Alaska Army Lands Withdrawal Renewal

Final Legislative Environmental Impact Statement Volume I







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U.S. Army Alaska Department of the Army



ALASKA ARMY LANDS WITHDRAWAL RENEWAL FINAL LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

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EXECUTIVE SUMMARY

Purpose

A Draft Legislative Environmental Impact Statement (LEIS) is required by the Military Lands Withdrawal Act (Public Law 99-606, 100 Stat. 3457, et seq.), dated November 6, 1986, for the continued military use of public domain lands by the U.S. Army on Fort Wainwright and Fort Greely, Alaska. The Draft and Final LEIS were prepared by U.S. Army Alaska.

The Department of the Army has determined there is a continuing military need for the use of Alaska lands now withdrawn from public use under the Military Lands Withdrawal Act and is requesting to renew the withdrawals through new legislation. U.S. Army Alaska proposes to renew its use of the Fort Wainwright Yukon Training Area (formerly known as the Fort Wainwright Maneuver Area), the Fort Greely West Training Area (formerly known as the Fort Greely Maneuver Area), and the Fort Greely East Training Area (formerly known as the Fort Greely Air Drop Zone), each greater than 5,000 acres. The Engle Act (Public Law 85-337), enacted February 28, 1958, allows the Department of Defense to apply for withdrawal of public land for defense purposes; for a withdrawal involving more than 5,000 acres, the Act requires Congressional approval.

The Military Lands Withdrawal Act requires the Army to publish a Draft Environmental Impact Statement for the continued or renewed withdrawal of these lands by November 6, 1998. The Engle Act requires the Alaska Army lands withdrawal renewal be authorized by Congress through legislation because each withdrawal area covers more than 5,000 acres. The Department of Defense directed the Army to complete a Legislative Environmental Impact Statement. Since Congress has the final authority for renewing the military's use of the withdrawal lands, the Army will not issue a Record of Decision following completion and publication of the Final Legislative Environmental Impact Statement. Instead, the Department of Defense and Department of the Interior will prepare draft legislation and submit it to Congress.

U.S. Army Alaska is requesting to renew the land withdrawals under the same stipulations and conditions of the Military Lands Withdrawal Act of 1986 and for the same military purposes which have been conducted over the past 15 years.

The parcels of land proposed for withdrawal renewal are located in the State of Alaska. Fort Jonathan Wainwright lies approximately 120 miles south of the Arctic Circle near the City of Fairbanks in interior Alaska. The installation, consisting of the Main Post, the Tanana Flats Training Area, and the Yukon Training Area, covers 915,098 acres (Figure ES.a). The Fort Wainwright Yukon Training Area is a rectangular-shaped 390 square-mile parcel covering approximately 247,952 acres. It is located 16 miles east-southeast of Fairbanks and immediately east and adjacent to Eielson Air Force Base. The Yukon Training Area lies east of the Tanana River between the Chena and Salcha Rivers and northeast of the Richardson Highway.

The other withdrawal parcels are at Fort Greely; they are the Fort Greely West and East Training Areas. Fort Greely is approximately 105 miles southeast of Fairbanks near the City of Delta Junction in interior Alaska. The installation, consisting of the Main Post, the West and East Training Areas, and three outlying training sites: Gerstle River Test Site, Black Rapids Training Area, and Whistler Creek Rock Climbing Area, covers approximately 662,000 acres (ES.a). The Fort Greely West Training Area is a 894 square-mile parcel bounded by the Richardson Highway to the east and the Little Delta River to the west. It covers approximately 571,995 acres with the Delta River flowing north through the eastern portion. The Fort Greely East Training Area is a separate 81 square-mile parcel stretching east of the Richardson Highway to Granite Creek. It covers approximately 51,590 acres.

Legislation

The Military Lands Withdrawal Act, enacted by Congress on November 6, 1986, identified the Fort Wainwright Yukon Maneuver Area (now known as the Fort Wainwright Yukon Training Area) and Fort Greely Maneuver Area (now known as the Fort Greely West Training Area) and Fort Greely Air Drop Zone (now known as the Fort Greely East Training Area) as lands withdrawn from public use until November 6, 2001. Subject to valid existing rights, these lands are withdrawn from all forms of appropriation under the public land laws (including the mining law and the mineral leasing and the geothermal leasing laws), under An Act to Provide for the Admission of the State of Alaska into the Union approved July 7, 1958 (Public Law 85-508) and under the Alaska Native Claims Settlement Act (Public Law 92-203).

The Act reserves these lands for use by the Secretary of the Army for military maneuvering, training, equipment development and testing, as well as other defense-related purposes. The Secretary of the Interior and Secretary of the Army manage the lands subject to conditions and restrictions necessary to permit military use. The Secretary of the Interior can issue a lease, easement, right-of-way, or other authorization for nonmilitary use of these lands with the concurrence of the Secretary of the Army. Hunting, fishing, and trapping on these lands is permitted in accordance with the provisions of Military Reservations and Facilities: Hunting, Fishing, and Trapping (Section 2671 of Title 10, United States Code).

Background of Military Activity

Throughout the 1910s and 1920s, aviation played an increasingly important role in Fairbanks' development. Fairbanks' location in the Interior and lack of roads throughout Alaska made the airplane an attractive mode of transportation. Heavy machinery, food, mail, and passengers were flown regularly from Fairbanks to hundreds of Interior mining camps (Cashen 1971, Robe 1970). It was Fairbanks' status as an aviation hub that compelled Colonel Henry H. Arnold to recommend that it be considered as the site for an airbase in 1934 (Cloe and Monaghan 1984).

Between the World Wars, the military realized the need for an airfield in Alaska. In 1928, a joint Army/Navy plan established a defensive triangle in the Pacific Ocean to defend the continental United States from an attack from Japan. Plan Orange designated Hawaii, Panama, and Alaska as the limits of the triangle. The Air Corps' inexperience in the Arctic played an important role in the drive for an Alaskan airbase. This was underscoredin 1929 when Colonel Ben C. Eielson disappeared in a winter storm while flying a rescue mission in the Bering Sea. Aviators from Alaska, Canada, and Russia joined in the search for Colonel Eielson. When assistance was requested from the Air Corps, they responded that they did not have anyone, except Colonel Eielson, who was experienced in Arctic flying.

Citing Alaska's strategic location and the need for a cold weather airfield, Alaska Delegate Anthony J. Dimond introduced the Dimond Bill in 1934. The bill called for construction of an Alaskan airfield. Eventually, in August 1939, a site was selected, and work began on the new Ladd Field. The garrison was activated on April 14, 1940. Later that year, the Cold Weather Station was also activated. The ever-urgent need for cold weather research and development called for expansion to 558 people by 1944.

During World War II, there was a major expansion of facilities at Ladd Field. The mission of Ladd Field as the North American terminus of the Alaska-Siberia Lend-Lease route was its best known contribution to the war effort. It was here, from 1942 to 1945, that the Soviet Union received United States' lend-lease aircraft. Soviet pilots received training in U.S. aircraft at Ladd Field before flying them across Siberia to the Eastern Front. Almost 8,000 aircraft were delivered over this route during the three-year period it was in operation.

Relations between the United States and the Soviet Union deteriorated rapidly after World War II. In response, Ladd Field was maintained, and the Strategic Air Command (SAC) established. SAC organized its first operational unit at Ladd Field in 1946 to begin developing a system of polar navigation (White 1994). Throughout the late 1940s and 1950s, various SAC missions were carried out from Ladd Field.

The Army's mission at Ladd Field included antiaircraft and ground defense, cold weather training, and emergency preparedness for nuclear attack. Antiaircraft Artillery (AAA) batteries were installed around Fairbanks in the early 1950s to support its defense mission. To support the dual service missions, a major construction program was initiated at Ladd Field in the early 1950s.

With the creation of Ladd Air Force Base (AFB) in 1947, the War Department designated Big Delta, an inactive World War II airfield, as an Army post. An Arctic training center was established, and cold weather testing and training became the focus of activities at Big Delta. Many new facilities were constructed in the 1950s, and the military's first nuclear power plant was part of this program. After numerous name changes, the post was designated Fort Greely for Army Brigadier General Adolphus Greely in 1955 (Anchorage Daily News 1972).

Ladd AFB was transferred to the Army and renamed Fort Wainwright in 1961. This allowed the Army to enhance its cold weather testing and training program in Alaska. An example of this expansion was the establishment of the Cold Regions Research and Engineering Laboratory (CRREL) that same year. Throughout the late 1960s and early 1970s, military resources were directed towards the war in Vietnam. Arctic training was again emphasized in the 1970s, with exercises being conducted annually. With the activation of the 6th Infantry Division (Light) at Fort Wainwright in 1986, a major construction program was undertaken to build support facilities.

After the closure of Clark Air Base in the Philippines in 1992, the Air Force's COPE THUNDER, a Major Flying Exercise, was moved to Alaska. Through cooperation with the Army, the Air Force improved existing training areas on Fort

Wainwright and Fort Greely. These improvements include mock enemy air bases and a variety of equipment designed for aircrew training.

In April 1997, the Air Force's Military Operations Areas (MOA) Environmental Impact Statement was completed and corresponding airspace action approved by the Federal Aviation Administration. The new infrastructure provided Military Operations Areas connecting the training areas on Fort Wainwright and Fort Greely to support the Air Force mission in Alaska.

In the post Cold War period, the Base Realignment and Closure (BRAC 95) program identified Fort Greely for realignment. Approximately 1,800 acres of Main Post may be transferred under appropriate BRAC procedures (see Figure ES.a). Fort Greely realignment is scheduled for completion in July 2001. This realignment process does not affect the lands of this withdrawal renewal.

Selection of Preferred Alternative

The National Environmental Policy Act of 1969 (NEPA) requires a detailed statement of impacts associated with major Federal actions and decisions. A Record of Decision is prepared to document the alternative selected for implementation based on the analysis in the Environmental Impact Statement. Since Congress has the final authority for renewing the military's use of the withdrawal lands, the Army will not issue a Record of Decision following completion and publication of the Final Legislative Environmental Impact Statement. Instead, the Department of Defense and Department of the Interior will select a Preferred Alternative and prepare draft legislation and submit it to Congress. The draft legislation will contain their recommendation based on this Legislative Environmental Impact Statement.

The National Environmental Policy Act also requires that all reasonable alternatives for Federal actions be analyzed. With the input received during the scoping process, the Army examined all possible actions to build an effective and reasonable range of alternatives. The Army and Air Force considered alternatives as reasonable if they could be implemented without impairing their ability to complete their military mission in Alaska. Since Army and Air Force needs require renewal of the existing withdrawals in their entirety, the range of alternatives to be examined in this Legislative Environmental Impact Statement was refined to include only those alternatives that included the entire lands now withdrawn.

Possible alternatives were reviewed and considered to determine the viability of the military achieving their missions in Alaska. Two alternatives were considered in detail in this LEIS; others were considered and eliminated from further study for varying reasons.

Alternatives Considered in Detail

- 1. Deny Withdrawal Renewal (No Action Alternative).
- 2. Approve Withdrawal Renewal for Fifty Years (Preferred Alternative).

Alternatives Eliminated from Further Study

The following alternatives were considered and eliminated from further study in this Legislative Environmental Impact Statement.

1. **Renew Withdrawal for Varying Lengths of Renewal Periods.** The scope of actions would remain virtually the same in comparing renewals for 15, 25, 50, or 100 year increments. Management and use of these withdrawal lands by the military would remain the same under each time period. The 50-year withdrawal is the preferred selection.

2. **Partial Land Withdrawal.** Present Army and Air Force training and testing needs require the use of all existing military lands to fulfill their mission in Alaska (see Figure ES.a). Therefore, the Army and Air Force eliminated this alternative from further study.

3. Relinquish Beaver Creek-South Fork Area in the Fort Wainwright Yukon Training Area to Alaska State Parks. The State of Alaska Division of Parks has requested the Army relinquish jurisdiction to 13,440 acres in the Beaver Creek-South Fork area on the Fort Wainwright Yukon Training Area. This acreage was designated as part of the Chena River State Recreation Area by the State legislature, but is not under its jurisdiction. However, the Air Force has a critical need for the use of the Beaver Creek Valley as the preferred entry route for maneuvering and attacking tactical targets on the Stuart Creek Impact Area, as well as serving as a buffer zone. Therefore, due to the significant impacts to military training and the importance of this area's training infrastructure in achieving combat readiness, the Army and Air Force eliminated this alternative from further study. 4. Bureau of Land Management Retain Authorization for Mineral Extraction. This alternative would allow the Bureau of Land Management the right to grant use of the withdrawal lands for mineral extraction without Army concurrence. It is possible that conflicts between military and mineral use might occur. Military use of the withdrawal lands would be compromised if the Army could not control the use of its training lands. The Army eliminated this alternative from further study.

5. Acquiring Alternate Training Lands. Since military training and testing has occurred on these withdrawal lands for nearly 50 years with portions dedicated as High Hazard Impact Areas, it is likely that complete cleanup and decontamination would be extremely expensive and technologically challenging. It therefore seemed unreasonable and impractical to propose to relocate military training and testing activities to other public lands and to commit resources at these alternate sites as new High Hazard Impact Areas. In addition, acquiring other public lands in Alaska for use by the military could be cost prohibitive.

6. Acquiring Additional Training Lands. U.S. Army Alaska determined acquiring additional land will not be considered in this withdrawal action. Larger training lands would allow the Air Force to fully utilize all weapon systems while training and increase the Army's ability to conduct joint training by utilizing linked training areas. However, additional land acquisition falls outside the scope of this withdrawal renewal action.

Major Conclusions: Discussion of Two Alternatives Considered in Detail

The two alternatives considered in detail are discussed below.

1. The No Action Alternative would occur if Congress does not grant the requested withdrawal renewal. The lands would no longer be available for military use after November 5, 2001.

These lands, in conjunction with the recently approved Military Operations Areas, provide a unique training opportunity. The loss of these training lands would severely reduce combat readiness for military units worldwide.

If the military land withdrawals are not renewed, jurisdiction of the noncontaminated land would revert to the Bureau of Land Management. The State has already selected these lands in accordance with Alaska National Interest Non-military activities will have impacts as well. Increased activity will bolster the economy, but could be detrimental to the environment. For example, mining activities could potentially impact habitat and affect water quality.

However, interior Alaska holds promise for many activities, with or without the subject military lands.

2. The Preferred Alternative would renew the existing military withdrawals for 50 years until November 6, 2051. The permitting legislation may include mitigation direction as well. As is presently the case, these lands would be reserved for use by the Secretary of the Army for military maneuvering, training, equipment development and testing, and other defense-related purposes.

During the withdrawal period, the Secretary of the Interior and Secretary of the Army would manage the lands subject to conditions and restrictions necessary to permit the military use of these lands. The Secretary of the Army would close any road, trail, or portion of the lands to public use if necessary for public safety, military operations, or national security. The Secretary of the Interior would issue a lease, easement, right-of-way, or other authorization for nonmilitary use of these lands with the concurrence of the Secretary of the Army. Hunting, fishing, and trapping on these lands would be permitted in accordance with the provisions of Military Reservations and Facilities: Hunting, Fishing, and Trapping (Section 2671 of title 10, USC).

These military lands are a major component of the military operation in Alaska. The U.S. Army Alaska Mission Statement states: "Provide trained and equipped forces to deploy rapidly in support of worldwide joint military operations, crisis response, and peacetime engagements; maintain quality of life and force projection platform; and serve as the Army Component Command to Alaskan Command (ALCOM)."

The goals of Army training are to produce a force trained to mobilize, deploy, fight, and win anywhere in the world. Army training conditions must match or closely resemble all possible environments throughout the world, including the Arctic and Subarctic.

Northern regions make up roughly 45% of North America and 65% of the Eurasian land mass. A theater of military operations in a northern region presents unique tactical challenges. During the winter, low temperatures, frozen

ground, snow, ice, and long periods of darkness hinder all military operations. During the summer, extensive overland movement is difficult because permafrost prevents drainage and extensive swampy areas result (Richmond 1991). The need for special Arctic warfare skills continues to be essential in the face of changes in warfare technology (Swinzoe 1993). Arctic testing of Army material assures it is suitable for operations and maintenance by the typical soldier under the severe conditions that exist in the natural environment during Arctic warfare.

Fort Wainwright and Fort Greely Training Areas offer mass areas suitable for artillery and mortar indirect fire weapons, aerial gunnery, small arms, platoon to brigade exercises, road marches, and bivouacs. These Army lands also offer the military unique training opportunities for glacier training, mountaineering, river rafting, technical climbing, and ice bridge construction.

Fort Greely provides a natural year-round mountainous and cold regions testing environment that cannot be duplicated by a manmade cold chamber. Fort Greely is suitable for testing weapon systems requiring large amounts of surface area and airspace or where visibility is important. The vast extent of the Fort Greely West Training Area provides the necessary Impact Area and Buffer Zone to permit testing of long and medium-range weapon systems, artillery, and rockets. Air drops of personnel and equipment, including large resupply missions, are essential to modern day warfare. The Fort Greely East Training Area is superior to other test sites in terrain, wind currents, accessibility, and ability to retrieve equipment and supplies. It has desirable ground cover, snow conditions, and weather, and is comparatively snowdrift free due to little or no vegetation, typical of Arctic desert areas in northern regions of the world. The Granite Mountains and Donnelly Dome shield the Donnelly Drop Zone from severe wind conditions that could interfere with air drop tests.

Major units located at Fort Greely are the Cold Regions Test Center and the Northern Warfare Training Center. Its lands are used for testing and evaluating weapons and equipment under conditions of extreme cold, and training forces for military action in Arctic and Subarctic regions.

The Cold Regions Test Center is responsible for testing vehicles, weapon systems, clothing, and individual equipment under conditions of extreme cold. The Center is charged with (1) planning, conducting, and reporting on environmental phases of development tests; and (2) providing advice and guidance on test and evaluation matters to material producers, other armed services, and private industry. The Cold Regions Test Center is the only Department of the Army facility that tests outside at temperatures below freezing. All military equipment should be designed and tested to a Basic Cold (-5°F to - 25°F) level and occasionally Severe Cold (below -50°F) levels.

Fort Greely's climate provides Cold (-25°F to -50°F) level testing from October through March. This winter season allows a longer period for repetitive, rigorous testing to ensure all components have been adequately and properly assessed (CRTC 1997).

The Northern Warfare Training Center is responsible for training military forces for action in Arctic and Subarctic regions. The Center trains individuals and units in Arctic and mountaineering skills. The Center conducts high-altitude search and rescue missions, tests and evaluates mountaineering techniques and equipment, and trains and equips the Military Mountaineering Team of the U.S. Army Mountain Team. Instruction in winter skills include snowshoe movement, allterrain skiing, route selection, risk management, and shelter construction. Summer skills instruction include technical climbing, fixed rope installations, glacier travel, stream crossing, route selection, and risk management.

Fort Wainwright Yukon Training Area is a year-round accessible training area for military units. The area is suitable for indirect fire weapons, aerial gunnery, small arms, road marches, bivouacs, and platoon to brigade live fire exercises. In addition, Fort Wainwright's Stuart Creek Impact Area (R2205) is the only Impact Area in Alaska that allows continued year-round use that is not restricted by fire indicies. Except for Major Flying Exercises, the majority of military training is conducted in the Fort Wainwright Yukon Training Area.

While the Army has need for the size and unique qualities of the renewal lands, the U.S. Air Force (USAF) is also a major user of Fort Wainwright and Fort Greely. As U.S. Air Forces-Alaska, the 11th Air Force plans, conducts, and coordinates air operations in accordance with tasks assigned by the Commander, Pacific Air Forces (PACAF). Key to the effectiveness of training is the ability to conduct air-to-air and air-to-ground operations in the same airspace.

The Department of Defense has identified Stuart Creek and Fort Greely's Oklahoma/Delta Creek Impact Areas as the primary sites for military aircraft airto-ground training. With the recent additional Military Operations Areas, tactical operations are also conducted in and around Fort Greely West Training Area (USAF 1992, USAF 1995). The military has invested approximately \$100 million in range and infrastructure improvements.

USAF currently has an estimated \$50 million worth of electronic and target equipment on Army withdrawn lands in Alaska supporting Air Force and joint

training. For successful accomplishment of the mission of "maintaining a level of readiness necessary for successful completion of military operations", Eleventh Air Force units use, on a daily basis, the special use airspace in Alaska to hone their warfighting ability. Air assets of the Air Force, Navy, and Marine Corps take advantage of PACAF's COPE THUNDER exercise program, staging out of Eielson Air Force Base near Fairbanks and Elmendorf Air Force Base near Anchorage. Air assets of all services also participate in the NORTHERN EDGE exercise program, sharpening tactical level skills in a joint training environment.

Alaska stands out as one of the very few places left where all conditions to conduct large-scale joint operations can be satisfied. The U.S. Alaskan Command (ALCOM) mission of "command, control, and coordinate joint and combined operations as a subordinate unified command in Alaska ..." requires the opportunities offered by the combined and synergistic effect of Alaska's Military Operations Areas, Restricted Areas, and withdrawn lands. As the Department of Defense's premier large-scale joint and combined training opportunity, the NORTHERN EDGE exercise program provides participating units with virtually all the features desired for full scale Joint Task Force training exercises and rehearsals. The ability to concurrently employ air and ground conventional weapons in combination with large scale maneuver makes Alaska a prime choice for joint training operations.

Issues

Concerns and comments presented during the scoping process by agencies and the public helped to identify potential issues. Potential issues were determined to be significant if they fell within the scope of the proposed action, they suggested different actions or mitigation, and they influenced the decision on the proposed action. Impact analysis was completed for each significant issue to determine the environmental consequences of the Preferred and No Action alternatives. The significant issues analyzed in this Legislative Environmental Impact Statement are:

Access: Conflicts of public use of the withdrawal lands and its airspace for recreational activities. This issue will not be resolved in this LEIS.

Air Quality: Impacts on air quality due to military use, particularly vehicle emissions and ice fog.

Contamination: Impacts of ammunition contamination on land and water resources from military training and testing.

Noise: Impacts of increased noise levels due to military use.

Submerged Lands: Impacts on water quality of submerged lands (property below the mean high level water mark) due to military use, and jurisdiction of submerged lands on the withdrawal properties, particularly the Delta River. The jurisdiction of submerged lands on the withdrawal properties will not be resolved in this LEIS.

Wildlife: Impacts on wildlife and their habitat due to military use, particularly moose, caribou, and bison.

Only a limited number of studies for many resources have been conducted by the military or Federal and State agencies. In many instances, comparative data were incomplete and/or unavailable. Thus, the ability to conduct quantitative evaluations was limited. Where data were available, site specific references are included within the individual resource sections.



÷	Figure ES.a
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XXX	Other Military Withdrawal Boundaries
大大大人	Adjacent Military Installations
EXE	💛 Trans-Alaska Pipeline
F.T.Y.	N Road
ot ke	│ Stream
- A	Glacier
The second	SCALE 1 : 750,000 5 0 5 10 15 20 25 30 35 Kilometers 5 0 5 10 15 20 Miles
	Sources: U.S. Army Alaska U.S.G.S. 7.5 Minute Quadrangles

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Scoping Summary

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PURPOSE OF AND NEED FOR ACTION

The Department of the Army has determined there is a continuing military need for the use of Alaska lands now withdrawn from public use under the Military Lands Withdrawal Act (Public Law 99-606) and is requesting to renew the withdrawals through new legislation. U.S. Army Alaska proposes to renew its use of the Fort Wainwright Yukon Training Area (formerly known as the Fort Wainwright Maneuver Area), Fort Greely West Training Area (formerly known as the Fort Greely Maneuver Area), and Fort Greely East Training Area (formerly known as the Fort Greely Air Drop Zone); each is greater than 5,000 acres. The Engle Act (Public Law 85-337), enacted February 28, 1958, allows the Department of Defense to apply for withdrawal of public land for defense purposes; for a withdrawal involving more than 5,000 acres, the Act requires Congressional approval.

The Military Lands Withdrawal Act requires the Army to publish, by November 6, 1998, a Draft Environmental Impact Statement (EIS) for the continued or renewed withdrawal of these lands.

1.1 MILITARY LANDS WITHDRAWAL ACT

The Military Lands Withdrawal Act, enacted by Congress on November 6, 1986, identified the Fort Greely Maneuver Area (now known as the Fort Greely West Training Area) and Fort Greely Air Drop Zone (now known as the Fort Greely East Training Area), and Fort Wainwright Yukon Maneuver Area (now known as the Fort Wainwright Yukon Training Area), as lands withdrawn from public use until November 6, 2001. Subject to valid existing rights, these lands are withdrawn from all forms of appropriation under the public land laws (including the mining laws and the mineral leasing and the geothermal leasing laws), under "An Act to Provide for the Admission of the State of Alaska into the Union" approved July 7, 1958 (Public Law 85-508), and under the Alaska Native Claims Settlement Act (Public Law 92-203).

The Act specifies that these lands are reserved for use by the Secretary of the Army for military maneuvering, training, equipment development and testing, as well as other defense-related purposes. The Secretary of the Interior and Secretary of the Army manage the lands subject to conditions and restrictions necessary to permit the military use of these lands. The Secretary of the Army can close any road, trail, or portion of the lands to public use if necessary for public safety, military operations, or national security. The Secretary of the

Interior can issue a lease, easement, right-of-way, or authorization for nonmilitary use of these lands with the concurrence of the Secretary of the Army. Hunting, fishing, and trapping on these lands is permitted in accordance with the provisions of Military Reservations and Facilities: Hunting, Fishing, and Trapping (Section 2671 of Title 10, United States Code).

1.1.1 Description of Fort Wainwright Yukon Training Area

Fort Jonathan Wainwright lies approximately 120 miles south of the Arctic Circle near the City of Fairbanks in interior Alaska. The installation consists of the Main Post, the Tanana Flats Training Area, and the Fort Wainwright Yukon Training Area, covering 915,098 acres (Figure 1.a). Fort Wainwright is the fourth largest Army training area in the United States (USARAK Public Affairs Office).

The Fort Wainwright Yukon Training Area is a rectangular-shaped 390 squaremile parcel covering approximately 247,952 acres. It is located 16 miles eastsoutheast of Fairbanks and immediately east and adjacent to Eielson Air Force Base. The Training Area lies east of the Tanana River between the Chena and Salcha Rivers, and northeast of the Richardson Highway.

Appendix 1.A contains the legal boundary description of the Fort Wainwright Yukon Training Area.

1.1.2 Description of Fort Greely West and East Training Areas

Fort Greely is approximately 105 miles southeast of Fairbanks near the City of Delta Junction in interior Alaska. The installation covers approximately 662,000 acres. Fort Greely contains the Main Post, West and East Training Areas, and three outlying training sites: Gerstle River Test Site, Black Rapids Training Area, and Whistler Creek Rock Climbing Area (Figure 1.a).

The West Training Area is a 894 square-mile parcel bounded by the Richardson Highway to the east and the Little Delta River to the west. It covers approximately 571,995 acres with the Delta River flowing north through the eastern portion. The East Training Area is a separate 81 square-mile parcel stretching east of the Richardson Highway to Granite Creek. It covers approximately 51,590 acres.

