cumulative fire management impacts to the region would mainly result from the addition of new firing ranges and population growth in the forested areas bordering installations. Assuming high

risk areas will be treated to reduce the spread of fire, the proposed action of transformation would not significantly contribute to cumulative impacts to the region.

There will be some negative additive impacts expected from the USARAK mission-essential projects planned at FRA (Stout 2002c). The multi-purpose training range, infantry squad battle course, infantry platoon battle course locations were all assessed as wildfire risks.

Infrastructure

Highways and Railways

Transportation corridors break up contiguous stretches of forest and could act as firebreaks for small fires. They also provide access for fire management personnel. Extensions of road networks encourage development further away from town centers. This new development increases the need for fire suppression and increases the risk to personal property.

Land Management

Fire management in the Anchorage area is also guided by the Alaska Interagency Fire Management Plan. This plan is discussed in the interior Alaska region of influence section.

Use of Renewable Natural Resources

While timber harvesting in general would not necessarily reduce risk of fire, proposed thinning and prescribed burn projects designed to reduce dense fuel buildup would be a beneficial impact to area fire management.

The continued outbreak of spruce bark beetle in the area is an additional impact to fire management. Dead and dying spruce trees present a fire hazard during dry times. Plans to remove the dead trees would benefit fire management in the region.

Communities

Urban Development

Communities of the Anchorage Bowl can be expected to grow from approximately 300,000 residents in 2000 to over 400,000 by 2020. Nearby communities are also expected to grow substantially. As communities grow away from urban centers, impacts to fire management increase. More personal property is at risk, and it may be less accessible. Areas that were once able to burn periodically have not seen fire in many years. This is considered a negative impact to cumulative fire management.

Recreation

Fires may be caused by area recreationists. If fires are more common than the natural rate of return, recreation could be a negative impact to fire management, although no data has been found to suggest this.

4.20.5.2.11 Cultural Resources (Issue F)

Military Activities

Past Actions on Army Lands

Past activities on USARAK lands may have impacted cultural resources. Land-disturbing activities, such as range construction and modification, maneuver training, and creation of roads and trails for maneuver training, may have disturbed or destroyed undocumented or undiscovered archaeological sites. However, given the lack of prehistoric sites found through repeat surveys of FRA, this is not considered a highly probable past impact. Unsympathetic uses of the buildings and structures that make up either the unlisted eligible historic district that encompasses part of the FRA cantonment area, or the Nike Site Summit historic property, including modification or demolition of relevant structures, would also have impacted the integrity of the landmark. Lack of maintenance and security to prevent ongoing vandalism at Nike Site Summit may be considered a past impact.

Current and Future Actions

USARAK activities and projects have little potential to impact cultural resources in this region due to a lack of sites identified following extensive surveying. Activities that involve modification or destruction of buildings that make up either the Nike Site Summit historic property or the unlisted eligible historic district within FRA cantonment area would impact the viability of those historic resources.

Infrastructure

Transportation and Communications

The construction of the Glenn, Parks, and Seward highways, as well as the Alaska Railroad, may have impacted cultural resources in this region, given the acreage affected by construction of these corridors. Further development of highways and roads is expected. These have the potential to impact cultural resources, although surveying, documentation, and mitigation efforts would be required if under federal funds or permits.

Land Management

Chugach State Park

Chugach State Park is managed as a wilderness recreational area. As such, its lands are in relatively pristine condition, especially away from the trail system within the park. This serves to protect any cultural resource sites within the park boundaries.

Native Lands

CIRI activities, such as oil, gas, and mining exploration, and real estate development, have the potential to affect cultural resources in the region of interest. Efforts to survey, document, and protect identified sites may reduce potential impacts.

Use of Renewable Natural Resources

As with interior Alaska, hunting and fishing activities that involve use of off-road vehicles have the potential to impact regional cultural resources. This remains a low probability throughout most of the region. There is no large-scale timber harvest within the south-central Alaska area.

Communities

Urban growth and development may impact the region's cultural resources. Prehistoric cultural sites for this area are rare but may be disturbed by activities associated with population growth and urbanization, such as increasingly intensive recreational impacts, development, and other ground-disturbing activities. Anchorage, and especially the corridor north to Palmer and Wasilla, is growing rapidly. Associated development without cultural resource surveys or documentation could have significant impacts to the region's cultural resources.