The two training areas are separated at the north by the Main Post withdrawal, and at the south by a transportation corridor withdrawal utilized by the Trans-Alaska oil pipeline and the Richardson Highway.

Appendix 1.A contains the legal boundary descriptions for the Fort Greely West and East Training Areas.

1.2 NEED FOR ACTION

The U.S. Army Alaska Mission states "Provide trained and equipped forces to deploy rapidly in support of worldwide joint military operations, crisis response, and peacetime engagements; maintain quality of life and force projection platform; and serve as the Army Component Command to Alaskan Command (ALCOM)."

The goals of Army training are to produce a force trained to mobilize, deploy, fight, and win anywhere in the world. Army training conditions must match or closely resemble all possible environments throughout the world, including Arctic and Subarctic conditions.

Northern regions make up roughly 45% of North America and 65% of the Eurasian land mass. A theater of military operations in a northern region presents unique tactical challenges. Low temperatures, frozen ground, snow, ice, and long periods of darkness during the winter hinder all military operations. Winter warfare skills must be learned by instruction and intensive training to survive these challenges. During the summer, extensive overland movement is difficult because permafrost prevents drainage and extensive swampy areas result (Richmond 1991).

Many military operations will be affected by the environment under which they are conducted. The effect of the Arctic and Subarctic environment on material and personnel must be understood for survival (Richmond 1991). Historically, one fatal error that recurs with regularity is unpreparedness for winter warfare. The need for special Arctic warfare skills continues to be essential in the face of changes in warfare technology (Swinzoe 1993).

The trend in warfare has moved toward a highly mobile air and ground force supported by massive firepower capable of attacking over much wider and deeper areas. The increased range, speed, and firepower inherent in combat units equipped with modern weapon systems have increased the need for maneuver acreage. Heavier and faster vehicles, longer combat engagement distances, and increased use of combined arms exercises have made it essential to retain existing training lands and maintain them for realistic training situations under all environmental conditions.

Battlefield conditions must be reflected in military training to adequately prepare units for combat. Military units need as much space to fire and maneuver in training as they would in combat (DA 1991). Testing and training requirements of existing and developing sophisticated weapon systems require large tracts of land. The Alaska Army withdrawal renewal lands together total approximately 871,537 acres.

Fort Wainwright and Fort Greely Training Areas are mass areas suitable for artillery and mortar indirect fire weapons, aerial gunnery, small arms, platoon to brigade exercises, road marches, and bivouacs. These Army lands also offer the military unique training opportunities for glacier training, mountaineering, river rafting, technical climbing, and ice bridge construction.

Fort Greely is suitable for testing weapon systems requiring large amounts of surface and airspace, or where visibility is important. The vast extent of the West Training Area provides the necessary Impact Area and Buffer Zone to permit testing of long and medium range weapon systems, artillery, and rockets.

Fort Greely provides a natural year-round mountainous and cold regions testing environment that cannot be duplicated by a manmade cold test chamber. Sophisticated equipment has recreated segments of the Arctic environment in climatic chambers. However, the synergistic effects of temperature, wind, and snow cannot be artificially duplicated. Arctic testing of Army equipment assures it is suitable for operations and maintenance by the typical soldier under the severe conditions that exist in the natural environment during winter warfare. Frequently, equipment that has passed cold chamber testing has failed during field testing on the Alaska Army lands. Reliable military equipment in all combat situations are essential for successful missions.

Air drops of personnel and equipment including large resupply missions are essential to modern day warfare. The Fort Greely Training Areas are superior to other tested sites in terrain, wind currents, accessibility, and ability to retrieve equipment and supplies. They also have desirable ground cover, snow conditions, and weather.

The Donnelly Drop Zone in the Fort Greely East Training Area is comparatively snowdrift free due to little or no vegetation. The Granite Mountains and Donnelly Dome shield the Donnelly Drop Zone from severe wind conditions that could interfere with airborne operations. Unfavorable winds are encountered only 22% of the time (Department of the Army Letter dated January 21, 1974).

The Northern Warfare Training Center is responsible for training military forces for action in Arctic and Subarctic regions. The Center trains individuals and units in Arctic and mountaineering skills. The Center conducts high-altitude search and rescue missions, tests and evaluates mountaineering techniques and equipment, and trains and equips the military mountaineering team of the U.S. Army Mountain Team. Instruction in winter skills include snowshoe movement, allterrain skiing, route selection, risk management, and shelter construction. Summer skills instruction include technical climbing, fixed rope installations, glacier travel, stream crossing, route selection, and risk management.

Fort Wainwright Yukon Training Area is the closest year-round accessible training area for the units stationed at Fort Wainwright. In addition, Fort Wainwright's Stuart Creek Impact Area is the only Impact Area in Alaska that allows continued year-round use that is not restricted by fire indicies. Except for major exercises, the majority of military training is conducted in the Fort Wainwright Yukon Training Area.

The U.S. Air Force (USAF) is a major user of Fort Wainwright and Fort Greely. As U.S. Air Forces-Alaska, the 11th Air Force plans, conducts, and coordinates air operations in accordance with tasks assigned by the Commander, Pacific Air Forces (PACAF). Key to the effectiveness of training is the ability to conduct airto-air and air-to-ground operations in the same airspace. The Department of Defense has identified the Stuart Creek and Oklahoma/Delta Creek Impact Areas as the primary sites for military aircraft air-to-ground training. The Air Force conducts air-to-ground training in the restricted airspace (R2202 and R2205) over the Training Areas. Restricted area R2205 over the eastern portion of the Fort Wainwright Yukon Training Area is the primary tactical air-to-ground weapons range for the Air Force in Alaska. With the recent addition of Military Operations Areas around R2202, tactical operations are conducted in and around Fort Greely (Figure 1.b) (USAF 1992, USAF 1995).

The military has invested approximately \$100 million in range and infrastructure improvements. The USAF currently has an estimated \$50 million of electronic and target equipment on Army withdrawn lands in Alaska supporting Air Force and joint training. For successful accomplishment of the mission of "maintaining a level of readiness necessary for successful completion of military operations", 11th Air Force units use, on a daily basis, the special use airspace in Alaska to hone their warfighting ability. Air assets of the Air Force, Navy, and Marine Corps take advantage of PACAF's COPE THUNDER exercise program, staging out of Eielson Air Force Base near Fairbanks and Elmendorf Air Force Base near Anchorage. Air assets of all services also participate in the NORTHERN EDGE exercise program, sharpening tactical level skills in a joint training environment. A single range cannot handle multiple flights of fighter aircraft simultaneously, therefore both the Fort Wainwright Yukon Training Area and the Fort Greely West Training Area are needed to fulfill the aircraft training operations of the 11th Air Force (USAF 1992).

Alaska stands out as one of the very few places left where all conditions to conduct large-scale joint operations can be satisfied. The U.S. Alaskan Command (ALCOM) mission of "command, control, and coordinate joint and combined operations as a subordinate unified command in Alaska ..." requires the opportunities offered by the combined and synergistic effect of Alaska's Military Operations Areas, Restricted Areas, and withdrawn lands. As the Department of Defense's premier large-scale joint and combined training opportunity, the NORTHERN EDGE exercise program provides participating units with virtually all the features desired for full scale Joint Task Force training exercises and rehearsals. The ability to concurrently employ air and ground conventional weapons in combination with large scale maneuver makes Alaska a prime choice for joint training operations.

Realistic training situations must exist to ensure the combat readiness of our armed forces in all environments. The Arctic and Subarctic military training and testing conducted in Alaska cannot be duplicated at any other Army installation. Large investments made by the United States in military training and testing facilities on Fort Wainwright and Fort Greely would be lost without the withdrawal renewal. More importantly, the combat readiness of not only the forces in Alaska but all armed forces will be compromised without effective Arctic and Subarctic training and testing. This in turn, threatens the military's national defense capabilities and its ability to protect U.S. forces and interests worldwide.

1.3 PROPOSED ACTION

The Department of the Army has determined there is a continuing military need for the use of the Fort Wainwright Yukon Training Area and the Fort Greely West and East Training Areas. The Military Lands Withdrawal Act requires the completion of a Draft Environmental Impact Statement in order to renew the withdrawals through new legislation; therefore, U.S. Army Alaska is preparing the Draft and Final Legislative Environmental Impact Statements as part of this process (see Figure 1.a).

1.4 DECISION TO BE MADE

The Engle Act of 1958 requires that withdrawals of public land greater than 5,000 acres for defense purposes must be approved by Congress. The Alaska Army lands withdrawal renewals are each greater than 5,000 acres and total approximately 871,537 acres.

Since Congress has the final authority for renewing the military's use of the withdrawal lands, the Army will not issue a Record of Decision following completion and publication of the Final Legislative Environmental Impact Statement. Instead, the Department of Defense and Department of the Interior will prepare draft legislation and submit it to Congress. The draft legislation will contain the agencies' recommendations based on the impact analysis in this Legislative Environmental Impact Statement. Congress can deny the withdrawal renewal by not passing legislation or approve the renewal by passing legislation. Congress will determine which mitigation measures are implemented as part of the withdrawal by incorporating those into the legislation.

Completion and publication of the Final Legislative Environmental Impact Statement is scheduled for the spring of 1999. Submission of draft legislation to Congress is scheduled for the fall of 1999. The existing withdrawals authorizing the military's use of the Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas expire November 6, 2001.

1.5 COOPERATING AGENCIES

The Bureau of Land Management, Northern Field Office, Fairbanks, Alaska and the 11th Air Force, Pacific Air Forces are cooperating agencies in the preparation of this Legislative Environmental Impact Statement and have actively participated in its development and review.

The Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas are withdrawn from public use for military purposes. The Secretary of the Interior and Secretary of the Army manage the lands subject to conditions and restrictions necessary to permit the military use of these lands. The Army is required to prepare and submit withdrawal applications to the Bureau of Land Management, and the agencies will work together to draft the proposed legislation to be submitted to Congress.

1.6 INTERAGENCY COORDINATION

The State of Alaska was notified by the Army of its intent to renew the Alaska Army land withdrawals for military purposes. The Army has worked closely with various departments of the State to define potential impacts of the Proposed Action and No Action Alternatives. Pursuant to Section 7 of the Endangered Species Act, U.S. Army Alaska consulted with the U.S. Fish and Wildlife Service to determine potential impacts of the Proposed Action on threatened, endangered, and proposed species found on the withdrawal lands (see Chapter 3.14, 4.14 and Appendix 3.14).

The Alaska State Historic Preservation Office has been contacted regarding potential impacts of the Proposed Action on cultural resources and possible compliance requirements per Section 106 of the National Historic Preservation Act (see Chapter 3.18, 4.18 and Appendix 3.18.B).

Since 1980, native and non-native subsistence uses on Federal public lands in Alaska have been regulated by Title VIII of the Alaska National Interest Lands Conservation Act (ANILCA) (Public Law 96-487). Title VIII addresses the rights of customary and traditional subsistence users by giving "rural" Alaskans, those who actually depend upon subsistence uses, preference in the take of fish and wildlife on Federal lands (Public Law 96-487, Sec. 801, Sec. 802). At the last renewal of these withdrawn lands (1986), the Bureau of Land Management determined the military withdrawals did not significantly impact subsistence use (see Appendix 3.20).

The Army has also solicited input and consulted with Native Alaskan tribes in accordance with the requirements of Executive Order 13007 and Department of Defense interpretive guidance.

1.7 SCOPING

The Council on Environmental Quality regulations implementing the National Environmental Policy Act of 1969 require an early and open process to inform the public of a proposed action and identify significant issues related to the action. U.S. Army Alaska invited and encouraged agency and public participation in the scoping process for this Legislative Environmental Impact Statement.

Public and agency preliminary scoping meetings were held to discuss the withdrawal renewal process and accept comments on the military's continued use of the withdrawal lands. The public meetings were announced in local and regional newspapers, and flyers were posted throughout the communities of Anchorage, Fairbanks, Delta Junction, Salcha, and North Pole. Public meetings were held at the following locations:

June 24, 1997	Delta Junction Community Center	Delta Junction
June 25, 1997	Noel Wien Library	Fairbanks
June 26, 1997	Z.J. Loussac Library	Anchorage
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Letters were sent to local, State, and Federal agencies, and local, State, and Federal governmental authorities inviting their participation in either the public or agency meetings. Agency meetings were held:

June 25, 1997	Fort Wainwright	Fairbanks
June 26, 1997	Fort Richardson	Anchorage

The Notice of Intent to prepare a Legislative Environmental Impact Statement was published in the *Federal Register* on October 15, 1997. Scoping meetings were announced in local and regional newspapers twice a week throughout the month prior to the scheduled meetings. An open house and meeting were held at each of these locations:

December 2, 1997	Fort Greely	Delta Junction
December 3, 1997	Carlson Center	Fairbanks
December 4, 1997	Russian Jack Chalet	Anchorage

The scoping comment period extended from publication of the Notice of Intent through February 4, 1998. During this period, verbal and written comments were accepted. All comments received have been compiled into a Scoping Summary, which is part of the Planning Record and is included in this Final LEIS following the Appendices.

1.8 ISSUES

Concerns and comments presented during the scoping process by agencies and the public helped to identify potential issues. Potential issues were determined to be significant if they fell within the scope of the proposed action, they suggested different actions or mitigation, and they influenced the decision on the proposed action. Impact analysis was completed for each significant issue to determine the environmental consequences of the Preferred and No Action Alternatives. The significant issues analyzed in this Legislative Environmental Impact Statement are:

Access: Conflicts of public use of the withdrawal lands and overlaying airspace for recreational activities. This issue will not be resolved in this LEIS.

Air Quality: Impacts on air quality due to military use, particularly vehicle emissions and ice fog.

Contamination: Impacts of ordnance contamination on land and water resources from military training and testing.

Noise: Impacts of noise levels due to military use.

Submerged Lands: Impacts on water quality of submerged lands (property below the mean high level water mark) due to military use, and jurisdiction of submerged lands on the withdrawal properties, particularly the Delta River. The jurisdiction of submerged lands on the withdrawal properties will not be resolved in this LEIS.

Wildlife: Impacts on wildlife and their habitat due to military use, particularly moose, caribou, and bison.

Table 1.a provides a cross reference for locating the significant issues within the impact analysis of this document.

ISSUES	AFFECTED ENVIRONMENT	ENVIRONMENTAL CONSEQUENCES
Access	Chapters 3.16 and 3.17	Chapters 4.16 and 4.17
Air Quality	Chapter 3.2.1	Chapter 4.2.1
Contamination	Chapter 3.6, 3.8.2	Chapter 4.6, 4.8.2
Noise	Chapter 3.22	Chapter 4.12, 4.14, 4.22
Submerged Lands	Chapter 3.1.1, 3.8.2	Chapter 4.1, 4.8.2
Wildlife	Chapter 3.12, 3.13, 3.14	Chapter 4.12, 4.13, 4.14

Table 1.a Significant Issues Analysis.

Issues identified by the public or agencies, but determined not to be significant, are included in the analysis of the LEIS. These include timber management (Chapter 3.11 and Chapter 4.11) and mineral resource exploration (Chapter 3.5 and Chapter 4.5). Effects, including temporal impacts, of military training and testing on a Subarctic environment were included in the analysis of the significant issues and resources found on the withdrawal renewal lands.

1.9 ISSUES OUTSIDE THE SCOPE OF THIS LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT

U.S. Army Alaska reviewed all of the concerns and comments presented during the scoping process to identify potential issues. All issues, concerns, and comments received during the scoping process are included in the Scoping Summary. Issues falling outside the scope of the proposed action to renew the land withdrawals were eliminated from further review. The Scoping Summary identifies all issues eliminated from analysis with an explanation for their elimination. The Scoping Summary follows the Appendices in this LEIS.

1.10 REGULATORY REQUIREMENTS

1.10.1 Withdrawal Renewal Requirements

To renew the public land withdrawals for military purposes, the Army must fulfill withdrawal requirements of certain laws and regulations. Each of these laws and regulations contain specific requirements that must be completed. Table 1.b contains a matrix of the requirements with their source location.

The Engle Act of 1958 (43 U.S. Code 155 et seq.) states that all withdrawals of public land of more than 5,000 acres for defense purposes must be approved by Congress. Congress must pass legislation to renew the Alaska Army lands withdrawal.

The Military Lands Withdrawal Act of 1986 (MLWA) (100 Stat. 3457 et seq.) identified the Fort Greely West and East Training Areas and the Fort Wainwright Yukon Training Area as lands withdrawn from public use for military purposes until November 6, 2001. The Act requires the Army publish a Draft Legislative Environmental Impact Statement by November 6, 1998, to renew its use of these lands.

The Federal Land Policy and Management Act of 1976 (FLPMA) (43 U.S. Code 1701 et seq.) establishes public land policy to provide for the management, protection, development, and enhancement of public lands administered by the Bureau of Land Management. The Secretary of the Interior, through the Bureau of Land Management, has the responsibility to coordinate the withdrawal process of public lands under this Act.

Land Withdrawal Regulation (43 CFR Part 2300) (BLM Regulations (Regs)) of the Bureau of Land Management, Department of the Interior, establishes the

Bureau's procedures to process applications that make, modify, or extend Federal land withdrawals.

Alaska National Interest Lands Conservation Act (ANILCA) (Sections 801 and 802) establishes the rights of customary and traditional subsistence users by giving rural Alaskans, those who actually depend upon subsistence uses, preference in the take of fish and wildlife on Federal lands.

REQUIREMENT	ENGLE ACT	FLPMA	BLM REGS	MLWA	ANILCA	DOCUMENT	LOCATION
Name and address of applicant, and using agency if other than applicant	x		X	-	-	LEIS and Application	Chapter 1, 2.1.3
Preparer's qualifications of all information, studies, analyses, and reports	-	-	x	-	-	LEIS and Application	Chapter 5
Delegation of authority of official acting on behalf of the department or agency	-	-	х	-	-	Application	Application
Location of withdrawal area, detailed boundary description including excepted areas	х	-	x	-	-	LEIS and Application	Appendix 1.A
Gross land and water acreage within withdrawal exterior boundaries and net land and water acreage of application	x	-	x	-	-	Application	Application
Duration of withdrawal	×	x	x	-	2	LEIS and Application	Chapter 2.1.3

Table 1.b Withdrawal Renewal Requirements Matrix (x=indicates a requirement of the law or regulation).

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REQUIREMENT	ENGLE ACT	FLPMA	BLM REGS	MLWA	ANILCA	DOCUMENT	LOCATION
Description of use of the lands if withdrawal allowed, and analysis of how the lands and its natural resources would be used to implement purpose	x	x	x	-	-	LEIS and Application	Chapter 1, 2.1.3, and 3
Lands subject to withdrawal application under administration by agency other than dept. of the interior must include written consent from other dept. Head	-	-	х	-	-	Application	Application
Identify present users of withdrawal land and affect on them; and analyze existing and potential resource uses which conflict with proposed use; economic analysis of continuation, alteration, or termination of existing uses		x	-	X	-	LEIS and Application	Chapter 1, 2, 3, 4 and Application
Type of withdrawal action requested - making, extension or modification	-	-	х	-	-	LEIS and Application	Chapter 1

Alaska Army Lands Withdrawal Renewal

REQUIREMENT	ENGLE ACT	FLPMA	BLM REGS	MLWA	ANILCA	DOCUMENT	LOCATION
Identify existing withdrawals if application overlaps or adds lands; identify by project name, date of order, number and type of order, or copy of order; total area and legal description of overlapped area; and total acreage added to existing withdrawal if allowed	-	-	x	-	-	Application	Application
Location of withdrawal records for review	-	х	х	-	-	Application	Application
Identify suitable alternate sites and cost of obtaining them, and projected costs of obtaining and developing each alternate site for uses the withdrawal would displace	-	x	x	-	-	Application	Application
Statement whether water is needed to fulfill purpose of withdrawal action	х	-	х	-	-	Application	Application
Identify wetlands and floodplains on withdrawal lands, and effects on them, and how they would affect the withdrawal purpose	-		x	-	-	LEIS	Chapter 3.8.1, 3.8.2, 3.10, 4.8, 4.10

Table 1.b Withdrawal Renewal Requirements Matrix (x=indicates a requirement of the law or regulation).

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REQUIREMENT	ENGLE ACT	FLPMA	BLM REGS	MLWA	ANILCA	DOCUMENT	LOCATION
Effects on public land laws and federal regulations relating to conservation, utilization, and development of mineral resources, timber, and other material sources, grazing resources, fish and wildlife resources, water resources, and scenic, wilderness and other values	X	-	x	-	-	LEIS	Chapter 2, 3, and 4
Type of temporary land use which may be permitted or allowed by blm during segregation period	-	-	х	-	-	LEIS and Application	Chapter 2.1.3 and Application
Extent withdrawal lands are withheld from settlement, sale, location or entry under public land laws and mining laws; and time and extent of temporary segregation	-	x	X	-	-	LEIS and Application	Chapter 2.1.3
Identify permanent or temporary contamination from proposed use on any or all of requested withdrawal, reservation, or restriction area	х	-	-	-	-	LEIS	Chapter 2.1.3

Alaska Army Lands Withdrawal Renewal

REQUIREMENT	ENGLE ACT	FLPMA	BLM REGS	MLWA	ANILCA	DOCUMENT	LOCATION
Economic impact analysis of proposed withdrawal use on individuals, local communities, state and local government interests, regional economy, and nation	-	x	x	-	-	LEIS	Chapter 3.19, 4.19
Explain why right-of- way or cooperative agreement will not provide for proposed use	-	x	-		-	Application	Application
Mineral resources report	-	х	х	-	-	LEIS	Chapter 3.5, 4.5
Environmental impact statement	-	-	х	х	-	LEIS	LEIS
Prepare resource management plan and implementation program regarding use and management of public lands and their resources	-	-	x	x		Application	Application
Inventory of natural resource uses and values on site and adjacent lands; affects on them by withdrawal, particularly degradation of the environment; and economic impact of change in use on individuals, communities, and the nation	-	x	-	-	-	LEIS	Chapter 3 and 4
Threatened and endangered species biological assessment	-	-	x		-	LEIS	Chapter 3.14, 4.14

Table 1.b Withdrawal Renewal Requirements Matrix (x=indicates arequirement of the law or regulation).

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REQUIREMENT	ENGLE ACT	FLPMA	BLM REGS	MLWA	ANILCA	DOCUMENT	LOCATION
Identify roadless areas with wilderness characteristics	-	-	х		-	Application	Application
Statement of consultation with federal, state, regional, and local agencies, groups, and individuals on the proposed action	-	х	x	-	-	LEIS	Chapter 1.5, 7, and 8
Public involvement in environmental review process	-	x	х	-	-	LEIS	Chapter 1.7, Scoping Summary
Cultural resources report in accordance with 36 cfr part 800, and prepare 810 report	н	-	x	-	x	LEIS	Chapter 3.18, 3.20, 4.18, 4.20
Draft legislation prepared by authorized officer and applicant, include recommendations of secretary of the interior	x	-	x	х	-	Draft Legislation	Draft Legislation

1.10.2 Legislative Environmental Impact Statement

The Army has completed this Legislative Environmental Impact Statement to fulfill the requirement of the Military Lands Withdrawal Act to renew the Alaska Army lands withdrawal. The Engle Act requires the Alaska Army lands withdrawal renewal be authorized by Congress through legislation because each withdrawal area covers more than 5,000 acres. Congress requires the Army to submit a detailed statement to consider the withdrawal renewal legislation. The Department of Defense directed the Army to complete a Legislative Environmental Impact Statement.

Utilizing existing data, this document evaluates the potential environmental impacts of implementing either of the alternatives for the withdrawal renewal.

The Army prepared this Legislative Environmental Impact Statement in compliance with the National Environmental Policy Act (NEPA) (Public Law 91-190, 42 U.S.C. 4321-4347, as amended), the Council on Environmental Quality *Regulations for Implementing the Procedural Provisions of NEPA* (40 CFR 1500-1508), and the Department of the Army Regulation AR200-2, *Environmental Effects of Army Actions*, 1988.

1.10.3 Federal, State, and Local Laws and Regulations

Federal, State, and local laws and regulations may apply to the proposed action in addition to the NEPA and the withdrawal renewal requirements. All permits, licenses, and other entitlements that must be obtained prior to implementing the proposed action must be listed in this Final Legislative Environmental Impact Statement (40 CFR 1502.25(b)). They are included within the individual resource sections in Chapters 3 and 4 of this document.

1.10.4 Organizational Structure of this LEIS

This document was prepared in accordance with the Council on Environmental Quality regulations. The chapters are organized by presenting separate information first for Fort Wainwright Yukon Training Area, then followed by Fort Greely West and East Training Areas for each topic. Tables and figures presented in each chapter are numbered by first identifying their corresponding chapter, and when applicable, section, and are presented in alphabetical order. For example, Figure 3.2.a identifies the first map (a) in Chapter 3, section 2. Figures and large tables are located at the end of each chapter in which they are first referenced. Appendices are numbered by their corresponding chapter number and when applicable, section number, and located in Volume II.

Chapter 1 Purpose of and Need for Action explains why the Army is considering the withdrawal renewal action.

Chapter 2 Alternatives Including the Proposed Action describes the proposed action and alternatives, and summarizes the environmental consequences of the alternatives.

Chapter 3 Affected Environment describes the relevant environmental resources of the withdrawal lands.

Chapter 4 Environmental Consequences determines the impacts of each alternative on the relevant environmental resources. Cumulative impacts are discussed within the individual resource sections.

Chapter 5 List of Preparers and Contributors identifies the individuals, with their qualifications, who prepared this document and indicates the sections they completed or contributed towards their completion.

Chapter 6 Bibliography documents all sources referenced in this document.

Chapter 7 Agencies and Individuals Contacted identifies local, State, and Federal agencies and individuals who were contacted by the preparers of this document for consultation of their expertise.

Chapter 8 Distribution List identifies all agencies, organizations, and individuals to whom copies of this statement were sent.

Chapter 9 Comments and Responses contains the Army's responses to comments received on the Draft Legislative Environmental Impact Statement.

Appendices contain material prepared for this Legislative Environmental Impact Statement which is either relevant to the decision to be made or is the basis for the analysis completed in this document.

Scoping Summary contains all concerns and comments received during the scoping process.