4.20.5.2.12 Socioeconomics

Military Activities

Past Actions on Army Lands

In 1984, there were 4,500 military and 4,500 dependents living on FRA. Additionally, there were 1,400 civilians who commuted to FRA daily. Total daytime population was estimated to be 10,400. The 172nd Infantry Brigade and elements of the 222nd Aviation Battalion were moved from FWA to FRA between the years 1985-1987. The Anchorage military population increased less than 1%, not significant in an area growing by 10% a year. Increased demand for schools, housing and sewage treatment facilities resulted (Department of the Army 1984).

Current and Future Actions

Planned mission-essential construction activities would provide significant beneficial impacts to the regional economy. The projected program amount is estimated at $54.6 million for the Anchorage region. Construction would begin in 2002 and is expected to be complete in 2007.

Infrastructure

As Anchorage is the site of the administrative and financial sector for the oil and gas industry, the natural gas line will have a beneficial impact on the Anchorage economy, although the natural gas line is not being built there. There are no other substantial infrastructure changes planned for the foreseeable future.

Energy Demand

The FRA power plant provides electrical power to the electrical distribution system and provides steam to the steam distribution system. The post maintains a coal supply at all times and is prepared to utilize the fuel if needed. The facility has indoor hopper capacity of 5,000 tons. The present electrical generating capacity is approximately 18 megawatts.

A separate diesel generation plant containing five diesel generators is located on post and is utilized only for emergency backup service. The diesel plant was built in the 1950s and is operated very rarely.

FRA owns and operates an electrical distribution system consisting of two electric power generation plants (one steam/electric co-generation plant and one diesel-powered generation plant). The distribution system is a combination of overhead and underground wire circuits. The FRA electrical system demand is approximately 12 megawatts. FRA has a 33 kilovolt (kV) tie to Anchorage Municipal Light and Power. This tie line is utilized as a backup to the present system, with very little exchange of power.

FRA currently receives all of the required steam for heating and laundry from the power plant, which delivers 100 psi saturated steam to the distribution piping. Condensate is returned to the boiler plant for reuse.

High-pressure lines owned and operated by the ENSTAR Gas Company supply all natural gas for FRA. There are two main supply lines located adjacent to and on the post.

Current energy sources and distribution infrastructure are sufficient to meet the energy demands of the SBCT as well as other future and ongoing activities on or near FRA.

Communities

Urban Development

There are some minor cumulative economic impacts foreseen. Due to the maturation of the Anchorage economy, the relative cost of living has moderated greatly in comparison to previous decades. The arrival of larger retail stores has provided more choices and lower prices for consumers. Much of this market transition has already occurred, but further gains are expected in the future, especially in the interior region.

Knik Arm Bridge

Construction of the Knik Arm Bridge would affect socioeconomics. Housing values could change due to increased development of the southwest Matanuska-Susitna Borough, an area previously too remote for viable use as permanent habitation (particularly when commuting to Anchorage). Values for currently owned properties southwest of Wasilla, along Point Mackenzie Road and Knik-Goose Bay Road, would probably increase. Property values within Anchorage could decrease due to increased availability of real estate across Knik Arm.

4.20.5.2.13 Public Access and Recreation (Issue A: Access, Issue C: Wildlife and Habitat)

Military Activities

Past Actions on Army Lands

Past military activities have impacted public access and recreation, due to permanent closure of some areas such as impact areas, which are off-limits to access, and temporary closures of USARAK lands for maneuver training purposes. These activities, which continue to impact public access and recreation, would have curtailed public use. Construction of roads and trails on Army properties would have led to beneficial past impacts to public access and recreation by increasing the amount of Army lands feasibly accessible for recreational purposes. In addition, USARAK has decided to disallow trapping on FRA due to potential human injury.

Current and Future Actions

USARAK activities will continue to affect public access and recreation on its lands. Army activities such as military training require land and access closures. The Eagle River Flats Impact Area will remain permanently closed to public access. The rest of FRA is available for use when it does not interfere with training.

Elmendorf Air Force Base restricts public access. The base is dominated by developed cantonment area, so public access and recreational opportunities are limited.

Infrastructure

Highways

The Parks, Glenn, and Seward highways provide an important resource for ground transportation within the south-central region of interest. These highways provide a primary means of access to much of the area. Future road and highway construction are expected to increase public access within the area.

Knik Arm Bridge

Construction of a bridge across Knik Arm could have long-term, regional impacts to public access and recreation. Development and privatization of the southwest Matanuska-Susitna Borough following bridge construction would increasingly limit hunting and fishing opportunities in that area, which hosts a number of popular salmon runs.

Land Management

State

Chugach State Park provides a large tract of undeveloped, relatively pristine lands in close proximity to Anchorage. It is open to many forms of public access and recreation.

Native Lands

CIRI and Eklutna Incorporated own acreage in south-central Alaska. Some of their management plans, such as tourism or possibly mining, are beneficial to public access and recreation. Real estate development essentially reduces the amount of land available for public access and recreation. These corporations may also have policies limiting public access and recreation on their properties.

Use of Renewable Natural Resources

Hunting and fishing are popular activities within south-central Alaska. The number of recreational anglers and hunters in this area may impact overall access and recreation due to fish and wildlife impacts, limits, and general crowding.

Communities

Population growth and urbanization within south-central Alaska may have a significant impact on public access and recreation in the region of interest. Land development and privatization have eliminated public access to and recreation over much of the area. An increasing number of recreational lots within this region are further limiting public access and recreation opportunities in areas away from developed population centers. The area population is expected to grow to 400,000 by the year 2020, which will probably lead to increased urbanization and development throughout the region.

4.20.5.2.14 Subsistence

Impacts to subsistence hunting and fishing in the south-central region of interest are much less likely due to its federal designation as a non-rural area. Much of the proposed actions on FRA would be located in already disturbed areas. While there may be an increase in access closures for some areas, much of FRA would still be accessible for plant and egg gathering.

4.20.5.2.15 Noise

Military Activities

Past Actions on Army Lands

The noise of military training may have affected wildlife. Sources of noise on FRA have included firing and detonation of munitions, low-flying aircraft, construction activities and general troop maneuvers (both mechanized and pedestrian). Numerous studies have indicated that the introduction of noise into previously undisturbed areas can initially cause behavioral changes and stress in some species of wildlife. But over an extended period of time these effects wane as wildlife becomes accustomed and habituated to the recurring disturbance. Observations of wildlife on FRA support this general statement that noise is of little significance.

Current and Future Actions

Construction of mission-essential projects at FRA would result in increased noise levels, but the effect would be short term and highly localized (Stout 2002d). The long-term effect of these projects would be nonexistent.

Activities by the U.S. Air Force and the Alaska Air National Guard contribute to adverse noise impacts in the Anchorage area, but the effects are mitigated (USAF 1995). Elmendorf Air Force Base does receive off-post noise complaints (USAF 1995). In 1993, approximately 21% of 1,000 people who lived within the 65-69 dBA zone adjacent to the base had complained about noise levels. However, impacts to wildlife may occur from helicopter training in Snowhawk Valley (William Quirk, personal communication 2002).

Communities

Noise contributed by the community, including transportation, construction, and recreation combined, causes adverse noise levels in the Anchorage vicinity.

4.20.5.2.16 Human Health and Safety (Issue B: Traffic)

Military Activities

Past Actions on Army Lands

Past human health and safety impacts on interior USARAK lands would involve use of explosive munitions, convoy use of public roadways, and inadvertent releases of hazardous materials. Unexploded ordnance would have occurred at roughly the same or higher relative frequency as current day (i.e., at or above 3.5% of ordnance fired). Unexploded ordnance would have been fired onto the existing impact areas; therefore, past human health and safety risks from unexploded ordnance are considered low due to the access restrictions placed on the impact areas as off-limits.

Convoy use of Alaska highways and other public roadways would have had human health and safety impacts due to traffic congestion and accident risks. Troops would have convoyed from cantonment areas to training areas, particularly from FWA and FRA to YTA and Fort Greely (now DTA). Finally, inadvertent releases of hazardous materials, including petroleums, oils, lubricants, and solvents, would have had the potential to impact human health and safety if such releases affected locally populated environments or drinking water. Contaminated sites, primarily within the FRA cantonment area, indicate the location of past releases (Appendix A, Figure 3.17.b).