X	Figure 1.a
11×1	General Locations
大大大	Withdrawal Lands
ほん	Legend
、	PL99-606 Withdrawal Boundary
N. A.	Other Military Withdrawal Boundaries
AXX (Adjacent Military Installations
FYL	💛 Trans-Alaska Pipeline
F.F.F.	N Road
Dot ake	N Stream
	Glacier
A A A A	SCALE 1 : 750,000 5 0 5 10 15 20 25 30 35 Kilometers 5 0 5 10 15 20 Miles
	Sources: U.S. Army Alaska U.S.G.S. 7.5 Minute Quadrangles



	<i>Figure 1.b</i> Special Use Airspace Withdrawal Lands
	Legend
	PL99-606 Withdrawal Boundary
	Other Military Withdrawal Boundaries
	<i>Military Operations Area (MOA)</i>
	Restricted Airspace
	MOA Exclusion Areas
MSL1	N Road
\mathcal{A}	Special Use Airspace Limits Are In Parentheses
2	SCALE 1 : 720,000 5 0 5 10 15 20 25 30 35 Kilometers 5 0 5 10 15 20 Miles
	Sources: US Army Alaska US Air Force, 11th Air Force

CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1	DETAILED DESCRIPTION OF ALTERNATIVES	. 2-1
2.2	COMPARISON OF ALTERNATIVES	2-31
2.3	ALTERNATIVES CONSIDERED AND ELIMINATED	2-34
2.4	IDENTIFICATION OF THE PREFERRED ALTERNATIVE	2-38
2.5	MATRIX OF ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES	2-38

ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter describes in detail the alternatives analyzed in this Legislative Environmental Impact Statement (LEIS) and the alternatives considered and eliminated from further study; it also contains a comparison matrix summarizing the environmental impacts of the alternatives. Through the LEIS process, each alternative is analyzed by an interdisciplinary approach to determine the environmental consequences. This chapter clearly defines the alternatives, particularly the differences of their environmental impacts on the significant issues.

2.1 DETAILED DESCRIPTION OF ALTERNATIVES

The National Environmental Policy Act (NEPA) requires the preparer of an EIS to define and consider reasonable alternatives. Reasonable alternatives are those that are technically implementable. The Army developed possible alternatives for the renewal of the Alaska Army lands withdrawal based on the input received from various State and Federal resource agencies and the public during the scoping process.

NEPA requires a range of alternatives be analyzed in an EIS. Neither NEPA nor the Council on Environmental Quality Implementing Guidelines for NEPA defines range by indicating a specific number of alternatives. Rather, the nature of the project, the scope of proposed actions, and the differing levels of impacts all contribute to the definition of range.

The Army and Air Force reviewed the possible alternatives to determine the viability of the military achieving their mission in Alaska under these alternate options. Military operational parameters and training needs were used to determine if an alternative would satisfy the proposed action.

2.1.1 Military Operational Parameters and Training Needs

There are three general military land uses: (1) Cantonment or Main Post areas, (2) Impact Areas, and (3) Training Areas. The withdrawal renewal lands are utilized only for Impact Area and Training Area land uses.

Impact Areas are permanently designated areas where shelling, bombing, explosive demolition, and direct fire from weaponry occurs. Dedicated Impact Areas are permanently designated areas used to contain fired or launched ammunition and explosives and the resulting fragments, debris, and components. Dedicated Impact Areas are used for less sensitive ammunition and explosives; however, access is still strictly controlled due to the high risk to personnel. High Hazard Impact Areas are permanently designated within the Training Areas and used to contain high explosive ammunition and explosives and the resulting fragments, debris, and components. Access is limited and strictly controlled due to the extreme hazard of unexploded ordnance.

The two-mile wide area surrounding the Impact Area is the Buffer Zone. This zone serves as a barrier between the military activities occurring in the Impact Area and the surrounding areas. The Buffer Zone contains the safety fan of weapons fired at targets in the Impact Area. It provides a safe distance from explosive fragments, debris, and components resulting from live weapon expenditures into Impact Areas. For safety reasons, sections of the Buffer Zone are closed during military activities to military personnel and the public.

Training Areas are designated management areas where specific training and testing occurs. Military use of Training Areas includes maneuver activities, bivouac, foot-use, firing points, firing ranges, drop zones, airstrips, road corridors, and testing of equipment.

Areas used for maneuvering generally provide easy cross-country movement. Military activities conducted on Training Areas include offensive and defensive operations, and tactical movement.

Areas used for bivouac operations are where training units consolidate and rest/recover for a period of time. Bivouac activities include assembly area operations, combat service support operations, and unit security and defense operations.

Foot-use activities often are conducted on areas that prevent vehicular movement. They are dense forests, steep terrain, and wetlands. Foot-use areas are used by units conducting tactical movement and land navigation without vehicles.

Drop Zones or Landing Zones are cleared areas used for inserting troops and equipment. Military activities include airborne assault, air assault in support of combined arms, aeromedical evacuation, and rotary wing aircraft landing zones. Ranges are facilities for weapons firing, demolition, and assault courses usually containing buildings or berms. Military use includes the training and testing of direct fire weapons, hand grenades, demolitions, air-to-ground exercises, and Military Operations in Urban Terrain (MOUT) exercises.

Firing Points are areas from which multiple types of weapon systems are fired. These areas are usually cleared of vegetation and designated with survey markers.

Assault airstrips are facilities used for aircraft landing and take-off operations. They have unpaved surfaces.

Road corridors and trails are access ways maintained for military operations.

Military Operational Parameters

Technological changes in warfare have had a significant impact on training concepts and the space required to conduct effective training. Training involves the management of a three dimensional battlefield, including artillery, missiles, and attack and assault helicopters combined with Air Force air support.

Available training acreage should represent the scale of the modern battlefield. Acreage available on installations for maneuvering may be limited due to Ranges, Impact Areas, untrafficable terrain, Main Post (built-up) areas, and protected areas.

Further restrictions to available maneuver land result from the extensive safety zones that apply to direct and indirect fire weapons ranges. Safety zones contain the surface danger areas and firing limits of munitions. The size of the safety zone varies according to the weapon and munition fired. These zones restrict the amount of available maneuver land when weapons are being used.

Training land requirements are dependent upon the type of unit using the land, their mission, and type of terrain available. Types of units include armored, mechanized infantry, light infantry, air assault, or airborne. Approximate unit troop strengths are:

Platoon	30 - 50 soldiers
Company/Squadron/Troop	. 100 - 300 soldiers
Battalion	500 - 1,000 soldiers
Brigade	000 - 6,000 soldiers
Division	00 - 18,000 soldiers

The brigade (Brigade Combat Team) is the lowest echelon (level) where all battlefield operating systems can be integrated and synchronized. The brigade needs sufficient acreage to realistically deploy its maneuver battalion task forces and to position brigade combat support and combat service support elements.

The battalion is the lowest echelon at which all elements of the combined arms team effectively fight together. It is the focus of the battle in combat. While training emphasis is focused on the battalion level, brigade-sized units need to practice performing major tactical missions in division-sized battles (DA 1991).

Required acreage to complete training tasks are defined as maneuver boxes. Maneuver box areas combine maximum effective weapon ranges with maneuver frontage and depth requirements. The maneuver box is a conceptual template, the size of which must be adapted to particular terrain and battlefield conditions. These area requirements are multiplied by the unit density, the number of repetitions to complete to maintain proficiency, and the number of days per iteration. A brigade-sized maneuver box ranges from 16 x 32 km (126,515 acres) for an isolated training event to 16 x 48 km (189,773 acres) for a flowing scenario training event. A maneuver box for a light brigade unit is 12 x 32 km (94,886 acres). A heavy battalion task force requires a land area of 31 x 8 km (47,443 acres). A division-sized area of operations may range between 2-5 million acres (DA 1991).

2.1.2 No Action Alternative

The No Action Alternative would occur if Congress does not grant the requested withdrawals. These lands would no longer be available for military use after November 5, 2001. The resulting effect on military operations would include a reduction in cold temperature related defense preparedness. The extent of this reduction would be dependent on whether viable substitute lands are available.

After November 5, 2001, the Secretary of Defense would determine the extent the lands are contaminated with explosive, toxic, or other hazardous materials. If the lands are contaminated, the Secretary of the Interior and Secretary of Army would determine if decontamination is practicable and economically feasible. The Secretary of the Army would decontaminate the lands to the extent funds are appropriated for that purpose. If the Secretary of the Interior and Secretary of the Army determine that the lands cannot be decontaminated sufficiently to be opened under public land laws, or it is not practicable or economically feasible to decontaminate, or Congress does not appropriate sufficient funds for the decontamination, the Secretary of the Interior would not be required to accept these lands. The Secretary of the Army must warn the

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Decontaminated land will remain withdrawn from all forms of appropriation, including location and entry under the mining laws and from leasing under the Mineral Leasing Act until further classified by the Bureau of Land Management (BLM). The land would be managed by the BLM under its existing Resource Management Plans until new plans could be developed.

These lands have been selected as general grant lands by the State of Alaska under Section 6(b) of the Alaska Statehood Act and Section 906(e) of the Alaska National Interest Lands Conservation Act (ANILCA) (Public Law 96-487). If the military withdrawal expires and the lands are decontaminated sufficiently to be opened under public land laws, the State selections would become valid and the lands would be adjudicated by the BLM for conveyance of the lands to the State of Alaska subject to valid existing rights (Alaska Department of Natural Resources 1992). It is impossible to predict the likelihood these lands would be adjudicated to the State. For the analysis in this LEIS, we assumed the lands would be adjudicated.

The Fort Wainwright Yukon Training Area was selected by the State for recreation and community development and for its various resource values. The State has assigned the Stuart Creek Impact Area as a low priority selection, with the remainder of the Yukon Training Area either a high or moderate selection. The State ranks the Yukon Training Area as moderate for mineral potential and forest values and considers portions of the Yukon Training Area to contain high value habitat for black bear, moose, and fish. The State considers the northeast portion of the Training Area as a high potential for addition to the Chena River State Recreation Area, due to the trail and road access, which would provide for heavy recreational use. The State also feels there is potential for agricultural homesteads in portions of the Yukon Training Area and high potential for settlement near the Richardson Highway with moderate potential along the Little Salcha River (Figure 2.a) (Alaska Department of Natural Resources 1992).

Fort Greely was selected by the State for its mineral, wildlife, recreation, and forestry values west of the Delta River and its wildlife, settlement, and transportation resources east of the Delta River. The State considers the potential for agriculture to be moderate to high along the Richardson Highway and near Delta Junction. The State has assigned the area east of the Delta River as a high priority selection and the land west of the Delta River as a moderate to low selection. The Impact Areas are assigned a low priority selection (Figure 2.a) (Alaska Department of Natural Resources 1992).

2.1.3 Preferred Alternative: Renew Alaska Army Land Withdrawals For Fifty Years

Renew existing military withdrawals for 50 years, until November 6, 2051. The proposed 50 year withdrawal period is approximately the same length of time the military will have used these lands when the existing withdrawals expire in 2001. The Army's selection of a 50-year renewal period is based on requirements of substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue to be critical to national defense preparedness in the future. A creditable operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources (both dollars and personnel) to protect resource values and implement natural resource management measures.

Military activities conducted on the withdrawal renewal lands would be consistent with those conducted during the past 15 years (see following sections). The Army is proposing to renew the withdrawal areas with the existing military land uses. The Army is not proposing to expand or add Impact Areas on the withdrawal lands.

Subject to valid existing rights, these lands would be withdrawn from all forms of appropriation under the public land laws (including the mining laws and the mineral leasing and the geothermal leasing laws), under An Act to Provide for the Admission of the State of Alaska into the Union, approved July 7, 1958 (Public Law 85-508), and under the Alaska Native Claims Settlement Act (Public Law 92-203). These lands would be reserved for use by the Secretary of the Army for military maneuvering, training, equipment development and testing, and other defense-related purposes.

During the withdrawal period, the Secretary of the Interior would manage the lands subject to conditions and restrictions necessary to permit the military use of these lands. Management of these lands would follow the Integrated Natural Resources Management Plans currently being developed by the Army with concurrence from the BLM. The Secretary of the Army would close any road, trail, or portion of the lands to public use if necessary for public safety, military operations, or national security. The Secretary of the Interior would issue a lease, easement, right-of-way, or authorization for nonmilitary use of these lands with the concurrence of the Secretary of the Army. Hunting, fishing, and trapping on these lands would be permitted in accordance with the provisions of *Military*

Reservations and Facilities: Hunting, Fishing, and Trapping (Section 2671 of Title 10, United States Code).

2.1.3.1 U.S. Army Alaska (USARAK)

The primary military mission of U.S. Army Alaska (USARAK) after the Cold War has been peacetime deployment to support United States interests worldwide and the defense of Alaska. Fort Richardson, located near Anchorage, is the command headquarters for all Army forces in Alaska. Fort Wainwright and Fort Greely are satellite installations of Fort Richardson. Two-thirds of USARAK's combat forces are stationed at Fort Wainwright (Table 2.a).

Fort Wainwright has the fourth largest military training area in the United States. A land use permit with the State of Alaska allows the Army to construct a winter trail between the Tanana Flats Training Area on Fort Wainwright and the Fort Greely West Training Area. This provides the Army the ability to maneuver between the two installations in the winter, thereby linking over 1.2 million acres of training land.

Other military units in Alaska use the withdrawal renewal lands for training. Table 2.a lists the units' strength and location.

Unit	Authorized	Assigned	Location
USARAK Fort Greely Fort Richardson Fort Wainwright	6,928 298 2,158 4,472	6,557 299 2,114 4,144	Fort Greely Fort Richardson Fort Wainwright
Air Force Eielson Air Force Base Elmendorf Air Force base	9,653 2,823 6,830	9,346 2,668 6,678	Eielson Air Force Base Elmendorf Air Force Base
U.S. Army Reserve B Company, 411 Th Engineer Battalion 11020D Garrison Support Unit 1984 th Hospital Detachment	66 32 81 68	47 35 65 68	Fort Richardson Fort Wainwright Fort Richardson Fort Richardson
Alaska Army National Guard	2020	1,925	Fort Richardson
Alaska Air National Guard	1,925	1,892	Kulis Air National Guard Base
U.S. Marine Corps E Company, 4 th Reconnaissance Instructor and Inspection Staff	85 12	94 12	Elmendorf Air Force Base Elmendorf Air Force Base
17th Coast Guard District	1,832	1,832	Various Locations

Table 2.a Units Utilizing Withdrawal Renewal Lands.

Fort Greely was designated by Congress to be realigned under the Base Realignment and Closure-1995 (BRAC). The BRAC process is scheduled to become final in July 2001. Approximately 1,800 acres of Main Post may be transferred under appropriate BRAC procedures. This area contains most of the buildings on Fort Greely. Under BRAC, the Cold Regions Test Center and the Northern Warfare Training Center will relocate to Fort Wainwright. This will reduce the number of civilian employees at Fort Greely from about 300 to approximately 50-60, and the number of military personnel from about 300 to about 11. The primary missions of the Cold Regions Test Center and Northern Warfare Training Center will continue to be conducted on Fort Greely, and military units will continue to use Fort Greely for training after the BRAC process becomes final.

See Appendix 2.A for a complete demographic listing of combat forces stationed at Fort Wainwright and Fort Greely.

Fort Wainwright Yukon Training Area Army Facilities

The Yukon Training Area is divided into seven Training Areas and contains the Stuart Creek Impact Area and Buffer Zone. Along the road network, near the Stuart Creek Impact Area, there are 20 firing points for indirect fire weapons and one assault airstrip (unimproved runway with a dirt surface). A Military Assault Course (MAC) Range exists south of the Stuart Creek Impact Area. In the western portion of the Training Area is the Husky Drop Zone and a Biathlon Course. Two Prohibited Tactical Training Areas are designated in the Training Area on withdrawal renewal land. One covers the former Pine Creek Mining Claim (approximately 92 acres) and the other is adjacent to the Chena River Recreation Area (approximately 13,440 acres). Two Small Arms Ranges are on the Training Area but are not on the withdrawal renewal land. Two former NIKE surface-to-air missile battery sites are located southwest of the Impact Area. One of these dismantled sites is used as operating and support areas for Air Force electronic threat emitters. Both sites were withdrawn under separate Public Land Orders so are not included in this withdrawal renewal action (see Figure 2.b).

The Stuart Creek Impact Area is a High Hazard Impact Area covering approximately 25,240 acres within the Fort Wainwright Yukon Training Area. It is used by both Army and Air Force personnel for aerial gunnery, bombing, surface-to-air, air-to-surface, and direct and indirect firing exercises. All munitions, except small arms, fired by the Army from a Training Area, or fired by the Air Force from Restricted Area R2205, must detonate within the Stuart Creek Impact Area. Area R2205 has been designated as a Restricted Area by the Federal Aviation Administration and is closed to all aircraft up to an altitude of 20,000 feet above mean sea level during periods of scheduled activity.

Army Use

The Yukon Training Area has sustained a variety of military activities on its lands in support of its military mission. Light infantry, mechanized infantry, artillery, special forces, and assault aircraft have used the Yukon Training Area for training. The Training Area is suitable for artillery and mortar indirect fire weapons, aerial gunnery, small arms, platoon to brigade exercises, road marches, and bivouacs. The Training Area is used year-round for military training. However, military access is largely limited to the road system due to the steepness of terrain and thick vegetative cover. Stuart Creek Impact Area is the only Impact Area in Alaska that allows continued year round use that is not restricted by fire indicies. Except for major exercises, the majority of training is conducted in the Yukon Training Area.

Army use data were compiled for the Fort Wainwright Yukon Training Area from Range Control records. Range Control data were only available for 1995 and 1996 (O'Neal, pers. com. 1998). Table 2.b shows the total number of days facilities were used on the Yukon Training Area for each year. Appendix 2.B contains a complete listing of military use for 1995 and 1996 by month and activity.

AREA	1995	1996	TOTAL	AVERAGE
BIATHLON COURSE	35	22	57	29
FIRING POINT 3	0	3	3	2
FIRING POINT 5	0	26	26	13
FIRING POINT 7	64	31	95	48
FIRING POINT 8	32	19	51	26
FIRING POINT 9	118	62	180	90
FIRING POINT 10	24	4	28	14
FIRING POINT 12	0	21	21	11
FIRING POINT 16	0	14	14	7

Table 2.b Army Use by Number of Soldier Days of Fort Wainwright Yukon Training Area (Fort Wainwright Range Control Records). If a facility is not listed, it was not used during 1995-1996.

Table 2.b Army Use by Number of Soldier Days of Fort Wainwright YukonTraining Area (Fort Wainwright Range Control Records). If a facility is notlisted, it was not used during 1995-1996.

AREA	1995	1996	TOTAL	AVERAGE
FIRING POINT 19	4	4	8	4
FIRING POINT 20	72	52	124	62
FIRING POINT 21	0	1	1	1
HUSKY DROP ZONE	81	104	185	93
TRAINING AREA 1	38	82	120	60
TRAINING AREA 2	171	136	307	154
TRAINING AREA 3	32	15	47	24
TRAINING AREA 4	152	181	333	167
TRAINING AREA 5	45	33	78	39
TRAINING AREA 6	7	4	11	6
TRAINING AREA 7	56	9	65	33
CAM SITE II-OBS PT	13	38	51	26
TAC II-OBS POINT	32	42	74	37
TAC III-OBS POINT	0	21	21	11

Fort Greely West and East Training Areas Army Facilities

Fort Greely West Training Area is divided into 15 Training Areas and seven Impact Areas which support 13 Firing Ranges. The Training Areas were established to support battalion-sized operations under varying terrain conditions. The Training Areas west of the Delta River can support brigade or task forcesized maneuvers or operations. The Delta River runs through the Donnelly Training Area, making it an excellent but challenging area for river crossing operations during the entire year. The Delta River is usually frozen from November to April, allowing for easier access to the western Training Areas. Each of the 15 Training Areas have excellent unimproved air assault landing zones for rotary wing aircraft, facilitating the employment of air assault operations (Figure 2.c). buildings. Five ranges are unimproved with no facilities. Four ranges are located within the Allen Army Controlled Fire Area established by the Federal Aviation Administration (FAA). Aircraft access over the area is not restricted when firing occurs. Spotters report approaching aircraft and firing is stopped.

The Joint Combined Arms Live Fire Complex (CALFEX) is located in Training Area 77, overlooking the Oklahoma/Delta Creek Impact Areas. The range complex consists of Air Force convoy targets, landing zone with targets, a drop zone, buildings, collapsible targets, and vehicles. The complex is designed to employ a wide range of weapon systems in support of an infantry company assault.

Impact Areas cover 156,804 acres on the Fort Greely West Training Area. All Impact Areas are dedicated with 85,042 acres classified as High Hazard Impact Areas (Figure 2.c). The Oklahoma Impact Area is centrally located within the West Training Area, providing excellent observation from many directions on the varying terrain. Impact Areas east of the Delta River are designated as live fire ranges only. Maneuver units operate in these ranges only during live fire exercises. The Kansas, Arizona, Nevada, Oregon, and Michigan Lakes Impact Areas are used for limited periods and are normally used for non-dud producing ammunition or explosives, which are cleared and returned to other training support following termination of firing. All Impact Areas are surrounded by a Buffer Zone extending to a width of two miles or to the installation boundary.

Thirteen Observation Points along the east side of the Delta River provide overlapping views of the Impact Areas. They are used for observation of firing of medium and long range artillery, guided missile, and rocket firing tests to provide a precise determination of the impact or air burst of ammunition fired through triangulation.

The Fort Greely East Training Area contains six Training Areas that are subdivided into 15 sub-Training Areas, six Drop Zones, and two Combat Assault Strips. The East Training Area is used primarily as a nonfiring maneuver area. The Drop Zones are used for airborne testing or training operations, with Donnelly Drop Zone supporting a battalion airborne operation. All Drop Zones are cleared of vegetation and have maintained surfaces. Donnelly Assault Strip is graded and maintained. The Cold Regions Test Center uses the East Training Area for experimental airdrops, airborne testing, and testing of clothing, vehicles, and equipment (Figure 2.c).

The Bolio Lake Test Complex was specifically designed to accommodate the Cold Regions Test Center's (CRTC) test mission. It is located in the West Training Area in a bowl-like setting where the coldest temperatures on Fort Greely occur. The complex contains office facilities, maintenance garages, storage buildings, and overnight accommodations to provide an ideal base of test operations.

The Mississippi Test Site is used by the Cold Regions Test Center as a general purpose test facility. Its facilities accommodate large scale demonstrations of ordnance delivery in the adjacent Mississippi Impact Area (Figure 2.c).

Army Use

Units stationed at Fort Wainwright and Fort Richardson use Fort Greely for military training and will continue after the realignment is completed in July 2001. Its lands are used for testing and evaluating weapons and equipment under conditions of extreme cold and training forces for military action in Arctic and Subarctic regions. Major units located at Fort Greely are the Cold Regions Test Center and the Northern Warfare Training Center. The primary missions of the Cold Regions Test Center and Northern Warfare Training Center will continue to be conducted on Fort Greely after the BRAC process becomes final.

The Fort Greely West Training Area is a large contiguous training area containing a substantial Impact Area that supports the firing of most conventional weapons in the Army's inventory. Weapons may be fired from Firing Points in the West Training Area into the Impact Areas, or from just about any other location. Complete 365° direction of firing is available. Weapons training and testing includes, but is not limited to, small arms, mortars, artillery up to 155 mm howitzers, and rockets, both air and ground delivered.

Battalion and larger-sized elements train at Fort Greely throughout the year. Training exercises include deployment of troops by truck, helicopter, or troop transport aircraft, field bivouac, foot use, construction of temporary fighting or defensive positions, tactical movement, weapons firing, maneuvering with tracked and wheeled vehicles, and infantry tactical maneuvers.

Fort Greely is used for annual joint-readiness training exercises. These typically involve 10,000 to 14,000 troops for division exercises and 3,000 to 5,000 for brigade exercises. These exercises involve the use of other Alaskan installations, but the main battlefield has been on Fort Greely.

Army use data were compiled for Fort Greely West and East Training Areas from Range Control records. Range Control data were available from 1988 through 1995. Table 2.c shows the total number of days facilities were used on the Training Areas for each year. Appendix 2.B contains a complete listing of military use from 1988 through 1995 by month and activity.

AREA	1988	1989	1990	1991	1992	1993	1994	1995	TOTAL	AVERAGE
				Tra	ining Are	a				
TA4	7	13	44	7	34	101	25	8	239	. 30
TA5	7	13	38	39	34	101	27	0	259	32
TA6	75	212	126	35	44	132	23	5	652	82
ŤA7	65	212	128	24	42	112	23	5	611	76
TA8	4	0	8	19	1	61	23	0	116	15
TA9	11	0	38	29	11	71	23	0	183	23
TA10	4	0	44	24	11	71	23	0	177	22
TA11	1	13	38	24	1	74	163	177	491	61
TA13	0	0	0	0	0	16	23	0	39	5
TA14	0	10	6	0	0	16	23	0	55	7
TA15	0	0	0	0	0	16	23	0	39	5
TA16	0	53	95	30	65	142	130	13	528	66
TA17	0	53	70	30	65	136	130	19	503	63
TA19	0	43	64	30	190	196	364	195	1082	135
TA20	0	10	127	60	137	172	262	5	773	97
TA21	63	143	267	263	429	316	253	128	1862	233
TA22	63	143	235	255	429	438	474	121	2158	270
TA32	0	0	0	0	0	16	16	0	32	4
TA36	0	0	0	0	0	16	0	0	16	2
ТА37	0	0	0	0	0	16	0	0	16	2
TA38	0	0	0	0	0	16	0 ·	0	16	2
TA39	0	0	0	0	0	16	0	0	16	2
TA40	93	104	77	0	0	16	0	0	290	36
TA46	0	0	0	0	0	0	7	0	7	1

Table 2.c Army Use in Number of Soldier Days of the Fort Greely West and East Training Areas (Fort Greely Range Control Records). If a facility is not listed, it was not used during 1988-1995.

AREA	1988	1989	1990	1991	1992	1993	1994	1995	TOTAL	AVERAGE
T A48	93	104	163	30	65	398	242	7	1102	138
TA49	13	17	92	31	151	360	175	0	839	105
TA50	0	17	43	46	187	330	127	0	750	94
TA51	0	17	50	16	37	187	132	0	439	55
TA52	0	27	50	16	68	298	196	0	655	82
TA53	0	27	108	16	73	310	347	24	905	113
TA54	0	122	150	83	301	105	225	10	996	125
TA55	92	242	195	83	49	69	6	0	736	93
TA56	0	122	125	53	104	62	141	39	646	81
TA57	0	132	148	79	263	109	253	39	1023	128
TA58	0	132	206	142	251	369	214	196	1510	189
TA59	0	132	139	149	360	411	365	189	1745	218
TA60	0	24	115	63	99	316	611	266	1494	187
TA61	0	40	73	94	97	271	522	194	1291	161
TA62	0	40	77	12	121	276	634	211	1371	171
TA63	0	30	164	53	33	166	102	3	551	69
TA71	0	0	0	0	0	1	0	0	1 `	0
TA72	0	0	0	4	0	0	0	0	4	1
TA75	0	0	0	0	1	0	0	0	1	0
TA77	0	0	0	0	0	0	0	13	13	2
TA86	0	0	7	0	0	0	0	0	7	1
				Fi	ring Point			_		
FP ARKANSAS	0	0	0	59	0	0	0	0	59	7
FP ARTY	0	0	0	31	0	0	0	0	31	4
FP AUDREY	21	0	12	88	102	0	51	19	293	37
FP BELUGA	0	0	0	4	0	0	0	0	4	1
FP BIG LAKE	107	130	11	87	24	0	51	31	441	55

Table 2.c Army Use in Number of Soldier Days of the Fort Greely West and East Training Areas (Fort Greely Range Control Records). If a facility is not listed, it was not used during 1988-1995.