Current and Future Actions

USARAK activities may affect local human health and safety. Training exercises require military convoys between FRA and DTA, which impact traffic along the region's highways. Alternatives 3 and 4 would, during the interim phase, increase the number and size of convoys between these two areas. End-state impacts may be lower than current levels or those under Alternative 1. Munitions training would continue to produce unexploded ordnance. However, all such unexploded ordnance is within the boundaries of the Eagle River Flats Impact Area, which is closed to all public access, thereby reducing human health and safety risks.

Infrastructure

Transportation and Communications

The Parks, Glenn, and Seward highways all impact human health and safety in south-central Alaska. As the primary ground-based transportation network in the region, these highways serve to ameliorate human health issues by allowing ambulance service between hospitals and remote areas. However, traffic risks increase along these highways, particularly during winter months. Convoy traffic and summer use of recreational vehicles, also exacerbate traffic risks.

Construction of the Knik Arm Bridge would impact traffic patterns. Traffic along the Glenn Highway would probably decrease, as an alternate route would be available.

Land Management

State, federal, and Native land management policies within interior Alaska are not expected to directly affect human health and safety.

Use of Renewable Natural Resources

Human health and safety risks are associated with some renewable resource use in south-central Alaska, such as hunting and fishing. However, risks are often assumed voluntarily and thus are not analyzed as significant impacts to regional human health and safety.

Communities

Population growth and urbanization in and around Anchorage is expected to have significant human health and safety impacts. Traffic associated with increased populations will congest existing roadways, increasing the likelihood of accidents. Pollution, such as carbon monoxide, particulate matter, and additional surface water pollutants such as e. coli, increases the risks of human health impacts. The population of the Municipality of Anchorage, including the communities of Palmer and Wasilla, is expected to grow 25%, to 400,000, by the year 2020. This increase is expected to result in additional impacts to human health and safety.

4.20.5.2.17 Environmental Justice

Military Activities

Past Actions on Army Lands

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was signed on February 11, 1994, directing federal agencies to identify and address any disproportionate environmental effects of federal programs or activities to minorities and low-income populations. The EO identifies the importance of

data collection, research, and analysis, particularly with respect to cumulative exposures to environmental hazards. Although the EO also provides for agencies to collect, maintain, and analyze information on patterns of subsistence consumption of fish, vegetation, and wildlife, the U.S. Army has only recently begun implementing programs to evaluate environmental justice impacts.

Current and Future Actions

Current USARAK construction projects have the potential to adversely affect unidentified cultural resources if archaeological or cultural sites are discovered. Because this possibility is difficult to quantify, USARAK construction projects cannot be said to contribute to cumulative impacts for environmental justice analysis.

4.20.5.3 Cumulative Impact Summary by Resource

See Table 4.20.f for a summary of cumulative impacts to the resources and issues of concern that have been described in this EIS.

Table 4.20.f Summary of Cumulative Impacts to Resources and Issues Relevant to USARAK Transformation EIS.

Resource	Summary of Impacts
Air Quality	Transformation would contribute to increases to cumulative air quality impacts. Future projects could contribute to negative cumulative impacts; however, new or modified facilities would be required to comply with PSD regulations. New projects in non-attainment areas would need to prepare a conformity analysis.
Geology	Small mining operations are located throughout the state. USARAK has not identified any impacts to geology associated with transformation activities (Section 4.3), so it would not contribute to any regional cumulative impacts to geology.
Soils **(Issue D)**	The greatest contributors to cumulative soil and permafrost impacts to the region include development and recreation pressures. Although the Army does contribute to impacts on soil resources and permafrost, mitigation measures will offset those impacts. Considering the vast amount of land encompassing the interior and south-central Alaska regions of interest (> 10 million acres), and Army lands (1.6 million acres), the extent of impacts from the Army would not add significantly to cumulative soil impacts.
Surface Water	Surface waters in interior and south-central Alaska have been impacted through flow alteration and water quality reduction. Infrastructure projects, military activities, resource extraction, and community development all have the potential to affect area surface waters. The greatest impacts probably occur from community development. Army activities do affect water quality; however, mitigation and monitoring programs reduce impacts to water resources.