Alaska Army Lands Withdrawal Renewal

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Table 2.c Army Use in Number of Soldier Days of the Fort Greely West
and East Training Areas (Fort Greely Range Control Records). If a facility is
not listed, it was not used during 1988-1995.

AREA	1988	198 9	1990	1991	1992	1993	1994	1995	TOTAL	AVERAGE
FP BOODLE	9	0	0	0	0	0	0	0	9	1
FP BO-WHALE	25	78	15	63	24	0	58	31	294	37
FP BRUCE	0	0	0	59	0	0	0	0	59	7
FP DEBORAH	3	0	0	0	0	0	0	0	3	0
FP DOC LAKE	0	26	0	0	0	0	0	0	26	3
FP H	4	0	0	0	0	0	0	0	4	1
FP HILLBILLY	9	0	0	59	0	0	0	0	68	9
FP ICE	9	0	0	0	0	0	0	0	9	1
FP LAKES	3	0	0	0	0	0	0	0	3	0
FP LEE	0	0	0	59	0	0	0	0	59	7
FP MARK	17	0	2	63	24	0	35	12	153	19
FP MT HAYES	13	52	0	59	14	0	47	19	204	26
FP MUSHY	0	26	0	0	0	0	0	0	26	3
FP RAY	0	0	0	88	0	0	0	0	88	11
FP SALLY	14	0	38	91	83	5	56	12	299	37
FP SAM	9	0	0	0	0	0	0	0	9	1
FP WHITEROW	9	0	0	0	0	0	0	0	9	1
				D	rop Zone					
BEAR DZ	0	0	3	120	365	105	4	26	623	78
BUFFALO DZ	16	44	77	24	75	1 1 5	35	17	403	51
BUTCH DZ	1	13	15	0	42	20	31	4	126	16
DELTA DZ	0	0	0	0	0	26	0	0	26	3
DONNELLY DZ	1	0	16	24	203	182	90	59	575	72
EDDY DZ	0	0	14	6	41	0	2	0	63	8
FOX DZ	0	30	0	6	76	4	10	8	134	17
PUMP DZ	0	0	0	0	31	0	0	0	31	4
RAMP DZ	0	0	0	0	0	0	10	10	20	3

not listed, it was not used during 1988-1995.											
AREA	1988	1989	1990	1991	1992	1993	1994	1995	TOTAL	AVERAGE	
SALLY DZ	0	0	8	2	32	30	13	0	85	11	
TEXAS DZ	0	0	0	0	0	0	5	0	5	1	
VIC DZ	0	0	3	0	0	0	0	0	3	0	
Assault Strip											
BENNET AS	0	0	0	2	0	0	0	0	2	0	
DONNELLY AS	33	0	104	103	186	85	184	0	695	87	
					Other						
BOLIO SKI TRAILS	92	120	0	0	0	0	0	0	212	27	
CALFEX BOWL	0	0	0	0	31	19	5	0	55	7	
DONNELLY LZ	0	0	0	0	0	0	16	31	47	6	
WINTER TRAIL	61	90	0	0	0	0	0	0	151	19	
				Obse	rvation Po	oint					
OP3	14	15	0	46	0	0	0	0	75	9	
OP4	14	0	0	47	0	15	16	0	92	• 12	
OP5	17	0	0	52	31	172	8	0	280	35	
OP6A	0	0	0	84	2	32	35	0	153	19	
OP6	32	14	8	152	259	130	95	27	717	90	
OP7A	70	8	74	164	43	134	219	254	966	121	
OP7	57	8	59	155	34	118	45	23	499	62	
OP8	63	2	69	154	41	102	148	97	676	85	
OP9A	0	0	0	0	0	0	0	0	0	0	
OP9	24	37	55	138	27	41	19	15	356	45	
OP10A	14	0	0	31	0	2	12	9	68	9	
OP10	1	26	0	207	154	7	0	1	396	50	
OP11	9	29	90	117	211	1	0	4	461	58	
OP12	14	0	0	115	211	0	0	0	340	43	

Table 2.c Army Use in Number of Soldier Days of the Fort Greely West and East Training Areas (Fort Greely Range Control Records). If a facility is not listed, it was not used during 1988-1995.

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AREA	1988	1989	1990	1991	1992	1993	1994	1995	TOTAL	AVERAGE
OP26	154	90	5	31	12	54	1	29	376	47
OP27	0	0	0	0	12	1	0	15	28	4
OP28	0	0	0	0	0	1	0	0	1	0
OP31	14	0	0	31	0	0	0	0	45	6
ОРН	22	0	0	31	0	0	0	0	53	7
OP LAKE	4	0	0	31	0	0	13	0	48	6
OP LAKES	0	0	0	0	0	4	0	0	4 ,	1
OP ROAD	0	0	0	0	0	0	0	5	5	1

Table 2.c Army Use in Number of Soldier Days of the Fort Greely West and East Training Areas (Fort Greely Range Control Records). If a facility is not listed, it was not used during 1988-1995.

The Cold Regions Test Center is responsible for testing vehicles, weapon systems, clothing and individual equipment under conditions of extreme cold. The Center is charged with planning, conducting, and reporting on environmental phases of development tests; and providing advice and guidance on test and evaluation matters to material producers, other armed services, and private industry. Major field evaluations are conducted on all types of wheeled and tracked vehicles, including cross-country mobility during summer and winter; trail breaking operations; difficult terrain performance; durability; reliability; petroleum, oil, and lubricant consumption; and maneuverability. Weapon systems, clothing, and individual equipment are tested and evaluated to determine their effectiveness and successful operation during the extreme challenges of winter warfare.

The Cold Regions Test Center is the only Department of the Army facility that tests outside at temperatures below freezing. All military equipment should be designed and tested to a Basic Cold (-5°F to -25°F) level. Special equipment for northern regions is designed and tested to Cold (-25°F to -50°F) and occasionally Severe Cold (below -50°F) levels. Successful cold weather testing requires at least a six hour block of time for setup; testing, which could extend for several days; and evaluation, during which ambient temperatures must remain within test parameters. Fort Greely's climate provides Cold level testing from October through March, with temperatures reaching Severe Cold level testing during that time period. Fort Greely's winter season allows a longer period for repetitive, rigorous testing to ensure all components have been adequately and properly assessed (CRTC 1997).

The Northern Warfare Training Center is responsible for training military forces for action in Arctic and Subarctic regions. The Center trains individuals and units in Arctic and mountaineering skills. The Center conducts high-altitude search and rescue missions, tests and evaluates mountaineering techniques and equipment, and trains and equips the Military Mountaineering Team of the U.S. Army Mountain Team. Instruction in winter skills include snowshoe movement, all terrain skiing, route selection, risk management, and shelter construction. Summer skills instruction include technical climbing, fixed rope installations, glacier travel, stream crossing, route selection, and risk management.

2.1.3.2 U.S. Air Force

The U.S. Air Force is a major user of Fort Wainwright and Fort Greely. The Department of Defense has identified the Stuart Creek and Oklahoma/Delta Creek Impact Areas as the primary sites for military aircraft air-to-ground training. The Air Force conducts air-to-ground training in the restricted airspace (R2202 and R2205) over the Training Areas. R2205, over the eastern portion of the Fort Wainwright Yukon Training Area, is the primary tactical air-to-ground weapons range for the Air Force in Alaska. With the recent addition of Military Operations Areas, tactical operations are also conducted in and around R2202 (Figures 2.d and 2.e) (USAF 1992, USAF 1995).

Restricted airspace R2205, over the Fort Wainwright Yukon Training Area, and R2202, over the Fort Greely West Training Area, have been designated Restricted Areas by the Federal Aviation Administration. R2205 is closed to all civilian aircraft up to an altitude of 20,000 feet above mean sea level during periods of scheduled activity. Restricted airspace R2202 is subdivided into three separate areas: R2202A, R2202B, and R2202C. R2202A and R2202B are closed to all civilian aircraft up to an altitude of 10,000 feet mean sea level during periods of scheduled activity. R2202C is closed from 10,000 feet mean sea level during periods of scheduled activity. R2202C is closed from 10,000 feet mean sea level during periods of scheduled activity. R2202C is closed from 10,000 feet mean sea level during periods of scheduled activity. R2202C is closed from 10,000 feet mean sea level during periods of R2202A and R2202B.

The Stuart Creek, Oklahoma, and Delta Creek Impact Areas are equipped with mock enemy airfields, targets, manned radar emitters, anti-aircraft threat simulators, and electronic scoring sensors. Targets are constructed to simulate combat situations. Targets resemble helicopters, aircraft, hangars, tanks, bunkers, armored personnel carriers, and vehicles. They are constructed of plywood, steel drums, concrete, or salvaged metal vehicles. The mock enemy airfield consists of a runway, aircraft hangars, and airfield support areas. Radar emitters are used to simulate surface-to-air missile systems. The Television Ordnance Scoring System (TOSS) is used for electronic scoring of air-to-ground munitions.
The Air Force uses the Stuart Creek Impact Area and Oklahoma/Delta Creek Impact Areas for low and high altitude bombing by most aircraft in the current U.S. and allied forces inventory. The Stuart Creek and Oklahoma/Delta Creek Impact Areas support the firing of most conventional weapons in the Air Force's arsenal. Air Force weaponry training and testing includes aircraft machine gun, rockets, bombs, and air-to-ground missiles. Combining the Stuart Creek and Oklahoma/Delta Creek Impact Areas with surrounding Military Operations Areas provides the Air Force with a sophisticated training infrastructure comparable to other major training complexes.

The Air Force has installed the Yukon Measurement and Debriefing System on the Fort Wainwright Yukon Training Area and Fort Greely West Training Area. This computerized system displays air wars of up to 36 aircraft simultaneously. With this system, Air Force aircrews have the ability to view a mock air war realtime or evaluate their performance after landing on-screen. The re-creation of the mock war shows how the aircrews reacted to simulated enemy aircraft and ground threats, the level of success on bombing targets, and various other flying parameters.

The Air Force has a joint use agreement with the Army for the Air Force Technical Application Center (AFTAC) located in the Fort Wainwright Yukon Training Area. The Air Force maintains a group of seismic monitors on this site. The Army has joint use of 19,272 acres of this area with training restricted to foot and light vehicle maneuvers. The Army refrains from subterranean explorations and ordnance explosions, except for small arms. Heavy tracked vehicles are only allowed on Beaver Creek Road, which runs through the site. The Air Force has exclusive rights to the remaining 2,995 acres of the AFTAC site (Figure 2.d).

The Air Force is a major user of Fort Wainwright and Fort Greely for routine training and Major Flying Exercises (MFE). Routine training involves aircraft departing from their base, participating in training missions, and returning to their base. This scenario is called a sortie. While completing a sortie, participation in training missions could include one or more of the following: counter air, air interdiction, close air support, forward air control, or suppression of enemy air defenses. These missions would be completed within the Restricted Areas over the Fort Wainwright Yukon Training Area and Fort Greely West Training Area. Routine training activities occur an average of 240 days per year, including 60 days of MFE training (USAF 1995).

During an MFE, a combat scenario is developed and roles are given to participating aircraft. Ground forces position simulated air defenses throughout

the training area combined with airborne defenses, which provide a realistic air defense environment. During an MFE, aircraft typically accomplish two sorties per day. Normally, flight activity is conducted in a two to three hour flying window twice a day. Typically, one exercise occurs sometime between February and April, four exercises between May and August, and one exercise between October and November. Generally, an MFE runs for 10 flying days but could extend for a total of up to 15 flying days, not to exceed a total of 60 flying days per year. COPE THUNDER is an example of an MFE, conducted in Alaska with the closing of Clark Air Base, Philippines, in 1991 (USAF 1995).

A single aircraft typically uses only one range during a sortie. Daily range use during an MFE would be greater than during routine training as up to 60% of the aircraft involved in an exercise would be expected to use the air-to-ground weapon ranges. Approximately half would use Stuart Creek and half would use Oklahoma/Delta Creek Impact Areas. Table 2.d shows the average number of sorties completed during routine training and MFEs for each of the Restricted Areas (USAF 1995).

]	O	Stuart Creek					
Restricted Airspace	R2202A		R2202B		R2202C		R2505	
	Sorties	Days	Sorties	Days	Sorties	Days	Sorties	Days
1 Oct 90 - 30 Sept 91	223	101	2,073	241	2,251	250		
1 Oct 91 - 30 Sept 92	2,587	224	3,430	247	3,112	236		
1 Oct 92 - 30 Sept 93	967	279	1,439	242	904	242	4,491	275
1 Oct 93 - 30 Sept 94	2,748	207	2,748	122	2,748	207	3,299	235
1 Oct 94 - 30 Sept 95	4,201	301	4,152	249	4,152	249	3,082	231
1 Oct 95 - 30 Sept 96	3,674	219	4,101	232	4,099	247	2,602	251
1 Oct 96 - 30 Sept 97	6,170	234	6,170	222	6,036	238		254

Table 2.d Total Number of Sorties and Days Used by the Air Force of the Restricted Airspace in the Fort Wainwright Yukon Training Area and Fort Greely West Training Area (Fort Wainwright and Fort Greely Range Control Records). Incomplete information indicates the data was not available.

The Stuart Creek and Oklahoma/Delta Creek Impact Areas are certified for laser operations. The range was studied and approved for use by Army ground-toground and Air Force air-to-ground lasers including the Low Altitude Navigation and Targeting Infrared for Night (LANTIRN). LANTIRN is a highly sophisticated laser-based navigation and targeting system that provides high-resolution infrared imagery for high-speed, low-altitude flight and precision air-to-ground weapons delivery during darkness and during some limited visibility conditions (USAF 1992). The LANTIRN system targeting pod has operational (combat) and training mode lasers. The training mode laser is "eye-safe" and is approved for unrestricted use throughout all Alaskan airspace (USAF 1995).

2.1.3.3 Fuels

Fuel on Fort Wainwright and Fort Greely is used to heat buildings and operate vehicles and aircraft. It is distributed directly to post users by private contractor tanker trucks. The Army uses several vehicular tankers (HEMTTs) and collapsible rubber containers for transporting aviation and other fuels to the field.

The Air Force has 31 above-ground storage tanks on the Fort Wainwright Yukon Training Area operated by a contractor, Lockheed Martin. All tanks are double-walled and store diesel or propane fuel. Most of the tanks have a 1,000 gallon capacity, one tank has a 5,000 gallon capacity, two have a 10,000 gallon capacity, and one has a 15,000 gallon capacity. All of the tanks were installed between 1992 and 1996. There are no underground storage tanks on the Fort Wainwright Yukon Training Area. The Spill Prevention Control and Countermeasure Plan for Fort Wainwright (1996) lists fuel spills of more than 100 gallons for 1985-1995. Spill reports since 1995 were reviewed for spills greater than 10 gallons (Table 2.e). All fuel spills on Fort Wainwright are remediated by implementing applicable U.S. Army regulations.

Date	Location	Amount	Туре
Feb. 6, 1989	Husky Drop Zone	150 gallons	JP-4
Aug. 12, 1995	Yukon Training Area	805 gallons	DFA
Sep. 25, 1995	Hill 3265	300 gallons	Diesel Fuel 8
Dec. 7, 1995	C-Battery	30 gallons	Unleaded Gas
Oct. 4, 1996	C-Battery	10 gallons	Mogas

Table 2.e Fuel Spills on Fort Wainwright Yukon Training Area.

Fort Greely has 16 above-ground storage tanks on its withdrawal renewal lands. The storage tank capacities range from 500 to 5,000 gallons. All are used to store heating oil, fuel oil, diesel, or JP8. Five of the tanks were installed between 1987 and 1994. It is not known when the other tanks were installed.

There are three underground storage tanks on the Fort Greely West Training Area at the Bolio complex. Two were installed in 1989. Two tanks store used oil

The Spill Prevention Control and Countermeasure Plan for Fort Greely (1996) lists fuel spills of more than 55 gallons for 1986 to 1993. Spill reports since 1993 were reviewed for spills of greater than 10 gallons (Table 2.f). All fuel spills on Fort Greely are remediated by implementing applicable U.S. Army regulations.

Date	Location	Amount	Туре
Jan. 13, 1986	Mississippi Range	1,000 gallons	JP-4
Dec. 22, 1986	Texas Range	150 gallons	Diesel
Nov. 2, 1987	Donnelly Flats	1,500 gallons	Diesel
Jan. 17, 1989	Beales Range	1,400 gallons	Diesel
Dec. 9, 1990	Texas Range	1,500 gallons	Diesel
Feb. 5, 1991	Hill No. 1825	60 gallons	DFA
May 26, 1991	Texas Range	250 gallons	Diesel
May 5, 1992	Texas Range	150 gallons	Diesel
May 14, 1993	Beales Range	100+ gallons	Diesel
June 1, 1993	Beales Range	unknown	Fuel Oil
Jan. 8, 1996	Donnelly Dome	190 gallons	Diesel
Feb. 13, 1996	Training Areas	15 gallons	Condensate
June 24, 1996	Texas Range	unknown	Diesel
Sep. 17, 1996	Donnelly Dome	25 gallons	JP-8
Dec. 7, 1996	Mississippi Range	unknown	JP-4
Feb. 19, 1997	Donnelly Dome	60 gallons	Diesel
July 21, 1997	Arkansas Range	50 gallons	DFA

Table 2.f Fuel Spills on Fort Gree	ely's Withdrawal Renewal Lands.
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2.1.3.4 Munitions

Munitions are stored on Fort Wainwright and Fort Greely for training and testing; storage facilities are not located on the withdrawal renewal lands. All firing on Ranges and from Firing Points is conducted to cause ammunition and explosives to detonate in a designated Impact Area. Impact Areas and their associated

Buffer Zones are the ground and associated airspace within the training complex used to contain fired or launched ammunition and explosives and any resulting fragments, debris, and components.

Five classes of munition have been fired into the Stuart Creek and Oklahoma/Delta Creek Impact Areas by the Army. These are high explosives, smokes, illumination rounds, small arms, and inert. Projectiles containing high-explosive compounds explode upon impact with the ground, creating a crater and spreading fragments of steel. Smoke projectiles burst in the air or on impact with the ground and create an intense smoke. Illumination rounds exple a flare attached to a parachute which illuminates a target area. The flare continues to burn on the ground or in water. Small arms and inert ammunition do not contain filler material. Munition expenditures by the Army for the Stuart Creek Impact Area and Oklahoma/Delta Creek Impact Area are contained in Tables 2.g and 2.h. Appendix 2.C contains the chemical composition of munitions fired into the Stuart Creek and Oklahoma/Delta Creek Impact Areas.

Table 2.g Muntion Expenditures by the Army in the Stuart Creek Impact Area, Fort Wainwright Yukon Training Area (Fort Wainwright Range Control Records). Ammunition data was only available for 1995 and 1996. For both years reported, Army records had 595 entries that ammunition was used in training, but 439 entries showed either no data, unknown, or not available. Therefore, ammunition expenditure amounts are considerably understated.

Ammunition	1995	1996	Total
High Explosives	7,630	44,971	52,601
Smoke	88	160	248
Illumination	1,852	4,096	5,948
Small Arms	91,710	122,430	214,140
Inert	11,870	576	12,446

Table 2.h Munition Expenditures by the Army in the Oklahoma/Delta Creek Impact Area, Fort Greely West Training Area (Fort Greely Range Control Records).

Ammunition	1992	1993	1994	1995	1996	1997	Total
High Explosives	4,815	13,298	2,868	5,506	2,440	2,675	31,602

Ammunition	1992	1993	1994	1995	1996	1997	Total
Smoke	232	110	19	389	0	316	1,066
Illumination	92	5,460	1,586	417	507	1,431	9,493
Small Arms	92,951	335,039	301,739	209,590	148,916	68,032	1,156,267
Inert	5,592	1,880	1,306	1,333	0	348	10,459

Table 2.h Munition Expenditures by the Army in the Oklahoma/Delta Creek Impact Area, Fort Greely West Training Area (Fort Greely Range Control Records).

The Air Force carries inert and live munitions during training flights for attacking the target formations in the Stuart Creek and Oklahoma/Delta Creek Impact Areas. The primary type of training munition expended by the Air Force is BDU-33 (excluding 20mm and 30mm ammunition). BDU-33 expenditures accounted for over 70% of the total munitions delivered in the withdrawal lands Impact Areas for the years reported in Tables 2.i and 2.j. This is a 25-pound or less practice bomb composed of ferrous metals and a small spotting charge equivalent to two shotgun shells (USAF 1995) Appendix 2.C contains the chemical composition of munitions fired into the Stuart Creek and Oklahoma/Delta Creek Impact Areas.

Table 2.i Munition Expenditures by the	Air Force in the Stuart Creek Impact
Area (Air Force records 1998).	

	Machine Gun		Rocket	Practice Bomb	500lb Bomb	1000lb Bomb	2000lb Bomb	Missile
Year	20mm	30mm	2.75"	BDU-33	Mk-82	Mk-83	Mk-84	AGM- 65
1992	5,430	12,410	551	4,308	1,158	0	79	5
1993	2,500	40,713	312	3,653	713	38	164	4
1994	5,370	27,680	660	3,730	613	69	149	0
Jan-Sep 95	1,040	22, 8 40	93	2,130	206	0	4	0
Oct 95-Sep 96	7,683	43,537	348	2,734	230	0	131	0
Oct 96-Sep 97	2,300	68,360	1,552	3,010	736	0	74	0
Total	24,323	215,540	3,516	19,565	3,656	107	601	9

	Machine Gun		Rocket	Practice Bomb	500lb Bomb	1000lb Bomb	2000lb Bomb	Missile
Year	20mm	30mm	2.75"	BDU-33	Mk-82	Mk-83	Mk-84	AGM- 65
1992	8,302	11,950	976	5,176	268	122	28	6
1993	860	36,000	404	3,917	215	38	173	0
1994	8,250	33,300	985	3,441	679	53	70	0
Jan-Sep 95	2,050	26,960	221	2,226	122	16	100	6
Oct 95-Sep 96	4,450	18,020	66	1,759	193	0	20	7
Total	23,912	126,230	2,652	16,519	1,477	229	391	19

Table 2.j Munition Expenditures by the Air Force in the Oklahoma/Delta Creek Impact Areas, Fort Greely (Air Force records 1998).

Current 11th Air Force policy allows for dispensing self protection chaff and flares in the Oklahoma/Delta Creek and Stuart Creek Impact Areas depending on current fire hazard conditions.

Chaff is used by the Air Force as a defensive mechanism to avoid detection by radar. Chaff is released from an aircraft and spreads in the air to form an electronic smoke screen that reflects radar signals. Chaff dispensers can be programmed to dispense bundles at intervals normally over a two minute period. Each bundle produces a spherical cloud approximately 300 to 600 feet in diameter. Chaff is composed primarily of silica (60%), an aluminum surface (approximately 39%), and a coating of stearic acid (approximately 1%) (USAF 1995).

Flares are small, intense heat sources used by the Air Force as a defensive mechanism to counter heat-seeking threats. Only self-protection flares are used by the Air Force in Alaskan special-use airspace. Self-protection flares are ejected by an aircraft to mislead the guidance systems of heat-sensitive or heat-seeking targeting systems. Flares are a composite of magnesium and Teflon. They are designed to burn completely within 4 to 5 seconds after deployment (USAF 1995).

2.1.3.5 Decontamination

Routine decontamination operations are conducted each year on the Stuart Creek and Oklahoma/Delta Creek Impact Areas by the Air Force. The Air Force's routine decontamination operations are conducted only on the portions of the Impact Areas they utilize for training. Each year, all unexploded ordnance and inert residue are cleared to a radius of at least 1,000 feet from each of the Air Force's tactical targets. The access ways into the tactical targets and 100 feet on either side of the access ways are also cleared each year.

An estimate of the total cost to clear the Impact Areas on the withdrawal lands was generated based on the type of munitions used by the Army and Air Force and the size of the Impact Areas. The U.S. Army Corps of Engineers, Huntsville, Alabama estimated the total decontamination cost on the RACER Environmental Cost Engineering System Version 3.2A. The estimate was generated without an Archives Search Report and an Engineering Evaluation/Cost Analysis. The Archives Search Report would identify the actual areas used for military testing and training of munitions. The Engineering Evaluation/Cost Analysis Report would show the level of contamination and extent of necessary decontamination.

Estimated Decontamination Cost:

Oklahoma/Delta Creek Impact Area	\$55,700,000.00
Washington Impact Area	\$23,700,000.00
Lakes Impact Area	\$75,000,000.00
Texas Impact Area	\$24,100,000.00
Mississippi Impact Area	\$23,000,000.00
Stuart Creek Impact Area	\$47,400,000.00
Estimated Total Decontamination Cost	\$248,900,000.00

Since military training and testing has occurred on these lands for nearly 50 years, with portions dedicated as High Hazard Impact Areas, it is likely that a complete decontamination would be extremely expensive and technologically challenging.

2.1.3.6 Existing Mitigation

The following programs have been implemented by the Army at Fort Wainwright and Fort Greely. The Army would continue these programs for the duration of the withdrawal renewal to provide mitigation for achieving the military's mission while offering environmental protection. Each resource section in Chapter 4 contains existing and proposed mitigation. Also, Chapter 4.23 contains a complete and thorough description of existing and proposed mitigation measures.

Land Use - Chapter 4.1

 Land management will continue under the ITAM program, and the Integrated Natural Resources Management Plans which are reviewed and updated every five years.

Climate/Air Quality - Chapter 4.2

- Vehicle and power plant modifications exist to reduce carbon monoxide and unburned fuel emissions.
- Control of unnecessary vehicle idling.
- The Army participates in Fairbanks North Star Borough vehicle emissions testing program.

Soils and Permafrost - Chapter 4.6 and 4.7

- USARAK Regulation 350-2 Range Regulation requires the Army to fill in excavations and adhere to stream crossing and seasonal travel guidelines.
- Use of damage control steps in individual training plans.
- Integrated Training Area Management (ITAM) program inventories and monitors, repairs, maintains, and enhances training lands.
- Soil surveys are being completed for the withdrawal lands.

Surface Water - Chapter 4.8

- USARAK Regulation 350-2 Range Regulation requires the Army to control erosion and maintain streambank integrity, thereby reducing the risk of degraded water quality.
- The Army complies with all applicable State and Federal water resources statutes, and the Alaska State Drinking Water Standards for public water systems.

Groundwater - Chapter 4.9

- USARAK Regulation 200-4 Hazardous Waste, Used Oil and Hazardous Materials Management outlines guidelines for proper management of hazardous wastes.
- Spill Prevention Control and Countermeasure Plans implement measures to prevent oil spills from reaching navigable waters and/or groundwater.

Wetlands - Chapter 4.10

- A wetland planning-level survey was recently completed at Fort Wainwright Yukon Training Area and a similar study is in progress at Fort Greely.
- A wetlands management and revegetation plan is funded and in progress for the withdrawal lands.

Vegetation - Chapter 4.11

- Military Regulations provide procedures for protecting vegetation.
- Vegetation surveys are being conducted to identify ecosites and manage lands to protect ecosystems.
- Forest Management Plans are being prepared.

Land Rehabilitation and Maintenance projects are being conducted to restore vegetation.

Wildlife - Chapter 4.12

- Habitat Management Plans are being completed as part of the Integrated Natural Resource Management Plans.
- Sensitive habitat protection and minimum disturbance periods for several wildlife species.
- Prescribed burns to improve ruffed grouse habitat.
- Surveys to identify raptor habitats and locate nest sites.
- · Surveys for neotropical birds and waterfowl to identify species.
- Surveys for small mammals to identify populations.
- Bird Air Strike Hazard Program has been implemented.

Fisheries - Chapter 4.13

- No existing mitigation for directly managing fisheries.
- Current erosion control practices, water quality standards, and vegetation disturbance restrictions indirectly affect fish through protection of habitat.
- Ice bridge permits contain restrictions to protect fish populations.

Threatened or Endangered Species (State and Federal) - Chapter 4.14

 Surveys for threatened or endangered species are incorporated into other surveys.

Fire Management - Chapter 4.15

- Fire Management Plans to assess current fire hazards and list recommendations to reduce them. This includes maintaining current firebreaks.
- Monitoring of fire danger parameters, restrictions on military activities when necessary.
- Prescribed Burn Plans for fire hazard reduction and wildlife habitat improvement.

Public Access - Chapter 4.16

- Military regulations restricting public access imposed to provide public safety, protect vegetative communities, and wildlife and sensitive habitats while providing quality access.
- The Special Use Airspace Information Service (SUAIS), is provided to civilian pilots. The 24-hour service (1-800-758-8723 or 907-372-6913) provides information on which Military Operations Areas are active, Army artillery firing, and known helicopter operations.

Recreation - Chapter 4.17

- Federal, State, and military regulations govern recreational use of military lands.
- Recreational activities are monitored through the Integrated Natural Resources Management Plans.

Cultural Resources - Chapter 4.18

• The USARAK cultural resources management program provides for the inventory, evaluation, and protection of archeological sites.

Subsistence - Chapter 4.20

 Access to the withdrawn lands is permitted by the Army for subsistence purposes when it does not impact military training nor is a hazard to public safety.

Noise - Chapter 4.22

- Limit hours of firing demolitions, field artillery, and mortars from 6 a.m. to 10 p.m.; public notified of exceptions.
- Aircraft must fly at least 1,500 feet above ground level (AGL) over the Chena River Recreation Area from May 1 through September 30.
- U.S. Air Force mitigation relevant to the withdrawal lands decrease noisederived adverse impacts.
- U.S. Air Force provides a 24-hour public comment line (1-800-538-6647) to collect comments or complaints regarding noise.

2.1.3.7 Proposed Mitigation

The following programs are proposed to be implemented by the Army at Fort Wainwright and Fort Greely with the renewal of the withdrawal lands for military use. These programs will provide additional mitigation for achieving the military's mission while offering more extensive environmental protection for the duration of the withdrawal renewal. Chapter 4.23 contains a complete and thorough description of existing and proposed mitigation measures.

Pollution - Chapter 4.23

 Implementation of a program to identify possible munitions contamination of withdrawal lands. Includes collection of baseline data to determine the location, extent, and potential migration of munitions contamination in soils, surface water, and groundwater, and development of a long-term monitoring program to assess cumulative impacts

Final

Decontamination - Chapter 4.23

 Creation of a data collection system to incorporate munitions expenditure reports, number of duds in an area, chemical components of munitions, and biohazards of each chemical.

Soils - Chapter 4.6

 Implementation of a program to identify possible munitions contamination to soils of the withdrawal lands.

Permafrost - Chapter 4.7

 Implementation of a program to identify possible munitions contamination to permafrost of the withdrawal lands.

Surface Water - Chapter 4.8

 Development of a water quality sampling program, with monitoring stations located directly upstream and downstream of the installations.

Groundwater - Chapter 4.9

- Organize existing groundwater data to complete a more detailed groundwater quality assessment. Base future monitoring efforts on this compiled data.
- Monitoring program will also include munitions components.

Wetlands - Chapter 4.10

 Additional mitigation will be determined by the U.S. Army Corps of Engineers through the permitting process for the Clean Water Act, Section 404.

Vegetation - Chapter 4.11

• Implement forest resources inventory, complete and implement Forest Ecosystem Management Plans which are part of the Integrated Natural Resources Management Plans.

Wildlife - Chapter 4.12

 Information from bird surveys will be reviewed to identify habitat areas for neotropical migrants. Breeding Bird Surveys will continue on Fort Wainwright and be implemented on Fort Greely.

Fisheries - Chapter 4.13

- Fishing opportunities for the public will be maintained. Habitat for stocked fish will be improved.
- Wild fisheries habitat surveys will be conducted.

Threatened or Endangered Species (State and Federal) - Chapter 4.14

 If threatened or endangered species are found, management guidelines will be written and implemented after consultation with the U.S. Fish and Wildlife Service and Alaska Department of Fish and Game.

Fire Management - Chapter 4.15

 Interservice Support Agreements will be maintained for the length of the withdrawal.

Public Access - Chapter 4.16

• U.S. Army Alaska will develop a public information packet and media strategy to inform the public of restricted access areas and areas open for public use.

Recreation - Chapter 4.17

 Recreational use of stocked lakes will be monitored to determine impacts to the vegetation and shoreline surrounding the lakes.

Noise - Chapter 4.22

• Determine noise impacts to key species, such as caribou and bison, and include protection requirements within a management plan.

2.2 COMPARISON OF ALTERNATIVES

Implementing either of the alternatives results in different actions occurring on the withdrawal lands. The alternative chosen for implementation determines which agency has jurisdiction over the withdrawal lands. Specific agency ownership of the land determines the management actions implemented. Table 2.k provides a comparison of resource management under each alternative.

Resource management under the Proposed Action was obtained from the Army's Integrated Training Area Management Program for Fort Wainwright and Fort Greely, and Federal laws governing military land management, which is consistent with the existing Resource Management Plans for Fort Wainwright and Fort Greely.

The existing Resource Management Plans would guide the Bureau of Land Management's management of the withdrawal lands under the No Action Alternative. Therefore, management actions would be similar. However, the State of Alaska has future selections on the land that would become valid. It is impossible to predict how much of the land would be conveyed to the State. However, for purposes of comparison it is assumed the State would acquire title to all of the training lands.

Resource management under the No Action alternative was obtained from the *Draft Evaluation Units for Final State Land Selections* (ADNR 1992) and the *Tanana Basin Area Plan for State Lands* (ADNR 1991). Since the State has not obtained ownership of the withdrawal lands, specific management guidelines have not been developed for these land parcels. If the State does obtain ownership, the withdrawal lands will be managed according to the *Tanana Basin Area Plan for State Lands* (ADNR 1991).

Combining the State's Resource Information Summaries for the withdrawal lands and reviewing the State's management guidelines for its surrounding land parcels, it was possible to derive resource management actions which would be implemented by the State under the No Action alternative.

Table 2.k Compar	rison of Eacl	h Alternative	Based on \	Which Entity	/ Would
Own the Property	and the Ma	nagement A	ctions Each	Would Imp	ose on the
Properties.					

MANAGEMENT	NO ACTION	PROPOSED ACTION (CONTINUE CURRENT MANAGEMENT PRACTICES)		
Land Ownership	State	Federal		
Agriculture	Increase & Preserve Agricultural Lands	BLM Outgrants with Army Concurrence; None Issued		
Grazing	Increase & Preserve Grazing Lands	BLM Grants Leases with Army Concurrence; None Issued		
Cultural Resources	Preserve, Protect, & Interpret Historic, Prehistoric & Archaeological Resources	Inventory, Evaluate, & Protect Cultural Resources		
Wildlife	Protect Habitat Values for Public Use & Economic Benefits	Game Management to Support Hunting & Fishing; Protect Nongame Species Habitat to Maintain Ecosystem		
Vegetation	No Management Defined	Identify & Inventory Flora; Protect Rare, Threatened, or Endangered Species; Manage with Ecosystem Management Strategies		

Table 2.k Comparison of Each Alternative Based on Which Entity Would Own the Property and the Management Actions Each Would Impose on the Properties.

MANAGEMENT	NO ACTION	PROPOSED ACTION (CONTINUE CURRENT MANAGEMENT PRACTICES)		
Forestry	Ensure Continuous Productivity & Availability under Multiple Use Principles for Economic Development & Personal Use	BLM Administers Commercial Harvest of Timber Products with Army Concurrence		
Lake Shore & Stream Corridor ManagementProtect for Recreational Opportunities & Water Quality; Provide Land for Private OwnershipProtect to Ma Functions & F Opportunities		Protect to Maintain Ecosystem Functions & Provide Recreational Opportunities		
Saleable Minerals	Suitable Sites Maintained in State Ownership & Made Available to the Public	Mineral Material Disposal to Support Military Activities		
Public Access	Provide Access to Public & Private Lands	Open to Public Except Where Posted		
Recreation	Provide & Manage Recreational Opportunities for Alaskans & Support a Tourism Industry	Provide Recreational Opportunities Compatible with Military Needs		
Settlement	Private Land Sales with Emphasis on Meeting Demand for Recreational & Seasonal Residences	Lands Not Available for Disposal		
Leasable and Locatable Minerals	Allow Development to Benefit State's Economy & Provide Aid for Infrastructure & Technical Support	BLM & Army Determine which Lands are Suitable for Opening to Development without Interfering with Military Mission		
Wetlands	Maintain Hydrologic, Habitat, and Recreational Functions of Public Wetlands	Delineate, Protect, and Manage Wetlands		

2.3 ALTERNATIVES CONSIDERED AND ELIMINATED

The National Environmental Policy Act (NEPA) requires that all reasonable alternatives for Federal actions be analyzed. With the input received during the scoping process, the Army examined all possible actions to build an effective and reasonable range of alternatives.

The Army and Air Force considered alternatives as reasonable if they could be implemented without impairing their ability to complete their mission in Alaska. Since Army and Air Force needs require renewal of the existing withdrawals in their entirety, the range of alternatives to be examined in this LEIS was refined to include only those alternatives that included the entire lands now withdrawn.

The following alternatives were considered and eliminated from further study in this LEIS.

2.3.1 Renew Withdrawal for Varying Lengths of Renewal Periods

For the Army to analyze the proposed action under a range of alternatives consisting of various lengths of renewal periods would offer little effective impact analysis. The scope of actions would remain virtually the same in comparing renewals for 15, 25, 50, or 100 year increments. Management and use of these withdrawal lands by the military would remain the same under each time period.

2.3.2 Partial Land Withdrawal

The Army considered an alternative to renew only two of the three withdrawn areas: Fort Wainwright's Yukon Training Area, Fort Greely West Training Area, or Fort Greely East Training Area. This alternative would eliminate the withdrawal on any one of these areas.

Fort Wainwright Yukon Training Area is the closest year-round training area for troops stationed at Fort Wainwright. Considerable costs of time and travel would be incurred by the Army with the loss of the Yukon Training Area to access other military training lands in Alaska.

Fort Greely's West Training Area provides a large contiguous training area and associated Impact Areas to allow the firing of a large variety of conventional Army and Air Force weapons. Its location in interior Alaska has a winter climate that allows testing of military equipment at temperatures from -5°F down to temperatures below -50°F. Cold weather testing at these severe winter temperatures, and for the extended duration as occurs on Fort Greely, normally cannot be accomplished at any other Army installation in the United States.

with allied and sister service units.

Air drop of both personnel and equipment is essential to support forced entry missions essential to modern day warfare. The Donnelly Drop Zone in Fort Greely's East Training Area offers the ability to conduct mass tactical operations of up to battalion size and large heavy drop resupply missions including Container Delivery System (CDS) and Low Altitude Parachute Extraction System (LAPES). The Donnelly Drop Zone is one of the finest Drop Zones in the Army's inventory with desirable physical size, terrain, wind currents, and accessibility. The capabilities of this Drop Zone are not available anywhere else in Alaska. The loss of the Donnelly Drop Zone would seriously degrade the ability of the Alaskan Airborne Regiment to accomplish its primary mission; the essential task of airborne forced entry into a hot spot. This unit is currently the Commander-in-Chief Pacific's (CINCPAC) Crisis Response Force (CRF) with a critical world wide mission. This Drop Zone is also used extensively to conduct joint exercises

The only air-to-ground ranges available in Alaska are located at Stuart Creek, Oklahoma/Delta Creek, and at Blair Lakes on the Tanana Flats (see Figure 1.b). Blair Lakes is a non-tactical range. Only Stuart Creek and Oklahoma/Delta Creek Impact Areas meet the tactical training requirements of the 11th Air Force aircraft. A single range cannot handle multiple flights of fighter aircraft simultaneously. Therefore, both the Fort Wainwright Yukon Training Area and Fort Greely West Training Area are needed to fulfill aircraft training operations for the 11th Air Force.

Present Army and Air Force training and testing needs require the use of all existing military lands to fulfill their mission in Alaska. Therefore, the Army and Air Force eliminated this alternative from further study.

2.3.3 Relinquish Beaver Creek-South Fork Area in the Fort Wainwright Yukon Training Area to Alaska State Parks

The State of Alaska Division of Parks has requested the Army relinquish title to 13,440 acres in the Beaver Creek-South Fork area on the Fort Wainwright Yukon Training Area. This acreage was designated as part of the Chena River State Recreation Area by the State legislature. However, this State action does not transfer title of the land nor was it supported by Federal agencies. Army and Air Force training equipment exists on this land and it serves as part of the Buffer Zone for the Stuart Creek Impact Area (see Figures 2.f and 2.g).



Figure 2.g Beaver Creek-South Fork area of the Yukon Training Area, Fort Wainwright.

The Air Force has demonstrated a critical need for the use of the Beaver Creek-South Fork area as the preferred entry route for maneuvering and attacking tactical targets on the Stuart Creek Impact Area. Relinquishing this portion of the Fort Wainwright Yukon Training Area would restrict aircraft ingress and egress routes over the Stuart Creek Impact Area and reduce the land available for realistic training scenarios. Loss of the Beaver Creek Valley to this area would severely impact the Air Force's use of existing northern target formations by limiting their final attack headings and would prohibit the use of one of the most tactically desirable routes (Department of Air Force letter dated May 28, 1998).

Relinquishing the Beaver Creek Valley would prohibit certain types of weapon delivery training by the Air Force. Low altitude loft or high altitude dive bomb deliveries with training ordnance, 20mm/30mm gattling gun strafe, or inert 2.75 inch rocket deliveries would be lost. Aircraft routinely fly through the valley, armed and ready to expend ordnance on the targets in the Stuart Creek Impact Area. Loss of the Beaver Creek Valley would reduce arming distances and possibly prevent overflight of the area by aircrews during ingress (see Figure 2.f).

Automated anti-aircraft threat simulators protect the targets and require the aircrews to perform evasive maneuvers and expend chaff and flares to survive

a simulated attack. Relinquishing the Beaver Creek Valley could lead to conflict with civilian users and degrade the Air Force's ability to conduct threat avoidance maneuvers and expend counter measures to defeat the simulated threat systems that defend the targets (see Figure 2.f).

When firing occurs into the Stuart Creek Impact Area, the affected portion of the Impact Area and a two mile buffer adjacent to it are off-limits to military access and use. By relinquishing the Beaver Creek-South Fork area, the Army would lose part of its Buffer Zone and would be forced to convert existing active training land to new buffer area. Thus, reductions in target options and loss of ranges available for training would occur.

Loss of the Beaver Creek-South Fork area would severely hamper the use of northern target formations, which would reduce the effectiveness of military training by affecting the military's ability to conduct realistic combat training. This ultimately degrades the combat capability of military units in Alaska. Due to the excessive impacts to military training and the importance of this area's training infrastructure in achieving combat readiness, the Army and Air Force eliminated this alternative from further study.

2.3.4 Bureau of Land Management Retain Authorization for Mineral Extraction

This alternative would allow the Bureau of Land Management the right to grant use of the withdrawal lands for mineral extraction without Army concurrence. It is possible that conflicts between military and mineral use might occur. Military use of the withdrawal lands would be compromised if the Army could not control the use of its training lands. The Army eliminated this alternative from further study.

2.3.5 Acquiring Alternate Training Lands

The Army considered an alternative to acquire alternate sites in Alaska to relocate its training and testing activities. Military training and testing has occurred on these withdrawal lands for nearly 50 years with portions dedicated as High Hazard Impact Areas. It is unlikely the technology exists to completely decontaminate an Impact Area at an economically feasible cost. It therefore seemed unreasonable and impractical to propose to relocate military training and testing and testing activities to other public lands and commit resources at these alternate sites as new High Hazard Impact Areas. In addition, acquiring other public lands in Alaska for use by the military would be cost prohibitive even if the necessary acreage was available.

2.3.6 Acquiring Additional Training Lands

U.S. Army Alaska determined acquiring additional land will not be considered in this withdrawal renewal action. Larger training lands would allow the Air Force to fully utilize all weapon systems while training and increase the Army's ability to conduct joint training by utilizing linked training areas. However, additional land acquisition falls outside the scope of this withdrawal renewal action.

2.4 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

The Army's preferred alternative is to renew the withdrawal of the Fort Wainwright Yukon Training Area, and Fort Greely West and East Training Areas for 50 years until November 6, 2051.

2.5 MATRIX OF ALTERNATIVES AND ENVIRONMENTAL CONSEQUENCES

Table 2.I contains a matrix of the alternatives comparing their environmental consequences.



Figure 2.a

State Resource Selections

Fort Wainwright and Fort Greely

Legend

\sim	Post Boundary					
	Minerals, Moderate Value					
	Forestry, High Value					
	Habitat, High Value					
	<i>Recreation, High/Moderate Value</i>					
	Recreation, High Value					
51	Oil/Gas Basin					
\sim	Road					
\sim	Stream					
	Glacier					
5 <u>- 0</u> 5 <u></u>	SCALE 1 : 750,000 5 10 15 20 25 30 35 Kilometers 0 5 10 15 20 Miles					
Source Alaska Divisi for Fir	es: Department of Natural Resources on of Land; Evaluation Statistics nal State Land Selections					



Figure 2.b

Army Facilities

Fort Wainwright Yukon Training Area

Legend





Figure 2.c

Army Facilities

Fort Greely

Legend

\sim	Impact Area Boundary			
	Dedicated Impact Area			
	High Hazard Impact Area			
	Impact Area Buffer Zone			
	Training Area			
\sim	Sub-Training Area Boundary			
\sim	Airfield			
\sim	Drop Zone			
N	Restricted Airspace, R2202			
	CRTC Test Site			
*	Firing Point			
٥	Observation Point			
	PL99-606 Withdrawal Boundary			
	Other Military Withdrawal Boundaries			
	Stream			
	SCALE 1 : 280,000 <u>2 3 4 5 6 7 8 9 10 11 12 1</u> 3 Kilometers <u>1 2 3 4 5 6 7 8</u> Miles			
Sources: U.S. Army Alaska USGS, 1998				



Figure 2.d

Air Force Facilities

Fort Wainwright Yukon Training Area

Legend

Target Array

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- H Threat Emitter Site
 - Yukon Measurement and Debriefing System
 - Air Force Technical Applications Center (AFTAC)

Air Force Exclusive Use

Air Force and Army Joint Use

Monitoring Equipment

Restricted Airspace, R2205

Stuart Creek Impact Area

Impact Area Buffer Zone

PL99-606 Withdrawal Boundary

Other Military Withdrawal Boundaries

SCALE 1:165,000

5 6

7 Kilometers

4 Miles

Stream

Wetland

1 2

1 0

Sources: U.S. Army, Alaska U.S. Air Force, 11th Air Force



Figure 2.e

Air Force Facilities

Fort Greely

Legend

Target Array Threat Emitter Site \bowtie Yukon Measurement and Debriefing System ¥ CALFEX Range Restricted Airspace, R2202 N Dedicated Impact Area High Hazard Impact Area \square Impact Area Buffer Zone PL99-606 Withdrawal Boundary Other Military Withdrawal Boundaries \sim Stream SCALE 1: 280,000 1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 Kilometers 1 0 1 2 3 4 5 6 7 8 Miles

Sources: U.S. Army, Alaska U.S. Air Force, 11th Air Force



PARAMETERS	PREFERRED ALTERNATIVE	NO ACTION ALTERNATIVE	
Air Quality	Continue to generally meet standards. Carbon monoxide and particulates will continue to be most commonly produced pollutants.	Less pollution created by military. Unknown levels of of pollution from public use.	
Ice Fog	Same as present.	Increase in production may result from increased public use.	
Soils	As present. Some soil damage from vehicles, weapons, and fires. Some erosion with net soil loss and water impacts.	Less damage. Increased public use may impact resource. Impacts dependent upon State management.	
Mineral Resources	No impact on mineral resources by military.	Mineral extraction activity could impact soils, surface water, groundwater, and wildlife.	С
Permafrost	As present. Localized long-term damage. Regulated as much as possible. Fires are a problem.	No military impacts. Impacts dependent upon State management.	
Vegetation	No change. Negligible impacts from direct destruction by military activities. Indirect impacts from soil compaction, increased fires. Water quality changes.	No military impacts. Impacts dependent upon State management.	Ċ
Surface and Groundwater Resources Meets standards except for high background iron levels in surface S		Spill/contamination risks reduced. Impacts dependent upon State management.	
Wildlife	Negative impacts - noise, activity, habitat destruction. No increase.	No military impacts. Impacts dependent upon State management.	
Fisheries	No increase in negative impacts. Negative habitat impacts. Military aids in lake stocking.	No military impacts. Impacts dependent upon State management. Stocking continues.	
Threatened, Endangered, and Species of Concern	"Not likely to adversely impact" as stated by USFWS.	No military impacts. Impacts dependent upon State management.	
Recreation/Tourism	Current conditions continued; access restricted.	Access improved; impacts from public use may occur. Increase in tourism revenue.	
Air/Land Access	Military controlled.	Reduced military control. Possible improved access.	
Fires	Military caused: 88%; Lightening strikes: 12%	No military impacts. Impacts dependent upon State management.	
Contamination/Hazardous Materials	Continues from weapons testing, vehicle maneuvering. Risk of hazardous spills. Continuous cleanup operations.	Requires complete cleanup, dependent upon funding and technology.	
Noise	No increase. Negative impacts continue.	No military impacts. Impacts dependent upon State management.	
Military Socioeconomics	Continued military training, research, and development. Defense preparation.	Compromise military activity. Need substitute training lands.	
Area Socioeconomics	Continued rates of employment, income, and population/schools.	Decreased military based activity. Increase due to tourism and land use changes.	
Cultural Resources	Continued Federal protection.	State protection.	
Subsistence	Continued use.	Access improved.	
Land Use	Military controls. Works with BLM where possible. No mineral extraction. Some recreation, agriculture, forestry.	tion. State disperses if decontaminated. Used for tourism, recreation, settlem mineral extraction, and wildlife. Impacts dependent upon State management.	

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CHAPTER 3 AFFECTED ENVIRONMENT

3.1	LAND USE
3.2	CLIMATE
3.3	TERRAIN
3.4	GEOLOGY
3.5	MINERAL RESOURCES
3.6	SOILS
3.7	PERMAFROST
3.8	SURFACE WATER
3.9	GROUNDWATER
3.10	WETLANDS
3.11	VEGETATION
3.12	WILDLIFE
3.13	FISHERIES
3.14	THREATENED OR ENDANGERED SPECIES (State and Federal) AND SPECIES OF CONCERN (State)
3.15	FIRE MANAGEMENT
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3:19	SOCIOECONOMICS
3.20	SUBSISTENCE 3-110
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3.22	NOISE

AFFECTED ENVIRONMENT

3.1 LAND USE

The lands affected by the proposed withdrawal renewal have been used by the military for approximately 50 years. Current use includes military maneuvering, training, equipment development and testing, and other defense-related purposes.

The Military Lands Withdrawal Act required the Army and Bureau of Land Management to prepare Resource Management Plans for the Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas. Resource Management Plans were completed in 1994. The Army and Bureau of Land Management manage the natural resources on the withdrawal lands in accordance with the 1994 plans, recognizing the withdrawal is for military purposes.

U.S. Army Alaska is currently preparing Integrated Natural Resources Management Plans for Fort Wainwright and Fort Greely as required by the Sikes Act (Public Law 105-85, 16 U.S. Code 670a et seq.). It is working with the Bureau of Land Management, other State and Federal agencies, and the public in the development of these plans. The plans are written for a five year period. When the Integrated Natural Resources Management Plans are completed and approved, management of the withdrawal lands will continue under the new plans. At the end of each five year period, the plans are reviewed and updated by U.S. Army Alaska, Federal and State agencies, and the public.

This LEIS does not pre-empt or replace the existing Resource Management Plans completed in 1994. The Resource Management Plans will continue to be implemented on the withdrawal lands until November 6, 2001, through the approved Memorandum of Understanding (MOU) (AK-930-9508), or until the MOU is cancelled, extended, or renewed. Approval of the proposed Integrated Natural Resources Management Plans for Fort Wainwright and Fort Greely may require modification or replacement of the existing MOU.

3.1.1 Land Acquisition for Military Use Fort Wainwright Yukon Training Area

In 1950, the Air Force obtained a permanent withdrawal of 22,600 acres through a Public Land Order (PLO) within what is now known as the Fort Wainwright Yukon Training Area. Additional permanent withdrawals were granted to the Air Force in 1952 for 6,720 acres and in 1955 for 4,760 acres. These withdrawals were later transferred to the Army. In 1956, the Army obtained a permit from the Secretary of the Interior for use of 256,000 acres and two NIKE missile test sites, making up the remainder of the Yukon Training Area.

After passage of the Engle Act in 1958 (all withdrawals of more than 5,000 acres for defense purposes require Congressional approval), Congress passed legislation withdrawing 256,000 acres of the Fort Wainwright Yukon Training Area in 1961 for a 10 year term. That withdrawal was extended for an additional five years in 1971 through a Public Land Order. In 1976, the Yukon Training Area was segregated from public use pending renewal of the existing withdrawal by Congress. Congress renewed the withdrawal in 1986 for a 15 year term with the passage of the Military Lands Withdrawal Act (Public Law 99-606, 100 Stat. 3457 et seq.). At that time, the Army did not renew 1,600 acres and it is now part of the Chena River State Recreation Area. Figure 3.1.a shows the property acquisition history of Fort Wainwright.

Fort Greely West and East Training Areas

In 1950, the Army obtained a Special Land Use permit from the Department of the Interior for use of 572,000 acres now known as the Fort Greely West Training Area. The permit was granted six month extensions until passage of legislation in 1961 granting withdrawal for a 10 year term. The withdrawal was renewed in 1971 for five years, excluding a five acre Trade and Manufacturing site near the western edge of the West Training Area. In 1976, the West Training Area was segregated from public use pending renewal of the existing withdrawal by Congress. Congress renewed the withdrawal in 1986 for a 15 year term with the passage of the Military Lands Withdrawal Act.