Table 4.20.f cont. Summary of Cumulative Impacts to Resources and Issues Relevant to USARAK Transformation EIS.

Resource	Summary of Impacts
Groundwater	Groundwater resources are impacted from multiple sources in the interior and south-central regions of interest. Groundwater flow alteration is possible due to diversion of flow for surface use, permafrost alteration, or reduction of recharge rates from surface percolation. Groundwater quality may decrease due to increased concentrations of introduced chemical constituents. Community and industrial development probably has the greatest potential to impact groundwater resources because of a lack of regulative controls and monitoring.
Wetlands **(Issues C and D)**	Impacts to wetlands associated with military activities are minimized because unauthorized military activity is strictly prohibited in wetlands. According to Section 404 of the Clean Water Act, wetland modification would occur only in designated areas with the acceptance of a permit application by the U. S. Army Corps of Engineers. Maneuver impacts to wetlands at FWA, DTA, and FRA could increase from less than 10 acres per year under Alternative 1 (No Action) to up to 40-100 acres per year combined if either Alternative 3 or 4 were selected. Considering that any damage would be mitigated, and that the interior and south-central regions of interest encompass well over 10 million acres total (including 1.6 million acres of Army lands), impacts from the Army probably would not add significantly to cumulative wetland impacts in interior and south-central Alaska. Ecosystem-level inventory and monitoring is paramount to ensuring wetland conservation in Alaska.
Vegetation	Cumulative impacts to vegetation from development, recreation, plant diseases, or pest infestations could be significant in some areas over the next 20 to 30 years. The effects of Army training would increase, but implementation of institutional matters would mitigate many effects. Damage to vegetation and ecosystems would be minimized through planning, monitoring, rehabilitation, and management programs. The ecological condition of Army lands may improve in the long-term if the institutional matters and programs such as ecosystem management are fully implemented as proposed under Alternative 4. The proposed action of transformation to SBCT would not significantly contribute to cumulative impacts to vegetation.

Table 4.20.f cont. Summary of Cumulative Impacts to Resources and Issues Relevant to U.S. Army Alaska Transformation EIS.

Resource	Summary of Impacts
Wildlife and Fisheries **(Issue C)**	**Wildlife** A variety of future activities could impact wildlife resources in interior and south-central Alaska. Impacts include loss of habitat, habitat fragmentation, disturbance from human activities, and mortality of wildlife. However, habitat management, harvest management, or other mitigations can offset some negative impacts. Projects and activities associated with transformation could contribute to cumulative impacts to wildlife populations. However, net effects from these changes are not likely to raise cumulative impacts to significant levels. Implementation of ecosystem management will help the Army and other government and non-government organizations to monitor and manage wildlife resources on USARAK lands and beyond their boundaries. **Fisheries** Development and recreational demands probably induce the greatest stressors to fisheries. Activities by USARAK could contribute to cumulative impacts. Possible cumulative stressors could include habitat loss, impediment of movements or migration, over-harvest, and water pollution. These stressors are caused by a variety of factors such as urbanization and infrastructure development, resource extraction and transport, recreation, land use, or actions from other military activities. USARAK's activities, regardless of alternative, are not likely to cause significant cumulative impacts to fisheries resources in either interior or south-central Alaska.
Threatened or Endangered Species & Species of Concern	Impacts to plant and wildlife species of concern include development projects and recreational demands. Invasive species or pests can also influence the abundance of species. These effects combined could cause population-level impacts to species of concern. Army training would increase, but implementation of institutional matters would mitigate many negative effects. Damage to species of concern would be minimized through planning, monitoring, rehabilitation, and management programs. Transformation would not significantly contribute to cumulative impacts. Indeed, after transformation the ecological condition of Army lands may improve in the long-term.
Fire Management **(Issue E)**	Fire management is becoming an increasingly complex issue in Alaska. Increased population growth and long-term fire suppression are the most significant impacts affecting fire management. The proposed action of transformation would contribute very minor impacts to fire management within the regions of influence. Mitigation measures have been proposed to reduce fire risk.
Cultural Resources **(Issue F)**	Impacts to cultural resources occur from large-scale, ground-disturbing activities, and are generally permanent in nature. The probability and severity of impacts rises with increased area of disturbance, as well as with geographic factors, such as non-wetlands areas, or possibly proximity to fresh water or other relevant resources. Military activities and projects require cultural resource surveys to identify cultural resources and potential impacts. Non-federal activities, especially private sector activities, have fewer restrictions and may impact cultural resources without knowledge or documentation.