The Army obtained permanent use of a 160 acre tract of the Fort Greely East Training Area in 1955 by a Public Land Order. In late 1958, the Army obtained the use of 51,750 acres of the East Training Area by a permit from the Department of the Interior (including the 160 acre tract). The permit was granted extensions until passage of Congressional legislation. The legislation passed in 1961, granting the Army use of 51,590 acres of the East Training Area for a 10 year term. That legislation excluded the 160 acre tract, which was returned to the Bureau of Land Management. The withdrawal was renewed in 1971 for five years. In 1976, the East Training Area was segregated from public use pending renewal of the existing withdrawal by Congress. Congress renewed the withdrawal in 1986 for a 15 year term with the passage of the Military Lands Withdrawal Act (Public Law 99-606, 100 Stat. 3457 et seq.). Figure 3.1.b shows the property acquisition history of Fort Greely.

For a more detailed summary of land acquisition for Fort Wainwright and Fort Greely see Appendix 1.B.

Submerged Lands

The State of Alaska, Department of Natural Resources, Division of Land, has indicated interest in the Delta River, including an ownership interest in the lands submerged under the Delta River. The United States Army Alaska is reviewing the Division of Land's ownership claim. The Division of Land has also requested cleanup of the Delta River. The United States Army Alaska will continue to use submerged lands for training purposes until the issue is resolved.

3.1.2 Existing Rights-of-Way

The Trans-Alaska Pipeline System transports crude oil from Prudhoe Bay to Valdez, Alaska. The Pipeline System right-of-way extends through the Fort Wainwright Yukon Training Area and the Fort Greely West Training Area. The right-of-way was authorized by the Trans-Alaska Pipeline Authorization Act of 1973. Its width is 50 feet plus the ground area occupied by the pipeline, which is approximately four feet.

A right-of-way for the Alaska Natural Gas Transportation System is adjacent to the Trans-Alaska Pipeline System on the Fort Wainwright Yukon Training Area. The right-of-way width for the natural gas pipeline is 50 feet.

A right-of-way has been approved by the Army and Bureau of Land Management for the proposed Trans-Alaska Gas System, which runs roughly parallel with the Trans-Alaska Pipeline System and the Alaska Natural Gas Transportation System through the Yukon Training Area and Fort Greely West Training Areas. (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a and 1994b).

3.1.3 Surrounding Land Use

The majority of land surrounding the Fort Wainwright Yukon Training Area is State land. Principal management of State land to the east of the Yukon Training Area is for fish and wildlife habitat, and public recreation. State lands to the south are managed for fish and wildlife habitat, and forestry. About 3,000 acres have been designated for agricultural sale and 200 acres for settlement. Private and Borough-owned land parcels exist south of the Yukon Training Area. Eielson Air Force Base adjoins the western boundary of the Yukon Training Area. North of Eielson Air Force Base is State land managed for public recreation, fish and wildlife habitat, and privately owned land.

The Chena River Recreation Area borders the Yukon Training Area to the north. Remaining State land west of the Recreation Area is managed for agriculture, public recreation, fish and wildlife habitat, and for future recreational settlements or fee simple homesteads (approximately 490 acres). Borough-owned land and Tanana Valley State Forest land also exists north of the Yukon Training Area. The *Tanana Basin Area Plan for State Lands* (1991) indicates two small parcels of native-owned land along the northern boundary of the Yukon Training Area.

Fort Greely is surrounded by State land except for a tract of Federal land to the south of the West Training Area managed by the Bureau of Land Management. State lands to the north of Fort Greely are managed for forestry, fish and wildlife habitat, public recreation, and watershed maintenance. Up to 60,000 acres may be designated for agricultural disposal. An additional 1,000 acres is designated for future settlement. Privately owned land exists north of the State land. Adjacent to the eastern boundary of the Fort Greely East Training Area, the State has designated bison habitat to provide winter range and alter seasonal movement to minimize damage to area agricultural lands. State lands along the southern boundaries of the Training Areas are managed for public recreation, mineral exploration, and fish and wildlife habitat. State lands adjacent to the western boundary of the West Training Area are managed for fish and wildlife habitat, forestry, and mineral exploration. State lands located between the Training Areas are managed for fish and wildlife habitat, forestry, and mineral exploration. State lands located between the Training Areas are managed for settlement (ADNR 1991).

3.2 CLIMATE

The natural environment of Fort Wainwright and Fort Greely is greatly influenced by climate. The region is subject to vast annual temperature variations including short moderate summers and long cold winters with low precipitation, low humidity and extreme seasonal contrasts in sunlight duration. These characteristics are typical of the continental Subarctic climate region in which the entire withdrawal area is located.

Weather patterns of the Fort Wainwright and Fort Greely region are determined by the mountain ranges framing the area on three sides. This restrictive barrier limits the flow of warm, moist, maritime air during most of the year and promotes the settling of cold Arctic air into the Tanana-Kuskokwim Lowlands. The inflow of polar air masses and the persistent snow cover create extreme low temperatures in the area and prevent the absorption of solar radiation. Over 80% of the year the sky above Fort Wainwright and Fort Greely is considered partly cloudy to cloudy. Climatic data for Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas are collected at individual climatological stations near the withdrawal lands as shown in Figure 3.2.a. The information presented here should serve only as a relative picture of the current climate conditions. Local influencing factors, such as mountain ranges and upland areas, will have an effect on the normal and extreme values. Thus, climate values should not be considered the same for all of the withdrawal lands. Appendix 3.2 contains monthly climatic summaries for each climate station.

Fort Wainwright Yukon Training Area

Average monthly temperatures recorded at Eielson Air Force Base (AFB) range from a low of -10.5°F in January to a high of 60°F in July. Maximum temperatures are typically recorded within the months of June and July. The highest recorded daily temperature, 93°F, occurred on June 15, 1969. On average, one or less days per year have a temperature higher than 90°F. The lowest temperatures are typically recorded between November and March due to the low amount of daylight. Average monthly temperatures vary from below zero to 10°F, with a record low of -64°F occurring on January 23, 1971. Approximately 160 days each year have temperatures of 35°F or less.

Total annual precipitation averages 13 inches at Eielson AFB. Precipitation during the summer months is in the form of rain showers with maximum intensity and duration occurring in July. Precipitation events of 0.5 inches or more a day occur on average only four times during the summer. A noticeable decline in precipitation begins in August and continues through the month of April. Total annual snowfall averages 76.4 inches. A maximum of 58.7 inches fell in November 1990, and record seasonal snowfalls occurred in the spring and fall of 1992. Blizzard conditions are rarely experienced in the Fort Wainwright area. There is a cover of snow on the ground for more than six months of the year, with the average maximum snow depth of 18 inches occurring in March.

Wind velocity is relatively low at the Yukon Training Area. For approximately 60% of the year, the winds are calm (eight miles an hour or less). Wind speed averages five miles per hour with a prevailing direction of north. However, during the months of June and July, wind direction is southwest (Defense Mapping Agency 1978).

On average, the last date of freezing temperatures in the spring is May 21 and the first frost in the fall is August 30. The length of the growing season averages 100 days (Defense Mapping Agency 1978).

Fort Greely West and East Training Areas

Maximum temperatures are typically recorded within the months of June and July. During these months, the sun is above the horizon from 18 to 21 hours each day and the average temperatures reach 60°F. Average monthly temperatures recorded at Big Delta in Alaska range from -4.0°F in January to 60.2°F in July. The highest recorded daily temperature of 92°F occurred on June 15, 1969. On average, one or less days with extreme temperatures higher than 90°F are recorded. Lowest temperatures are typically recorded between November and March due to the low amount of daylight. Sunlight ranges from 10 hours to less than 4 hours per day. Average monthly temperatures vary from below zero to 15°F, with a record extreme daily low of -63°F occurring on January 30, 1947. Approximately 150 days having temperatures of 35 °F or less are recorded during the year.

Annual precipitation at Fort Greely totals 11.71 inches. Precipitation during the summer months is in the form of rain showers. The frequency and intensity of rain showers increase as the summer progresses, building to a maximum in August (Defense Mapping Agency 1978). Precipitation events of 0.5 inches or more a day occur on average only four times during the summer. A noticeable decline in precipitation begins in September and continues through the month of April. Total annual snowfall averages 44.5 inches. A maximum of 41.8 inches fell in November 1994 and the record seasonal snowfall occurred in the fall of the same year. Snow covers the ground for more than six months of the year, with the average maximum snow depth of 10 inches occurring in February.

Wind velocity at Fort Greely averages 11 miles per hour with a prevailing south direction. From October to March the wind direction is east-southeast switching to primarily south and south-southwest for the remainder of the warmer months. For approximately 14% of the year, the winds are calm, eight miles an hour or less (Defense Mapping Agency 1978).

Data regarding the last day of freezing, first day of frost, and length of growing season were unavailable for the Fort Greely area. However, values would be expected to be similar to those listed for Fort Wainwright.

3.2.1 Air Quality and Emissions

National Ambient Air Quality Standards (NAAQS) are set by the Clean Air Act to establish the maximum allowable concentrations of air pollutants. The NAAQS serve as the ultimate air quality goal for the entire nation. Six pollutants are regulated under the NAAQS program: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM₁₀), and sulfur dioxide (SO₂). The State of Alaska also regulates ammonia and reduced sulfur

compounds. Primary and secondary standards have been established for the pollutants. Primary standards protect human health and secondary standards protect public welfare (Table 3.2.a).

Pollutant	Averaging Period	Exceedance	Primary National AAQS	Secondary National AAQS	Alaska AAQS
Ozone (O ₃)	1-hour Average 8-hour Average	Three year average not to exceed 1.0.	- 157 μg/m³	- 157 μg/m³	235 µg/m³ -
Carbon Monoxide (CO)	1-hour Average 8-hour Average	Not more than once a year.	40 mg/m ³ 10 mg/m ³	-	40 mg/m ³ 10 mg/m ³
Sulfur Dioxide (SO ₂) 3-hour Maximum 24-hour Maximum Annual Arithmetic Mean		Not more than once a year.	- 365 μg/m³ 80 μg/m³	1,300 μg/m³ - -	1,300 μg/m³ 365 μg/m³ 80 μg/m³
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	Not more than once a year.	100 µg/m³	100 µg/m³	100 µg/m³
Particulate Matter of 10 Microns or Less (PM ₁₀)	24-hour Average Annual Arithmetic Mean	Three year average not to exceed 1.0.	150 μg/m³ 50 μg/m³	150 μg/m³ 50 μg/m³	150 μg/m³ 50 μg/m³
Lead (Pb)	Annual Quarterly Average	Not more than once a year.	1.5 μg/m³	1.5 μg/m³	1.5 μg/m³
Ammonia	8-hour Average	Not more than once a year.	-	-	2.1 mg/m ³
Reduced Sulfur Compounds	30-minute Average	Not more than once a year.	-	-	50 µg/m³

Table 3.2.a National and State of Alaska Ambient Air Quality Standards (AAQS).

An additional Clean Air Act regulation that applies to the withdrawal lands is the Prevention of Significant Deterioration (PSD) program. This program preserves air quality in areas that already meet or exceed the NAAQS for clean air. This program primarily applies to industrial projects that build new facilities or increase emissions through the expansion and modification of existing facilities. Existing air quality is further protected by additional nitrogen dioxide, sulfur dioxide, and total suspended particulate matter limitations. The PSD program also classifies areas into three categories to establish the amount of protection needed to prevent future air pollution. The Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas are within a Class II designated

area (areas in attainment of the NAAQS or unclassifiable due to lack of data), which includes the majority of Alaska.

The State of Alaska is divided into four Intrastate Air Quality Control Regions based on common meteorological, industrial, and socioeconomic factors. The withdrawal lands are located in the Northern Intrastate Air Quality Control Region (AQCR9), which covers a total of 320,000 square miles and includes the northern half of the state. Areas within each control region can be classified as either attainment (local air quality meets or exceeds the established standards) or non-attainment (local air quality fails to meet the established standards) for each criteria pollutant. Occasional non-attainment episodes are experienced during the winter months during periods of strong temperature inversions. These poor air quality episodes involve increases in carbon monoxide and particulates.

The majority of local air quality information has been collected within the Fairbanks vicinity. Specific air quality data have not been collected at Fort Wainwright Yukon Training Area or Fort Greely West and East Training Areas. The closest non-attainment area to the withdrawal lands are the cities of Fairbanks and North Pole, including the developed portion of Fort Wainwright's Main Post area. These areas are designated as non-attainment for carbon monoxide. Table 3.2.b lists the highest carbon monoxide values recorded for each year at various Fairbanks monitoring stations. Generally, Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas air quality is good.

Monitor	1992	1993	1994	1995	1996	1997	
Carbon Monoxide 8-hour Value - Highest Value Recorded in Each Year EPA and State of Alaska Air Quality 8-hour Standard for Carbon Monoxide - 9 ppm							
020900002-1	10.2	12.0	13.5	15.2	9.8	13.3	
020900013-1	9.2	10.3	10.7	10.6	9.1	12.2	
020900020-1	10.3	10.9	12.4	12.1	8.8	12.8	
Carbon Monoxide 1-hour Value - Highest Value Recorded in Each Year EPA and State of Alaska Air Quality 1-hour Standard for Carbon Monoxide - 35 ppm							
020900002-1	16.0	22.8	20.7	24.3	12.2	17.7	
020900013-1	11.0	19.5	15.8	20.9	12.3	18.2	

Table 3.2.b Carbon Monoxide Air Quality Values Collected at Fairbanks, Alaska (AIRSWeb 1998). Values are reported in parts per million (ppm).
Monitor	1992	1993	1994	1995	1996	1997
020900020-1	12.9	15.6	14.4	15.0	13.2	14.7

Table 3.2.b Carbon Monoxide Air Quality Values Collected at Fairbanks,Alaska (AIRSWeb 1998). Values are reported in parts per million (ppm).

The primary source of carbon monoxide in Fairbanks is vehicle emissions. The levels of carbon monoxide are highest in the winter when cold spells accompanied by low winds produce temperature inversions. The topography of the area (Fairbanks lies in the Tanana River Valley) contributes to these climate conditions (U.S. Army Corps of Engineers Alaska District 1997). Appendix 3.2 contains an estimate of carbon monoxide emissions resulting from military mobile sources. Estimates of daily wintertime carbon monoxide emissions for Fairbanks during 1990, 1995, and 2000 are also included in Appendix 3.2.

The Fairbanks area has a relatively high suspended particulate concentration, even though it is an attainment area for particulate matter (Table 3.2.c). Main sources of suspended particulates are coal-burning power plants, residential wood and coal burning, road dust, and vehicle emissions. Particulate concentrations are highest in the winter (U.S. Army Corps of Engineers Alaska District 1997).

Table 3.2.c Particulate Matter Air Quality Values Collected at Fairbanks, Alaska (AIRSWeb 1998). Values are reported in micrograms per cubic meter of air $(\mu g/m^3)$.

Monitor	1992	1993	1994	1995	1996	1997	
Particulate Matter 24-hour Value - Highest Value Recorded in Each Year EPA Air Quality 24-hour Standard for Particulate Matter - 150 μ g/m ³							
020900025-2	115	92	76	102	98	60	
020900010-2	60	74	65	99	57	56	
Particulate Matter Annual Mean Value EPA Air Quality Annual Mean Standard for Particular Matter - 50 μg/m ³							
020900025-2	29.6	27.3	27.3	29.3	28.5	26.5	
020900010-2	24.3	23.8	21.1	23.8	21.6	23.3	

3.2.2 Ice Fog

The phenomenon of ice fog is primarily a human-made atmospheric condition. Its primary source is water vapor output from combustion activities such as automobile exhaust, household chimneys, power plant stacks, dust particles, and other sources associated with urban environments, which include human and animal breath and urban open water bodies such as settling ponds.

Ice fog is a unique condition within an urban area such as Fairbanks. Ice fog consists of supercooled water droplets that have crystallized as a result of temperatures falling below -22°F. During this cooling cycle, water is gradually condensed out of the air until the droplets freeze, forming ice fog. The formation of ice fog is rapid and widespread. It persists as long as the cold spell lasts and a continual source of moisture from human activities is present. The frequency of ice fog formation varies from 5 to 20 times per year with a duration of several hours to several days (Benson 1965).

Ice fog occurs in concentrated population centers where extremely strong temperature inversions are able to form. Population centers create a net loss of heat from the earth's surface by outgoing longwave radiation. Temperature inversions form when temperatures fall below -22°F. The surrounding topography contributes to the severity of the inversions. Air within the lowlands is typically colder and denser than the air moving in from the uplands. The incoming air cannot penetrate and moves across the cooler, low-lying air. As a result, the lower air is trapped causing the air to stagnate and cool.

Ice fog is generally 30 feet thick, rarely exceeding thicknesses of 90 feet. Both its vertical thickness and density increase as temperatures decrease. This is especially evident when temperatures plunge below -40°F. At this point, street-level visibility in Fairbanks is reduced to less than 90 feet (Benson 1965). Ice fog seldom reaches 1,000 feet above the ground level.

3.3 TERRAIN

Fort Wainwright Yukon Training Area

The Fort Wainwright Yukon Training Area is located entirely within the Yukon-Tanana Upland section of the larger Northern Plateaus physiographic province. Rounded, even-topped ridges with gentle side slopes characterize this section of broad, undulating divides and flat-topped spurs. Ridges are usually 3,000 to 5,000 feet in elevation, but some have domes as high as 6,800 feet. The entire Yukon-Tanana Upland section lies within the larger Yukon River catchment (Figure 3.3.a). Most streams originating in the Yukon Training Area flow south and west to the Tanana River, which is a tributary of the Yukon River. The few lakes present in the area are primarily thaw lakes located in valley floors. No glaciers exist within the uplands, but the entire section is underlain by discontinuous permafrost (Wahrhaftig 1965).

Fort Greely West and East Training Areas

The Fort Greely West and East Training Areas are separated into two physiographic provinces: Western Alaska and Alaska-Aleutian. The northern section of the Training Areas are located within the Tanana-Kuskokwim Lowland section of the Western Alaska province (Figure 3.3.b). The Tanana-Kuskokwim Lowland is a broad depression located just north of the Alaska Range. Coalescing outwash fans spread northward from the Alaska Range at a slope of 20 to 50 feet per mile towards the floodplain of the Tanana River. Braided glacial streams flow from these fans across the lowland at intervals of 5 to 20 miles. Over time, glacial outwash has pushed the Tanana River against the rolling hills of the uplands to the north. Although the Tanana-Kuskokwim Lowland contains no glaciers, the area is generally underlain by permafrost and contains numerous thaw lakes and sinks. In the outwash areas, the alluvium consists of porous gravel and has a deep water table allowing for substantial infiltration (Wahrhaftig 1965).

The southern portion of the Training Areas is located within the Northern Foothills of the Alaska Range section of the larger Alaska-Aleutian province (Figure 3.3.b). Topographic features within this section include flat-topped, east-trending ridges 2,000 to 4,000 feet in elevation, 3 to 7 miles wide, and 5 to 20 miles long. These foothills are separated by rolling lowlands 700 to 1,500 feet in elevation and 2 to 10 miles wide. Most streams flowing through the foothills originate in the Alaska Range and flow north in rugged V-shaped canyons and across the broad terraced valleys of the Tanana-Kuskokwim Lowland. Although no local glaciers originate in the Northern Foothills, a few glaciers from the Alaska Range terminate there and permafrost is extensive (Wahrhaftig 1965).

3.3.1 Glaciers

Glaciers are important and influential natural features located in the Fort Greely region. A glacier is defined as a large mass of snow and ice on the land that persists for many years. Glaciers are a product of local climate regimes. They are formed over a number of years when more snow falls than melts. As the snow accumulates, it is compressed into solid ice. Eventually this solid mass begins to flow outward due to its own weight. Glaciers are present south of Fort Greely, originating in the Alaska Range. Valley glaciers located in this rugged

topography include Gilliam, Trident (whose terminus is within Fort Greely West Training Area), and Hayes Glaciers (Figure 3.3.c).

3.4 GEOLOGY

Fort Wainwright Yukon Training Area and Fort Greely are located within a large geological province known as the Yukon-Tanana (Y-T) terrane. This is a region of deformed and faulted metamorphic rocks of Paleozoic and possibly Precambrian age. (See Appendix 3.4 for an explanation of technical geologic terms and ages.) The rocks have been intruded by plutons of Mesozoic and Cenozoic age, and overlain by younger sedimentary formations of Tertiary and Quaternary age.

The Y-T terrane extends from the Denali fault in the south to the Tintina fault in the north, and from western Alaska to western Canada. It encompasses three major physiographic provinces (Yukon-Tanana Upland, Tanana-Kuskokwim Lowland, and Northern Foothills) that are previously described in Chapter 3.3 of this Legislative Environmental Impact Statement.

For many years, the older metamorphic and igneous rocks in interior Alaska were known collectively as the Birch Creek Schist. However, this nomenclature has been abandoned by the scientific community and the mineral industry. The Y-T terrane is now recognized as a complex assemblage of many rock types with a very complicated geologic history (Hansen and Dusel-Bacon 1998).

Moderate seismic activity occurs throughout the region. However, the earthquakes have not been linked to movement along known faults. They may be associated with block rotation between the Tintina and Denali faults resulting from the collision of the Pacific and North American plates (Page et al. 1991, Page et al. 1995, Hammond, pers. com. 1998).

There has not been much geologic fieldwork on Fort Wainwright or Fort Greely since the lands were withdrawn in the 1950s. In interior Alaska, geologic mapping has always been challenging due to difficult access, poor exposures, dense vegetation, thick surficial deposits, complex structures, and lack of fossils (Foster 1992, Foster et al. 1994). However, modern geochemical and geophysical techniques are leading to a better understanding of the region's geologic history, structural relationships, and mineralization (Newberry et al. 1996).

Fort Wainwright Yukon Training Area

The general geology of the Fort Wainwright Yukon Training Area is shown on Figure 3.4.a. Major rock units are color-coded, and identified by abbreviated symbols such as Pzq, Pzsg, etc. The withdrawal area is underlain by altered and deformed rocks of Paleozoic and possibly Precambrian age that were originally deposited offshore in a continental margin environment (Foster et al. 1994). They were intruded in the late Cretaceous Period by the Eielson pluton. The area is cut by northeast-trending, high-angle faults. Bedrock is largely obscured by extensive deposits of wind-blown sand and loess, locally as much as 150 feet thick (Dusel-Bacon et al. 1998a, Foster et al. 1979, Weber et al. 1978).

Fort Wainwright Yukon Training Area is in the Salcha seismic zone, a distinct northeast-trending band of epicenters about 50 kilometers long (Page et al. 1991, Alaska Earthquake Information Center and U.S. Geological Survey 1997). Although the epicenters form a conspicuous pattern, no associated fault movement has been identified (Page et al. 1991). The Salcha Earthquake of 1937 was one of the largest ever recorded in the Interior, with a magnitude of 7.3. Its epicenter was less than 10 miles from the southwest corner of the Yukon Training Area (Figure 3.4.a). In 1996, an earthquake with a magnitude of 4.2 occurred on the Yukon Training Area east of Eielson Air Force Base (U.S. Geological Survey National Earthquake Information Center 1998, Alaska Earthquake Information Center 1998). Many smaller earthquakes, not shown on Figure 3.4.a, are routinely detected.

Earthquakes to the west of the Yukon Training Area are associated with the Fairbanks seismic zone, another northeast-trending band of activity. An average of five or six earthquakes a year are actually felt in this zone, and swarms of micro-earthquakes occur (Page et al. 1991). In June 1967, a series of three earthquakes of about magnitude 6 had epicenters to the west of the withdrawal lands. Two other moderate (magnitude 4.0-4.6.) quakes occurred in this zone in 1977 (U.S. Geological Survey National Earthquake Information Center 1998, Alaska Earthquake Information Center 1998).

Fort Greely West and East Training Area

The general geology of the Fort Greely area is shown on Figure 3.4.b. Major rock units are color-coded, and identified by abbreviated symbols such as Kgd, Pzs, etc. The Fort Greely area is underlain by altered sedimentary and volcanic rocks of Paleozoic age (see Appendix 3.4), which were later intruded by granitic plutons. These rocks were subsequently overlain by Tertiary-age sediments of continental origin. The oldest of the Tertiary sediments contains coal. As the Alaska Range rose to the south, the exposed Tertiary sediments were eroded, then covered by massive gravel deposits known as the Nenana gravel. Glaciers

flowed northward from the Alaska Range during the Quaternary Period, depositing moraine and outwash material in the withdrawal area. Deposits of loess were laid down between glacial periods (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a).

Structural features, such as faults, are masked by recent deposits of sand, gravel, and silt. The withdrawn lands lie immediately north of the active Denali fault, which runs roughly west-northwest near the southern boundary of the West Training Area and the northern edge of the Alaska Range.

The northwest corner of Fort Greely West Training Area is at the edge of the Salcha seismic zone (described previously in this chapter). Since 1973, only three earthquakes larger than magnitude 4 have been recorded in or immediately adjacent to Fort Greely (Figure 3.4.b). These include a 1994 quake of magnitude 4.1 east of One Hundred Mile Creek in the West Training Area, and a magnitude 4.5 quake near the northeast boundary of the West Training Area in 1992. The third earthquake was west of the Little Delta River, outside Fort Greely (U.S. Geological Survey National Earthquake Information Center 1998, Alaska Earthquake Information Center 1998).

3.5 MINERAL RESOURCES

Mineral resources on the withdrawn lands are managed by the Bureau of Land Management (BLM) under Federal regulations found in 45 CFR 3000. Sale and/or free use of mineral materials require National Environmental Policy Act review, and military concurrence. Unauthorized use of mineral materials is considered trespass and will be resolved jointly by the military and BLM. The BLM identifies three categories of mineral resources on Federal lands:

Locatable minerals include most metals, metallic ores, and some non-metallic minerals. If the land is open to mineral location under the Federal mining laws, private citizens may stake or "locate" a claim, perform assessment work, and develop the resource. Valid mining claims can result in private ownership of the mineral resource. The withdrawn areas have been closed to mineral location since the 1950s. There are no valid or existing mining claims within the withdrawals (Keill, pers. com. 1998).

Leasable minerals include oil, gas, coal, geothermal resources, oil shale, gilsonite, phosphate, potassium, and sodium. These mineral resources are leased from the Federal government for a period of time and do not become the

developer's property. The withdrawn areas have been closed to mineral leasing since the 1950s. There are no valid leases on the withdrawn lands.

Saleable minerals consist basically of construction materials such as sand, gravel, riprap, cinders, pumice, clay, limestone, and dolomite. They are purchased outright from the Federal government. Saleable minerals on the withdrawn lands have been used locally by the Army and other authorized agencies, but have not been extracted commercially since the lands were first withdrawn in the 1950s.

There has been little active mineral exploration or development within the withdrawn lands, either before or after the military withdrawals. The areas are largely obscured by floodplain deposits, loess, and heavy vegetation, and there has been no compelling evidence of major mineralized trends (Foster et al. 1979, Bundtzen, pers. com. 1998, Weber, pers. com. 1998).