Table 4.20.f cont. Summary of Cumulative Impacts to Resources and Issues Relevant to U.S. Army Alaska Transformation EIS.

Resource	Summary of Impacts
Socioeconomics	Socioeconomic impacts are expected in the areas surrounding USARAK posts. Projects and activities associated with transformation would contribute to cumulative impacts to socioeconomics. The effects from these changes would be mostly positive.
Public Access and Recreation **(Issues A and C)**	Continued population development and urbanization are expected to affect and limit public access and recreation. Privatization of lands, particularly for development purposes, would restrict public access and recreation on and across those lands. This impact is especially significant in south-central Alaska. Military activities will continue to impact public access and recreation on USARAK lands due to the military mission and programs. Per federal law, access and recreation in certain areas could be reduced to protect regulated wetlands. Impacts from Army activities would increase following selection of either Alternatives 3 or 4. However, changes associated with transformation are not expected to lead to significant impacts to public access and recreation within the regions of influence because there is ample land space available for access and recreation. Ecosystem-level inventory and planning would promote long-term sustainability of public access and recreational opportunities within Alaska.
Subsistence	Subsistence resources may be affected from activities including military activities, resource extraction, and community growth. Subsistence access may also be impacted due to military activities and area development. Impacts to subsistence in the interior Alaska region of interest are expected to be insignificant. Subsistence is curtailed in south-central Alaska by federal and state regulations, thus no impacts are expected. Overall, transformation would not be expected to cause significant impacts to subsistence.
Noise	Noise-generating activities include activities such as transportation and recreation, U.S. Air Force training, the Trans-Alaska pipeline at FWA and DTA, the Golden Valley Electric Association power line at FWA, and the Pogo Gold Mine and Space and Missile Defense System near DTA. Airports and highways also contribute impacts to noise levels. USARAK's activities also cause adverse noise impacts. Transformation would result in increased noise levels, especially from weapons training. However, the effects would not be significant, nor would they result in a significant additional contribution to current noise levels in the regions surrounding the posts.

Table 4.20.f cont. Summary of Cumulative Impacts to Resources and Issues Relevant to U.S. Army Alaska Transformation EIS.

Resource	Summary of Impacts
Human Health and Safety **(Issue B)**	Human health and safety impacts are largely mitigated by existing laws and regulations governing the transfer, storage, and use of hazardous materials. Other human health and safety risks include incremental increases or long-term exposure to pollutants. Traffic impacts are expected to continue, and USARAK convoys will impact traffic within each region. Traffic risks are largely associated with individual behavior, which cannot be accurately predicted, but which will probably continue to affect traffic on Alaskan roads and highways. Selection of Alternatives 3 or 4 would increase the frequency and size of military convoys, particularly along the Richardson Highway. Given the expected convoy increase, mitigation measures are proposed to reduce the overall impact of such convoys on area traffic. In addition, community growth will also increase traffic risks on local roads in both regions of interest. State traffic planning and management will help reduce the severity of such impacts.
Environmental Justice	Impacts due to Army activities may occur due to the unique role of cultural resources connected to the well-being of Alaska Native Tribes and the dependence on subsistence by low-income populations in meeting basic nutritional needs. Because development and intensive land uses could adversely affect cultural sites or disturb wildlife populations, cultural resources and subsistence could be negatively affected. When considering the cumulative effects of human activities such as urban or infrastructure development, minority and low-income communities may experience somewhat greater impacts than other populations in the context of these resources. Existing and proposed USARAK mitigation measures would help minimize any disproportionate effects of transformation.

See Appendix F, Section 4.20, Cumulative Impacts, for discussion of thresholds considered for these analyses.