However, interior Alaska is one of the State's most important regions for mineral production (Swainbank and Clautice 1998). The Fairbanks Mining District, which encompasses Fort Wainwright and a portion of Fort Greely West Training Area, is the largest historic gold producer in the State (McCoy et al. 1997). The Fairbanks District has experienced a resurgence in activity with the development of the giant Fort Knox gold mine, about 15 miles northeast of Fairbanks. Fort Knox began commercial gold production in 1997. In addition to gold, other potentially economic mineralization has been identified in the Fairbanks Mining District, including silver, bismuth, antimony, tungsten, tin, and lead (Newberry 1996).

To the north of Fort Greely West Training Area, the Richardson District has produced placer gold since the turn of the century (Menzie and Foster 1978) and is presently being evaluated for its lode (hardrock) gold potential.

Forty miles east of Delta Junction, active delineation work is taking place in the Goodpaster District, at the Pogo prospect, where substantial amounts of gold occur within underground quartz veins (Smith et al. 1998, Swainbank and Clautice 1998).

Fort Wainwright and Fort Greely lie within an area with abundant surficial deposits of sand and gravel for construction, as well as silt and peat for agricultural use (Newberry et al. 1996). Near North Pole, Alaska, basalt has been quarried commercially for several years, providing high-quality decorative stone and riprap for local projects (Bundtzen, pers. com. 1998).

Fort Wainwright Yukon Training Area Locatable Minerals

Figure 3.5.a shows potential locatable mineral resources within Fort Wainwright Yukon Training Area. These potential resources are, generally, associated with certain geologic units depicted on Figure 3.4.a.

Lode deposits of copper, lead, zinc, silver, and gold could potentially occur in the northeast portion of the withdrawal, within the units identified as Pzq and Pzsg. These units include rocks of volcanic and sedimentary origin that may contain so-called volcanogenic ("VMS") and shale-hosted ("sedex") sulfide deposits.

In the 1970s, the U.S. Geological Survey (USGS) studied the Big Delta Quadrangle, which encompasses most of the Fort Wainwright Yukon Training Area. Weber and others (1978) mapped the Pzq unit within the withdrawal area (Figure 3.4.a). O'Leary and others (1978) collected stream samples for chemical analysis, and found that streams flowing from the Pzq unit (Figure 3.4.a) had anomalously high concentrations of zinc and copper. The Pzq unit was identified as a target for sedex-type mineralization (Menzie and Foster 1978).

Lead-zinc mineralization has been studied in similar rocks over a broad area of eastern Alaska and the Yukon Territory. To the northeast of the Fort Wainwright Yukon Training Area, recent drilling in the Pzq by WGM, Inc. has identified up to 13 feet of 0.92% zinc, 0.32% lead, and up to 38 grams per ton silver (Dusel-Bacon et al. 1997 and 1998a, b, c).

The Pzsg unit (Figure 3.4.a) contains volcanic and sedimentary rocks that could also potentially host VMS mineralization with concentrations of copper, lead, zinc, silver, and gold. The Pzsg unit is exposed in the eastern part of the Training Area, but VMS-type mineralization has not yet been documented in the withdrawn lands. Currently, exploration for VMS deposits is taking place in the Bonnifield District, along the north flank of the Alaska Range, in rocks of similar age (Newberry et al. 1997, Smit 1998).

The geochemistry of the granitic Eielson pluton (Forbes and Weber 1975) is not considered favorable for gold deposits such as those found in plutonic rocks at Fort Knox (Burns et al. 1991, Solie et al. 1990). However, geochemical indicators are not always conclusive (McCoy et al. 1997, Newberry and McCoy 1997).

Portions of Fort Wainwright Yukon Training Area have a moderate to high potential for placer gold and tin deposits. Historic placer mines are reported on Beaver Creek and Pine Creek in the northeast corner of the Training Area (Figure 3.5.a). One small placer mine was located to the north of the withdrawal area at Nugget Creek. These mines were small, and no production records are available (Menzie and Foster 1978).

Leasable Minerals

Fort Wainwright Yukon Training Area was previously evaluated for leasable mineral potential by the U.S. Dept. of the Interior and U.S. Dept. of Defense (1994b). The area has an unfavorable geologic setting for oil, gas, or other leasable mineral deposits. A long history of intrusive activity has altered and deformed the sedimentary rocks, making them unsuitable hosts. Because of this low potential, no map of leasable resources has been included in this Legislative Environmental Impact Statement.

The U.S. Dept. of the Interior and U.S. Dept. of Defense (1994b) assigned moderate potential for geothermal resources, based on similarities to the geology of Chena Hot Springs and Circle Hot Spring, to the north. A geothermal test hole drilled seven miles from Fort Wainwright Yukon Training Area (near North Pole) yielded heat flow values of 75 to 100 milliwatts per square meter. The worldwide average is 62.8 milliwatts per square meter. A geothermal gradient of 31.5°C per kilometer was measured in a deep test hole drilled on the north side of the Eielson pluton. The geothermal gradient in the earth's crust averages 25°C per kilometer.

Saleable Minerals

Within the Fort Wainwright Yukon Training Area, the Army has extracted sand and gravel locally for road and runway construction. Sand and gravel have not been mined commercially (Griffen, pers. com. 1998) but have been made available to other authorized agencies.

Fort Greely West and East Training Area Locatable Minerals

Figure 3.5.b shows areas with potential locatable mineral resources in the Fort Greely area. These resources may be associated with certain rock units, which are depicted on Figure 3.4.b. The geology in this area could be favorable for VMS or sedex sulfides (see above), copper-molybdenum porphyry (Nokleberg et al. 1990), lode gold similar to Pogo (Smith et al. 1998, Dusel-Bacon et al. 1998a, Foster et al. 1987), and placer deposits. Gold, silver, lead, zinc, copper, tungsten, molybdenum, and tin could be present.

Lode mineral deposits are most likely to be found in the Paleozoic and Mesozoic-age rocks (see Appendix 3.4) exposed in the southwest and northwest part of the West Training Area. In the southwest, the granite intrusive shown as

Kgd (Figure 3.5.b) contains the Ptarmigan Creek molybdenum prospect (Smith 1942, Martin 1920) (Figure 3.5.b), which was discovered in 1914. Molybdenum is associated with quartz veins in the granite, at the contact between granite and black slate. Ore samples from the prospect reportedly contained up to 2.7% molybdenum. Traces of gold were also reported. About 32 claims were located along Ptarmigan Creek (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a) prior to the withdrawals. Although ore was stockpiled on site, there are no records of any being shipped.

In the 1980s, the U.S. Geological Survey mapped and conducted mineral sampling on Fort Greely (Nokleberg et al. 1990). Results of the sampling indicate that the Kgd and TKg intrusives have reasonable potential for hosting lode deposits of gold, molybdenum, tungsten, tin, and silver. Based on geochemical data, Burns and others (1991) gave these intrusives a high probability for association with gold. The geology and geochemistry in this area of the withdrawal are similar to the Pogo deposit (Smith et al. 1998).

There is also reasonable potential for VMS deposits (see above) within the altered volcanic units shown as Dmv and MDt on Figure 3.4.b, southeast of Fort Greely. Nokleberg and others (1990) reported locally intense iron staining associated with sulfide minerals in the Dmv. The MDt unit, known as the Totatlanika schist (Wilson et al. 1998), is host to VMS mineralization currently being explored to the west in the Bonnifield District (Newberry et al. 1997, Smit 1998). The Totatlanika schist is exposed to the east of the Fort Greely West Training Area and most likely extends across the withdrawal, but is buried under Tertiary and Quaternary cover. The DPzmp unit has moderate potential for sedex deposits, based on its age, rock types, geochemistry, and proximity to the Dmv.

Portions of the withdrawal have moderate to high potential for placer gold deposits. The Pzs unit, in the northwest portion of the Training Area, may correlate with rocks which have yielded placer gold in the Richardson District.

Localized placer deposits may also occur in streams draining the granites and Tertiary-age gravel benches. Some small placer mines, concentrated in the Tertiary gravels, are located southeast of Fort Greely in the Jarvis-Ober Creek area (Cobb 1972, Mulligan 1974). No production records are available. Several small placers are also reported on the west side of the withdrawal, but no information is available concerning production or activity. An area just east of Delta Creek was noted by Curtin and others (1990) as having good potential for placer gold. Nokleberg and others (1990) suggest that the same area has some potential for placer tin.

Leasable Minerals

Figure 3.5.c shows generalized leasable mineral potential on Fort Greely. The U.S. Dept. of the Interior and U.S. Dept. of Defense (1994a) considered Fort Greely to have low to moderate potential for leasable minerals.

The Nenana coal basin trends across the southern half of Fort Greely West Training area (Figure 3.5.c). The Ts unit (Figure 3.4.b) correlates with the formation that hosts the Jarvis Creek coal fields, just to the southeast, and the Healy coal farther to the west (Merritt and Hawley 1986). The Middle Tanana basin contains coal to the west of Fort Greely, but no coal has been documented on Fort Greely (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a). The potential of finding economic deposits of Tertiary coal on Fort Greely is unknown due to poor outcrops, a lack of subsurface information, the extensive erosion of Tertiary sediments, and structural deformation of the bedrock.

Coal and organics within the Tertiary sediments could generate and trap gas under suitable geologic conditions. The Nenana Basin, with its known coal deposits, has moderate potential for producing gas.

The igneous and metamorphic rocks on Fort Greely have no potential for leasable minerals. Geologic conditions are not favorable for oil.

Saleable Minerals

Throughout the northern and central portion of Fort Greely there are extensive sand and gravel deposits associated with glacial moraines, glacial outwash, stream beds, and river floodplains (Figure 3.5.c). Readily accessible sand and gravel occurs along the drainages and floodplains of Jarvis Creek, Granite Creek, and the Delta River.

Eight mineral material sites, all of which are now closed or inactive, have been located at Fort Greely. Other gravel pits are located near Fort Greely along the Richardson Highway and the Trans-Alaska Pipeline System.

Soil is a dynamic medium, with its characteristics continually altered by natural processes. Soil is produced by the continual interaction of five soil forming factors: climate, vegetation, organisms, parent material, and topography. The most influential factor on soil formation in interior Alaska is climate. Climate affects soil formation in three principle ways: weathering and transportation of parent material, development of internal soil processes, and erosion of the soil body. Weathering of parent material involves the physical and chemical alteration of the medium directly or indirectly by climate. Delivery of precipitation to the soil body and the rate at which drainage occurs affects the development of internal soil processes. The transportation or erosional agents of this weathered material are gravity, ice, wind, and surface water, the last three being components of the climatic system.

Fort Wainwright Yukon Training Area

Several soil associations exist in the Yukon-Tanana Upland. The largest of these associations is soil map unit 4 (Figure 3.6.a and Table 3.6.a) classified as a silt loam. This soil type is well drained with thin bands of fine silty or clayey material underlain by silt loess deposits. It is located on the mid-slopes of hills. Saturated, gravelly silt loams are underlain by permafrost and are located on the north-facing portions of valley bottoms, lower hillside drainages, and lower slopes. Steeper portions of these north-facing features also have poor-draining, shallow loess deposits underlain by permafrost. These areas usually have a thick surface mat of peat. Silt loams are present in areas other than north-facing locations with higher elevations. Loess is found in areas distant from the Tanana floodplain.

In the extreme northwestern portion of the Yukon Training Area, along the low terraces adjoining the Tanana and Chena Rivers, lies a band of well-drained silty to sandy loams (shown as soil map unit 3 in Figure 3.6.a). In lower lying areas, these silty to sandy loams are covered by a layer of peat and are underlain by permafrost.

To the west of the Tanana River and in the Upper Salcha River Valley, soils are characterized as silt loams underlain by sandy to gravelly deposits (shown as soil map unit 2 in Figure 3.6.a).

Ridge tops and steep upper slopes at higher elevations are covered by welldrained gravelly loams (shown as soil map unit 5 in Figure 3.6.a). Drainage is poor in some areas and permafrost is present on north-facing slopes. In general, the Tanana-Kuskokwim Lowlands have very gravelly to loamy soil on nearly level to rolling slopes. Soils adjacent to the Tanana River floodplain (shown as soil map unit 1 in Figure 3.6.b and Table 3.6.b) are found on terraces, outwash plains, and low moraines within the area. There is usually a layer of silt loam over a thick deposit of very gravelly sand. These soils are well drained in areas of no permafrost, but exhibit poor drainage and peat deposits in areas with permafrost.

Silt loams are present in the western portion of Fort Greely on low terraces in broad valleys and on long footslopes of the Alaska Range (shown as soil map unit 2 in Figure 3.6.b).

Soils along the floodplains of the Tanana and Delta rivers (shown as soil map unit 3 in Figure 3.6.b) are characterized as silt loams to fine sands with organic surface horizons. They are found in low areas including meander scars and natural levees along the existing and former river channels.

Further south along the Delta River, surface elevation increases and the soil composition shifts to a very gravelly and stony silt loam (shown as soil map unit 8 in Figure 3.6.b). These soils are well drained on hillsides and footslopes, and poorly drained in valley bottoms.

Further to the east along the gently sloping surfaces of glacial moraines and alluvium near Jarvis Creek, a layer of silt loam underlain by very gravelly sand exists (shown as soil map unit 9 in Figure 3.6.b). This soil is well to excessively drained.

Soils within the Northern Foothills of the Alaska Range are generally poorlydrained silt loams with a layer of peat. In the southern portion of Fort Greely, along the north-facing ridges, valleys, and foot slopes, soils are poorly drained gravelly silt loams with a surface organic mat (shown as soil map unit 6 in Figure 3.6.b). On the south-facing slopes, a well-drained silt horizon with very gravelly silt loams exist.

In the western drainageways and broad outwash plains of Fort Greely, poorlydrained silt and sandy loams with a surface organic mat can be observed (shown as soil map unit 7 in Figure 3.6.b). Permafrost is generally present in these areas.

In the higher elevations of the Alaska Range directly south of Fort Greely, rockland consisting of very gravelly shallow soils exists (shown as soil map unit

11 in Figure 3.6.b). These soils are typically frozen and permanent ice fields are present.

3.6.1 Soil Limitation Ratings

Soils delineated by the Exploratory Soil Survey of Alaska (1979) for the Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas have been assigned limitation ratings for particular land uses. These ratings are based on general, widely known soil properties and related factors. This information can be used for broad land use planning to determine areas with the highest potential for a specific use or areas with unfavorable soil properties. However, the suitability ratings should be applied in a conservative manner and should not be used to determine if an area is suitable for military activities due to the small scale of the soil survey. Additionally, these ratings should be applied only to the individual components of the map units and not to the map unit as a whole. Soils within any mapped area may have properties and limitations that differ from those described for the entire unit. Soil limitation ratings discussed in this study include those developed for recreation, road location, and off-road trafficiability (Table 3.6.c).

Table	3.6.c Definition	n of Soil	Limitation	Ratings	for the Fo	ort Wainv	vright
Yukon	Training Area	and the	Fort Gree	ly West	and East	Training	Areas
(Riege	r et al. 1979).						

Land Use	Slight	Moderate	Severe	Very Severe
Recreation	Soil limitations, if any, are easily overcome.	Soil limitations need to be recognized but can be overcome with careful planning and design. Modifications, such as ground leveling or stone removal, may be necessary.	Soil limitations interfere seriously with intensive recreational use and are difficult to overcome and may not be economically feasible.	Soil limitations are too severe to overcome. These soils are generally not suitable for development for recreational use.
Road Location	Soil limitations, if any, are easily overcome.	Soil limitations can be overcome but result in difficult and costly modifications in road design and construction.	Soil limitations are difficult to overcome and may affect road alignment and location. Special design requirements may result in excessive construction costs.	Soil limitations are so difficult or expensive to overcome that the soils should be avoided if possible.

Table 3.6.c Definition of Soil Limitation Ratings for the Fort Wainwright Yukon Training Area and the Fort Greely West and East Training Areas (Rieger et al. 1979).

Land Use	Slight	Moderate	Severe	Very Severe
Off-road Trafficiability	Soil limitations, if any, do not restrict the movement of overland vehicles.	Soil limitations need to be recognized but can generally be overcome with careful route planning. Some special equipment may be required.	Soil limitations are difficult to overcome, and special equipment and careful route planning are required. These soils should be avoided if possible.	Soil limitations are generally too difficult to overcome. Generally these soils are unsuitable for conventional off-road vehicles.

Soil limitation ratings for recreational use include intensive activities such as campgrounds, picnic areas, golf courses, and playgrounds. The principle soil characteristics that affect ratings for recreational use are internal drainage, slope, consistence under use, stoniness, susceptibility to flooding, and depth to bedrock (Rieger et al. 1979).

Soil limitation ratings for road location on withdrawal lands are based on soil features that affect the design, construction, and performance of roads and highways. Soils with the greatest limitation for roads are those underlain by permafrost, organic soils, and other poorly-drained soils. These ratings are based on the properties of undisturbed soil to a depth of five feet (Rieger et al. 1979).

Off-road trafficability refers to the overland movement of conventional wheeled and tracked vehicles. Soil features of greatest importance in relation to off-road vehicular movement are duration of wet conditions; soil texture as it relates to its ability to support loads, to traction and to production of dust by traffic; and erodibility of the soil (Rieger et al. 1979).

All of the listed soil units within the Fort Wainwright Yukon Training Area have a limitation rating of severe or very severe, and eight out of 11 listed soil units of the Fort Greely Training Areas are classified as severe or very severe for at least one of the land use activities (Tables 3.6.d and 3.6.e). Soils are most susceptible to damage during the spring and summer months due to their saturated, unstable state. However, the use of all areas within the Fort Wainwright and Fort Greely region should be evaluated on a seasonal basis regardless of their limitation rating.

Soil Map Unit	Soil Type	Recreation	Road Location	Off-road Trafficability
2	Histic Pergelic Cryaquepts	Severe ⁷	Very Severe ^{5,7}	Severe ⁷
3	Histic Pergelic Cryaquepts	Severe ⁷	Very Severe ^{5,7}	Severe ⁷
-	Typic Cryofluvents	Moderate ²	Moderate ²	Slight
	Alfic Cryochrepts	Severe ⁶	Severe 6	Moderate to Severe ⁶
4	Histic Pergelic Cryaquepts	Severe ⁷	Very Severe ^{5,7}	Severe ⁷
	Typic Cryochrepts	Slight	Slight	Slight
5	Histic Pergelic Cryaquepts	Severe ⁷	Very Severe 5,7	Severe ⁷

Table 3.6.d	Estimated Soil	Limitation	Ratings	for	Fort	Wainwright	Yukon
Training Area	a (Rieger et al.	1979).					

² - Soil is susceptible to flooding.
⁵ - Soil has perennially frozen substratum.
⁶ - Steep slopes or rough terrain.
⁷ - Soils are wet; high water table or seepage during all of the frost-free season.

Table 3.6.e	Estimated Soil Limitation Ratings for Fort Greely West and	l
East Training	Areas (Rieger et al. 1979).	

Soil Map Unit	Soil Type	Recreation	Road Location	Off-road Trafficiability
	Typic Cryochrepts	Slight	Slight	Slight
	Aeric Cryaquepts	Slight	Moderate ^{3,4}	Moderate 1
2	Histic Pergelic Cryaquepts	Severe ⁷	Very Severe ^{5,7}	Severe ⁷
3	Histic Pergelic Cryaquepts	Severe ⁷	Very Severe 5,7	Severe 7
-	Typic Cryofluvents	Moderate ²	Moderate ²	Slight
	Alfic Cryochrepts	Severe 6	Severe ⁶	Moderate to Severe 6
4	Histic Pergelic Cryaquepts	Severe ⁷	Very Severe 5,7	Severe 7
	Typic Cryochrepts	Slight	Slight	Slight
5	Histic Pergelic Cryaquepts	Severe ⁷	Very Severe ^{5,7}	Severe ⁷

Soil Map Unit	Soil Type	Recreation	Road Location	Off-road Trafficiability
<u> </u>	Pergelic Cryaquepts	Severe 6,7	Severe 6,7	Severe 6,7
6	Pergelic Cryochrepts	Severe ⁶	Severe ⁶	Severe ⁶
7	Histic Pergelic Cryaquepts	Severe ⁷	Very Severe 5,7	Severe ⁷
	Typic Cryochrepts	Slight	Slight	Slight
8	Histic Pergelic Cryaquepts	Severe 6,7	Severe 6,7	Severe ^{6,7}
9	Typic Cryochrepts	Slight	Slight	Slight
10	Typic Cryochrepts	Slight	Slight	Slight
	Aeric Cryaquepts	Slight	Moderate 3,4	Moderate ¹
	Typic Cryochrepts	Slight	Slight	Slight
12	Histic Pergelic Cryaquepts	Severe ^{6,7}	Severe ^{6,7}	Severe ^{6,7}

Table 3.6.e Estimated Soil Limitation Ratings for Fort Greely West and East Training Areas (Rieger et al. 1979).

¹ - Soil is dusty when dry and soft or slippery when wet.

² - Soil is susceptible to flooding.

³ - Soil is susceptible to frost action.

⁴ - Soil has low load-supporting capacity.

⁵ - Soil has perennially frozen substratum.

⁶ - Steep slopes or rough terrain.

⁷ - Soils are wet; high water table or seepage during all of the frost-free season.

3.7 PERMAFROST

Permafrost is defined as soil material with a temperature below freezing which has existed continuously for two or more years. The base of permafrost is the lower limit of ground temperatures that are below 32°F. The upper surface of permafrost is called the permafrost table. The active layer is the zone above the permafrost table that thaws in summer and freezes again in winter (Williams 1970).

Permafrost forms when the balance between net heat lost to the atmosphere at the earth's surface and heat received at the surface from sources within the earth produces a negative ground temperature below the base of the active layer. Thus, existing permafrost results from fluctuations in the heat balance at the ground surface over a period of a few to thousands of years. The local configuration of permafrost and its thickness arise from local differences in mean annual ground-surface temperature (Williams 1970).

Several natural features, such as vegetation, lakes, rivers, groundwater, and glaciers, may control the occurrence of permafrost on the withdrawal areas. In areas of discontinuous permafrost, vegetation may influence the thickness of the active layer and may determine whether permafrost is present or absent by controlling the temperature at the ground surface. The warming effect of water bodies on the ground surface temperature adjacent to and beneath glaciers also determine permafrost temperature, thickness, and areal extent. Thick accumulations of snow cause similar local variations in permafrost characteristics (Williams 1970).

Vegetation type is an indicator of the extent and location of permafrost. Permafrost initially forms in white spruce stands with a thick layer of mosses. These mosses insulate the ground more efficiently during hot summers when the moss is dry than in cold winters when the moss is frozen and saturated. Over time, the underlying soil becomes colder and eventually becomes perennially frozen. The resulting shallow permafrost layer creates cold, wet conditions that are more conducive to black spruce growth. Eventually the white spruce stands are replaced by black spruce and forest mosses are replaced by more watertolerant sphagnum mosses and sedges. It is possible that the black spruce will eventually be replaced by sphagnum or sedge bogs. This succession can be used as a permafrost indicator. In general, black spruce, larch, and bogs indicate the presence of permafrost within less than a foot of the surface. White spruce and aspen usually indicate a permafrost-free area or an area in which the active layer is several feet thick. Paper birch is typically found in permafrostfree areas or where the active layer has temporarily deepened as a result of burning or clearing (Pewe and Reger 1983).

Chapters 3.9, 3.10, and 3.11 offer further discussions of permafrost and its influence on surface water, groundwater, and wetland functions, respectively.

Fort Wainwright Yukon Training Area

Fort Wainwright Yukon Training Area is in the discontinuous permafrost zone of Alaska where perennially frozen ground is widespread. Figure 3.7.a illustrates the distribution of permafrost within Fort Wainwright Yukon Training Area. This permafrost map is based on vegetation type. Permafrost typically exists in multiple layers of varying thickness and ranges from less than one foot to more than 15 feet. In undisturbed areas, depth to permafrost varies from two to three feet (Williams 1970).

Permafrost is thickest in valley bottoms and on lower slopes and can extend to the summit of north-facing slopes. Sediments beneath the floodplain of the Tanana and Chena Rivers are perennially frozen as deep as 265 feet. Permafrost is generally absent on hilltops and moderate to steep south-facing slopes. Unfrozen zones that perforate permafrost lie beneath most deep lakes and large and medium-sized rivers (Williams 1970).

Fort Greely West and East Training Areas

The area between the alluvial apron of the Alaska Range, south of Fort Greely and the Tanana River, located north of Fort Greely, is also located within the discontinuous permafrost zone of Alaska. A specific permafrost map of Fort Greely is not available. Isolated masses of frozen ground exist in areas of sandy gravel from three to 40 feet below the ground surface with a base ranging from 10 to 118 feet in depth. Most permafrost lies above the water table, but the frozen ground is so thin and sporadic that it has little effect on the groundwater hydrology. Unfrozen zones that perforate permafrost lie beneath most deep lakes and large and medium-sized rivers. Recently abandoned river channels may also have underlying unfrozen zones (Williams 1970).

3.8 SURFACE WATER

Fort Wainwright Yukon Training Area

Surface water originating in the northern and northeastern portions of Fort Wainwright Yukon Training Area drain into the Chena River and its tributaries: the South Fork Chena River, Hunts Creek and Horner Creek. Tributaries of the South Fork Chena River include Globe Creek, Stuart Creek, and Beaver Creek. The southern portion of the Yukon Training Area is drained by tributaries of the Salcha River including Ninety-eight Creek, Redmond Creek, and McCoy Creek. Some streams draining the southern portion of the Yukon Training Area, such as the Little Salcha River, flow directly into the Tanana River. Others, such as French and Moose creeks, reach the Tanana River by way of Piledriver Slough. All of the streams within the Yukon Training Area originate in the rolling, glacier-free terrain of the Yukon-Tanana Upland at elevations of less than 2,000 feet. Figure 3.8.a shows the major waterways of the withdrawal area.

Fort Greely West and East Training Areas

The Delta River, which flows northward through Fort Greely for approximately 80 miles, originates at Tangle Lakes (approximately 50 miles south of the southern boundary of Fort Greely) and ends at its confluence with the Tanana River at Big Delta. The Delta River drains an area of 1,665 square miles. As the

Delta River flows through the Alaska Range, it receives melt water from Cantwell, Castner, and Black Rapids glaciers. When the Delta River enters Fort Greely, it flows across a north-sloping alluvial fan into which the river is entrenched up to 200 feet. The Delta River has virtually no tributaries once it leaves the confines of the Alaska Range, with the exception of Jarvis Creek, which enters on the east bank about 10 miles above the Delta River's mouth.

Jarvis Creek originates at the terminus of Jarvis Glacier on the north side of the Alaska Range and flows northward for 40 miles through a narrow valley. Jarvis Creek drains an area of 248 square miles and receives melt water from the glaciers of Mount Silvertip and the Alaska Range. Non-glacial streams enter Jarvis Creek from Granite Mountain. Jarvis Creek flows across the same alluvial fan as Delta River into which it is also entrenched.

The remaining streams of Fort Greely are glacier-fed and originate within the Alaska Range, with the exception of Granite Creek. Granite Creek flows from Granite Mountain to form the eastern border of the Fort Greely East Training Area. The southwestern border of Fort Greely West Training Area is formed by Buchanan Creek, which eventually combines with the West and East Forks of the Little Delta River to form the main stem. The East Fork receives melt water from Hayes and Gilliam Glaciers, and the West Fork receives melt water from unnamed glaciers near Mount Deborah. The Little Delta River constitutes the remainder of the West Training Area border and eventually empties into the Tanana River. Delta Creek drains the interior portion of the West Training Area and receives melt water from Trident and Hayes Glaciers and the Alaska Range. It flows directly into the Tanana River. Several other small tributaries originating in the Alaska Range flow throughout Fort Greely and ultimately empty into the Tanana River or another large tributary. Figure 3.8.b shows the major waterways of the Fort Greely withdrawal area.

3.8.1 Streamflow

All tributaries within the Tanana River basin can be classified as either nonglacial or glacial. This is an important distinction because of the unique seasonal streamflow variations associated with each type. In general, both stream varieties within the withdrawal areas experience high flows during the spring and summer and low flows during the fall and winter. Specifically, streamflow on nonglacial streams exhibits sharp rises in discharge during May due to spring snowmelt, a general recession during the summer months, a slight increase during the early fall rainy period, and low winter flows. On the other hand, the maximum stream discharge on glacial streams occurs in June and July following a rapid rise in the spring, which coincides with the peak melting of glaciers.

Fort Wainwright Yukon Training Area

All streams originating in the Yukon-Tanana Upland within Fort Wainwright Yukon Training Area, such as Stuart Creek, French Creek, and Moose Creek, are non-glacial. Stream discharge data for the smaller, non-glacial streams of the Yukon Training Area are unavailable. However, general trends exhibited by the Little Chena, Chena, and Salcha rivers give an indication of the seasonal trends that would be expected on smaller, non-glacial streams. Average monthly discharge values for the Little Chena, Chena, and Salcha rivers are presented in Appendix 3.8.A. Figure 3.8.a shows stream gaging station locations. Drainage characteristics and discharge values of selected streams on Fort Wainwright Yukon Training Area are presented in Table 3.8.a.

Fort Greely West and East Training Areas

A majority of the larger streams flowing through Fort Greely, such as the Delta and Little Delta rivers and Jarvis and Delta creeks are glacial. Long term surface water discharge data were unavailable for the Delta River and Jarvis Creek. However, data recorded for the Tanana River should give an indication of the seasonal trends that would be expected for the glacier-fed streams of Fort Greely. Appendix 3.8.A contains a graph showing average monthly discharge for the Tanana River at Big Delta and Fairbanks. Figure 3.8.b shows stream gaging station locations.

3.8.1.1 Base Flow

Base flow is defined as the water that enters the stream channel from persistent, slowly varying sources and maintains streamflow between water-input events. Large base flows occur in drainage basins with extensive groundwater storage, thus the minimum monthly flow (or baseflow) of the Tanana River at Big Delta has been about 30% of the average flow. Within the Yukon-Tanana Upland, base flows are extremely small because of the limited groundwater storage associated with that area. The minimum monthly flow of the Salcha River, which flows south of the Fort Wainwright Yukon Training Area, has been about 5% of the average flow (Anderson 1970).

3.8.1.2 High Flow/Floodplains

The magnitude and frequency of floods of smaller streams in the Tanana River Basin is not well known because streamflow records are short or periodic, and there are few gaging stations. Also, local floods can occur in remote areas without economic loss and may pass unnoticed. In general, floods commonly occur in the spring from snowmelt or in late summer from rain. The most severe flooding should be expected from rain concurrent with rapid snowmelt. Floods are aggravated during the early spring when channels are constricted with ice. Figure 3.8.c shows the 100-year, 500-year, and outside of the 500-year floodplain boundaries surrounding Fort Wainwright Yukon Training Area, as determined by the Federal Emergency Management Agency. The upper northwest portion of the Yukon Training Area relies on the Chena River Lakes Flood Control Project for flood protection. Additional floodplain information can be found in Appendix 3.8.B.

Fort Greely West and East Training Areas

Floodplain boundaries have not been developed by the Federal Emergency Management Agency for the Fort Greely West and East Training Areas. It is known, however, that the east bank of the Delta River is higher than the west bank. As a result, the low west bank, as well as the large flood plain, creates very low probabilities of overbank flooding to the east (Nelson 1995). The principal risk to local communities is not from river flooding, but from lateral erosion of the east bank of the Delta River.

Historically, Jarvis Creek has overflowed into an old channel, located approximately 14 miles above the confluence of Jarvis Creek and the Delta River, running through the City of Delta Junction. Flooding from Jarvis Creek may occur due to ice jams (Federal Emergency Management Agency 1982b). Additional floodplain information can be found in Appendix 3.8.B.

3.8.1.3 Low Flow/Aufeis

Low flow is defined as the minimum amount of discharge measured at a location. Low flow conditions occur during the months of October through May. Information about low flow occurrences on streams within the withdrawal areas is unavailable because of the lack of discharge data. In addition, winter streamflow data is limited because of the complexity of stream-ice formation and its control of the flow regimen.

In general, minimum weekly average discharge of basins smaller than 500 square miles, which include most of the basins within the withdrawal areas, ranged from 0.018 to 0.470 cubic feet per second per square mile and averaged between 0.1 and 0.2 cubic feet per second per square mile (Anderson 1970).

The smaller basins do not have sufficient discharge to maintain a free-flowing channel in the winter. Freezing is so extensive that most streamflow is converted to aufeis. Aufeis is an ice sheet that forms on a floodplain in winter when normal channels freeze solid or are otherwise dammed so that water spreads out over the floodplain and freezes (A.G.I Glossary 1960 *in* Dingman et al. 1971). Ice may start forming in October and generally breaks up in May. These stream

icings can achieve large dimensions, both in thickness and areal extent, because they are composed of a large percentage of the total winter flow. Thus, ice may be over three feet thick. Of all the withdrawal area streams, only the Tanana and Chena rivers typically flow year round (Anderson 1970).

Streams can also cease to flow in the winter because of losses due to influent seepage into groundwater aquifers. Jarvis Creek is an example of an influent stream. Channel losses occur when Jarvis Creek passes over the large alluvial fan at the base of the Alaska Range. Near its mouth, Jarvis Creek is dry during the winter.

3.8.1.4 Runoff

Runoff is defined as the amount of precipitation on land that ultimately reaches streams. Runoff is typically reported as the average depth at a place of origin. Runoff includes meltwater from glaciers.

The greatest contribution of runoff to the Tanana River (about 84 inches) is from areas above 5,000 feet within the Alaska Range. In the 3,000 to 5,000 feet elevation range, average runoff is approximately 100% of precipitation, or about 12 to 24 inches. From 3,000 feet to the valley bottom, runoff is about 60% of precipitation or eight to 12 inches. Within the poorly-drained valley bottoms, average annual runoff is estimated to range between zero and eight inches. In general, the maximum amount of runoff results from snowmelt with little runoff resulting from rainfall. The lowest amount of runoff occurs in lake and wetland areas where evapotranspiration rates are the highest (Anderson 1970).

3.8.2 Water Quality

All freshwaters of the State of Alaska are considered to be in their original and natural condition, and as such they are considered suitable to serve all the uses established under each class. State water is protected for the following use classes:

- (1) Fresh water
 - (A) Water supply
 - (i) drinking, culinary, and food processing
 - (ii) agriculture, including irrigation and stock watering
 - (iii) aquaculture
 - (iv) industrial
 - (B) Water recreation
 - (i) contact recreation
 - (ii) secondary recreation

(C) Growth and propagation of fish, shellfish, other aquatic life and wildlife

These classifications are effective as of March 1, 1998. If a water body is protected for more than one use class, the most stringent water quality criterion will apply (State of Alaska Water Quality Standards 18 AAC 70.040(a)).

All waters within the withdrawal boundaries are protected by use classes (1)(A), (1)(B), and (1)(C) as assigned by the State of Alaska. However, water bodies originating within the Fort Wainwright Yukon Training Area flow into the Chena River, which has been assigned site-specific water quality criteria. The Chena River from its confluence with Chena Slough to the confluence of the Chena River and Tanana River has been classified as (1)(A)(ii), (1)(A)(iii), (1)(A)(iv), (1)(B), and (1)(C) (State of Alaska Water Quality Standards 18 AAC 70.230(e)).

If the natural condition of a water body is demonstrated to be of lower quality than a water quality criterion for the designated use classes and subclasses, and the natural condition will fully protect the designated uses, the natural condition constitutes the applicable water quality criterion (State of Alaska Water Quality Standards 18 AAC 70.235(b)).

Appendix 3.8.C contains water quality criteria for freshwater uses as set by the State of Alaska.

3.8.2.1 Streams

Fort Wainwright Yukon Training Area

Background water quality represents the chemical and biological components of surface waters resulting from natural causes and factors. Limited development and other human-related activities account for the lack of human-induced pollutants and generally excellent water quality of the area streams and lakes (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a). Water quality concentrations of specific parameters also indicate the quality of water at the Yukon Training Area is good.

Surface water quality on the Yukon Training Area meets the primary Alaska Drinking Water Standards (18 AAC 80). Only naturally occurring iron concentrations were higher than the secondary standards set by the Alaska Drinking Water Standards (18 AAC 80). (See Appendix 3.8.D).

Chemical Analysis

The pH measurements collected at the Salcha and Chena Rrvers indicate values to be within the limits established by the State's standards (6.5-8.5) as shown

in Appendix 3.8.D. Trends observed in the Chena River showed pH values slightly above neutral during the winter (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a). Similar trends have been observed in the smaller water bodies of Redmond Creek, Ninety-eight Creek, and McCoy Creek (south of the Fort Wainwright Yukon Training Area) as shown in Appendix 3.8.D.

Iron is the only naturally occurring element in streams of the withdrawal area that may occasionally exceed recommended water quality levels. Alaska State Drinking Water Secondary Standards recommend less than 0.3 milligrams per liter (mg/l) of iron for waters that are being considered as a drinking water source. The high iron concentration in the lower portion of the Chena River may be attributable to surface water and groundwater drainage from the swampy, muskeg areas of the Yukon Training Area (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a, Anderson 1970).

Dissolved oxygen levels, measured for the Salcha River eight miles above Salchaket, Alaska, range from 9.4 mg/l to 14.2 mg/l. Dissolved oxygen levels measured for the Chena River at North Pole, Alaska, ranged from 5.8 mg/l to 11.7 mg/l. These values are above the State water quality minimum of 4.0 mg/l for dissolved oxygen, which was intended to prevent fish kills. Similar values have been observed in the smaller water bodies of Ninety-eight Creek (which is within the Fort Wainwright Yukon Training Area), Redmond Creek, and McCoy Creek.

Samples collected from the Chena River (Appendix 3.8.D), which does not flow directly through the withdrawal area, indicate that biological oxygen demand (BOD) and chemical oxygen demand (COD) values are low. Due to the similarity between the Chena River and the upland streams of Fort Wainwright Yukon Training Area, BOD and COD values would also be expected to be low in streams of the Yukon Training Area. Most BOD values collected from the Chena River are below 1.0 mg/l and COD values range from 3 mg/l to 46 mg/l.

Phosphate may be a limiting organic nutrient for phytoplankton (photosynthetic organisms of small size that drift on the water) production (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a). A study of biological data from the Chena River suggests that primary and secondary productions are low (McCoy 1974). This is reflected by the presence of a large and diverse number of groups of aquatic insects and other benthic invertebrates that are typical of streams high in dissolved oxygen and low in productivity (the overall rate of organic matter production of a body of water). The most common benthic invertebrates are *Chironomidae* (midges), *Plecoptera* (stoneflies), *Ephemeroptera* (mayflies), *Tricoptera* (caddis flies), and *Simuliidae* (blackflies). Aquatic *Acari* (water mites)

Final

were observed but comprise a smaller portion of the benthic fauna population (McCoy 1974).

Sediment Analysis

Suspended sediment and dissolved sediment concentrations are higher in the Tanana River as compared to the smaller streams originating in the uplands of Fort Wainwright Yukon Training Area. This is due to higher discharge rates and contribution of sediment-rich glacial meltwater from the Alaska Range. Near Fairbanks, the average annual (1974-79) load of the Tanana River is 24 million metric tons of suspended sediment and 321,000 metric tons of bedload (larger channel and floodplain material that is rolled, dragged, or skipped along the riverbed) (Burrows et al. 1981). Upstream, near North Pole, Alaska, the average annual load of the Tanana River is 20.7 million metric tons of suspended sediment and 298,000 metric tons of bedload (Burrows et al. 1981). For both sites, bedload is usually 1% to 1.5% of the suspended sediment load.

Sediment loads in the smaller streams of the Yukon Training Area are generally low. The Chena River and other waterbodies originating in the Yukon-Tanana Uplands receive sediment primarily during snowmelt and rainstorm runoff. Annual loads from non-glacial streams of the uplands are inferred to be less than 150 tons per square mile (Anderson 1970). Sediment transport within the Chena River also shows a seasonal variation. Sediment concentrations are much higher for concurrent discharge during spring break-up than for other times of the year. Approximately 50% of the annual load is transported during the period of spring runoff, which is usually in May. Suspended solid concentrations collected at Stuart Creek and the South Fork Chena River within Fort Wainwright Yukon Training Area ranged from 13 mg/l to 42 mg/l (Anderson 1970).

Individual daily suspended solid concentrations of the Tanana River ranged from 58 mg/l in early April to 4,340 mg/l in August then decreased to 160 mg/l in October (Burrows et al. 1981). Particle-size distribution for suspended sediment is similar at Fairbanks and North Pole. Median particle size is generally in the silt range, but at some low water discharges, it is in the very fine sand range. The reasonably defined relation of median particle size of suspended sediment decreasing as discharge increases suggests a watershed source of sediment during snowmelt runoff and within-channel source of sediment during lower runoff periods (Burrows et al. 1981).

Average particle size of bedload of the Tanana River near North Pole is generally in the gravel range, but at some low transport rates, it is in the median sand range. The median bed material particle size measured at North Pole was in the coarse gravel range. At Fairbanks, bed material particle size ranged from medium gravel to fine sand (Burrows et al. 1981).

Dissolved solids concentrations range from 60 to 484 mg/l within the Tanana Basin. Most surface water within the basin contains less than 200 mg/l of dissolved solids (Anderson 1970).

Fort Greely West and East Training Areas

A limited site-specific study of the water quality of streams flowing through Fort Greely was completed in September of 1990 (U.S. Environmental Hygiene Agency 1990). Water and sediment samples were collected upstream and downstream of Fort Greely. Upstream values give an indication of the background or natural water quality of Fort Greely. Appendix 3.8.D contains the water and sediment chemistries collected upstream for individual streams at Fort Greely. A discussion of downstream values is presented in 4.8.2.

Surface water quality values on Fort Greely meet the primary standards set by the Alaska Drinking Water Standards (18 AAC 80). However, aluminum, iron, and manganese concentrations were higher than the secondary standards set by the Alaska Drinking Water Standards (18 AAC 80). (See Appendix 3.8.D).

Chemical Analysis

The pH measurements collected on Fort Greely ranged from 7.9 to 8.4, which are within the limits established by the State's standards (6.5-8.5) as shown in Appendix 3.8.D.

Iron, a naturally occurring element in streams of Fort Greely, may occasionally exceed the secondary drinking water standard. The Alaska Drinking Water Standards (18 AAC 80) recommend less than 0.3 mg/l of iron for waters that are being considered as a drinking water source. High iron concentrations can be expected in streams that drain swampy areas high in organic matter (Anderson 1970). Iron values collected at streams on Fort Greely are shown in Appendix 3.8.D.

All dissolved oxygen values measured at Fort Greely were within the set State minimum of 4.0 mg/l. Dissolved oxygen values ranged from 9.7 mg/l at the Delta River to 12.1 mg/l at Jarvis Creek.

In general, streams from the Alaska Range are higher in sulfate and magnesium content than other streams in the basin, although these levels are still below the set standards.

The Tanana River receives the bulk of its sediment load from glacial meltwater. The streams draining the Alaska Range, of which the majority originates from glaciers, contribute loads ranging from 150 tons per square mile in the lowlands adjacent to the Tanana River, to several thousand tons per square mile at the termination of glaciers (Anderson 1970).

The average annual suspended sediment yield for the Delta River is 1,200 tons per square mile (Dingman et al. 1971). The Delta River sediment load ranges from 100 to 1,000 mg/l during the open-water season. In-stream sediment samples from the Delta River and other similar streams yielded the following particle size distribution:

clay size - 10-25% of suspended material silt size - 40-50% of suspended material sand size - remainder of suspended material

Most of the clay and silt-sized material found at glacial endpoints is rock silt, which is found in layers in the bottom part of most glaciers. Rock silt forms at the glacial bed by rock being ground to fine particles by glacial movement. These particles are transported to receiving waters by melting and freezing cycles at the bed-glacier interface.

Dissolved solid concentrations range from 60 mg/l to 484 mg/l within the Tanana River Basin. Most surface water contains less than 200 mg/l of dissolved solids (Anderson 1970). The primary components are calcium, magnesium, and bicarbonate. Fort Greely water is of the calcium carbonate type and is slightly basic. Typically, higher stream flows have lower dissolved solids concentrations. During low flow periods, the streams containing the highest dissolved solids are those draining mineralized bedrock areas, notably in the Alaska Range (Dingman et al. 1971).

Similar to dissolved solid concentrations, sediment load concentrations change rapidly with changes in stream discharge. Thus, more than 99% of the annual sediment load is transported during the summer and is evenly distributed over this time period (Anderson 1970).

Bedload for the Delta River consists mostly of particles larger than sand size, which move by rolling, bouncing, and suspension near the stream bed. It contains channel and floodplain material with a mixture of gravel particles (averaging about 1.6 inches in diameter), sand and silt. Total basin yield of bedload for the Delta River cannot be estimated (Dingman et al. 1971).

3.8.2.2 Lakes Fort Wainwright Yukon Training Area

There are a few small lakes and ponds located on Fort Wainwright Yukon Training Area. The smaller water bodies can be dry one to two months out of the year and typically freeze solid during the winter. Iron content in the lakes varies above and below levels found in nearby streams. The degree of hardness of lake water is generally less than the streams (Defense Mapping Agency 1978).

Fort Greely West and East Training Areas

Lakes are abundant on Fort Greely, but information on water quality is scarce. Water samples collected from Bolio, North Twin, South Twin, and Mark Lakes indicated that pH levels were higher than the State's recommended standards of 6.5 to 8.5 as shown in Appendix 3.8.D. All of the lakes have low concentrations of nitrite and nitrate, with Bolio Lake having most of its nitrogen in organic form. Dissolved oxygen concentrations measured at Bolio Lake ranged from 9.8 mg/l to 10.2 mg/l, which adequately meet the State water quality minimum of 4.0 mg/l.

Temperatures in the lakes of Fort Greely would be expected to follow seasonal trends with lows occurring during the winter months and highs occurring in midto late-August (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994b). Water temperatures measured at North Twin, South Twin, and Mark Lakes were slightly lower than those measured at Bolio Lake (Appendix 3.8.D).

3.8.3 Ice Bridges

Ice bridges are constructed by the U.S. Army across the Delta River and Jarvis Creek on Fort Greely (Figure 3.8.d). Ice bridges provide overland foot and vehicle access into remote areas of Fort Greely during winter training exercises and offer an important training opportunity for troops.

Ice bridges are artificially-thickened sections of ice constructed at river crossings, usually perpendicular to the river alignment. River sections with slow-flowing water are typically chosen because both the natural thickness of ice and its frequency of formation are greater in reaches with more tranquil flows (Gray and Male 1981). Ice bridge thickness is determined by the amount of traffic expected to travel over the structure.

Ice bridges are often constructed by building a low dike on both sides of the river using light vehicles to windrow the snow. The dikes are iced, or if snow is lacking, logs are used to confine the area into which water is pumped and then allowed to freeze (Gray and Male 1981). Ice bridges are permitted to be

constructed each season in the same location, and each site has a specific amount of water scheduled for use (Figure 3.8.d). Low temperatures allow for ice bridge construction anytime from November to mid-March.

Appendix 3.8.E lists various permits required for the construction of ice bridges by the State of Alaska. New applications for permits must be submitted when the existing permits expire. For any proposed activity that significantly deviates from the approved permit, the Army must notify each agency involved to obtain written approval prior to commencement of the activity.

3.8.4 National Wild and Scenic Rivers System

The National Wild and Scenic Rivers System was established by Congress in 1968 through the Wild and Scenic Rivers Act (Public Law 90-542). The Act declared that the established national policy of developing some rivers with dams and other construction needed to be complimented by a policy of protecting other rivers having outstanding natural, cultural, scenic, and recreational values in their free-flowing condition for the enjoyment of present and future generations (National Park Service 1999).

No streams within the withdrawal areas have been designated as wild and scenic. However, the upper reaches of the Delta River, all of the Tangle Lakes (approximately 50 miles south of the southern boundary of Fort Greely), and the Tangle River were designated as part of the National Wild and Scenic River System by the Alaska National Interest Lands Conservation Act in 1980. There are 26 rivers in Alaska that are part of this system and the Bureau of Land Management manages six of them (Bureau of Land Management 1999).

Tangle Lakes, Tangle River and the Delta River were recognized for their outstanding scenery and natural and cultural values and classified either wild, scenic or recreational. A *wild* river is free of impoundments, generally inaccessible except by trail, and has exceptionally clean waters. *Scenic* classifications apply to sections that are free of impoundments, have shorelines that are largely undeveloped but are accessible by roads. *Recreational* segments are accessible by road and may have some development along their shorelines (Bureau of Land Management 1999). The Delta River is classified as wild and scenic beginning at the Lower Tangle Lakes area to Milepost 212 on the Richardson Highway. From Milepost 212 to a point one-half mile north of Black Rapids, the Delta River is classified as recreational (Butorac, pers. com. 1998). The designation terminates approximately 15 miles south of the southern boundary of Fort Greely.

3.9 GROUNDWATER

3.9.1 Groundwater Occurrence Fort Wainwright Yukon Training Area

In general, groundwater exists in large supply on the Fort Wainwright Yukon Training Area. Local groundwater conditions are controlled by topography, waterbearing characteristics of the source, and the distribution of permafrost. Based on these conditions, three distinct groundwater source areas exist on the Yukon Training Area: the Tanana-Chena Rivers floodplain, creek valley bottoms, and upland hills (Figure 3.9.a). On a regional basis, groundwater migrates in a northwestward direction in a flow direction similar to the Tanana and Chena Rivers. Table 3.9.a lists the quantity, source, depth, quality, and development potential of groundwater within the Yukon Training Area.

The Tanana-Chena Rivers floodplain, located in the northwest portion of the Yukon Training Area, is relatively flat and is underlain by fine-to-coarse grained material with a moderate distribution of permafrost. The floodplain is the best source of groundwater in the area. The aquifer is composed of alternating layers and lenses of alluvial silt, sand, and gravel and is very permeable. As a result, this area is subject to rapid recharge rates from the Tanana and Chena Rivers, and from surface and underground flow from the uplands and surrounding mountains. A majority of recharge to the groundwater reservoir underlying the Yukon Training Area occurs in this region. Generally, the occurrence of groundwater is controlled by permafrost. Groundwater within the floodplain is an excellent source for development due to large supply, favorable drilling conditions, and shallow water table (Defense Mapping Agency 1978).

The next best source areas of groundwater, by volume, are creek valley bottoms located throughout the central portion of the Fort Wainwright Yukon Training Area. Unfrozen gravel located just above the bedrock, and the bedrock itself, comprise a majority of the water-bearing aquifer. High organic material content and the presence of permafrost in the valley bottoms prevents infiltration of surface water. As a result, groundwater recharge rates are low. Artesian springs are also present on the edges of valley floors where percolating groundwater is confined by permafrost located on lower slopes.

The upland hills located on Fort Wainwright Yukon Training Area are a very poor source of groundwater. The lack of groundwater storage is attributed to high topographic relief and the well-drained, unfrozen silts. Fractures and joints of underlying bedrock are a possible source of groundwater within the area. Generally, water yield is low and recharge rates are slow. Permafrost is absent on south-facing slopes and in the areas of higher relief. Perched water tables can be found along fracture zones or above permafrost on north-facing slopes and at the base of hillslopes (Defense Mapping Agency 1978).

Fort Greely West Training Area

Field specific groundwater data for the West Training Area do not exist due to the remoteness of the area. As a result, aquifer characteristics and groundwater occurrence, recharge, and discharge are inferred from the following characteristics of the East Training Area groundwater system. The portions of the West Training Area with the greatest groundwater potential are the floodplain alluvium along the Little Delta River, Delta Creek, and the broad alluvial fans extending along the north flanks of the Alaska Range (shown in Figure 3.9.b). Groundwater potential is greatest in these areas due to the extensive saturated thickness and abundant recharge of the unconsolidated alluvial deposits. In general, groundwater potential decreases with distance from the alluvial deposits. Well yields have been estimated to be greater than 50 gallons per minute for wells located in glacial moraines, and less than 50 gallons per minute for wells located in bedrock (Anderson 1970). Similar to the Fort Greely East Training Area, aquifers are recharged from surface streams. Small amounts of infiltration of precipitation may also contribute to aquifer recharge.

Fort Greely East Training Area

It is suspected that the alluvial aquifer system underlying the Fort Greely East Training Area may be composed of several aquifers separated by leaky confining layers even though data supporting this hypothesis are lacking. As a result, this system is classified as a single aquifer with varying local confinement. Silty sediments and glacial till may be the source of local confinement. The aguifer is unconfined near Clearwater Creek, which is east of the East Training Area, and near the Tanana River, 18 miles upstream from the Gerstle River, which is also east of the East Training Area. Well logs within the Fort Greely area indicate that permafrost does not generally extend into the saturated zone and usually does not act as a confining layer. Stratification due to lenticular deposits of silt, sand, and gravel with boulders causes permeability within the alluvial sequence to range widely. The presence of silty sediments in many areas may cause some sections of the aquifer to have low transmissivity values (the ability of the aquifer to transmit water). Overall, a large alluvium thickness and the presence of sand and gravel lenses results in a high transmissivity for the alluvial aguifer. Well yields in the Fort Greely East Training Area are as high as 1,500 gallons per minute (Wilcox 1980). Figure 3.9.b shows the location of groundwater within the Fort Greely East Training Area.

The alluvial aquifer system underlying the East Training Area is recharged by losing streams along all of its boundaries and by infiltration of precipitation.

Jarvis Creek and the Delta River are perched above the aquifer and lose water to it through their streambeds. Further north, the Tanana River also contributes to groundwater recharge through its streambed. To the east, the Gerstle River has a losing reach where the river flows onto an alluvial fan. Also, several small creeks draining the north face of the Alaska Range commonly lose all their flow to the ground near the apex of the alluvial apron located in the southeastern section of the East Training Area. During rainstorms and spring snowmelt period, flow within these streams can be observed further down channel. In general, the volume of groundwater recharge from this area is directly related to the amount of surface flow (Wilcox 1980).

In the northern, western, and eastern portions of the East Training Area, water is discharged from the alluvial aquifer system to the surface water system. Clearwater Creek and Clearwater Lake are almost entirely spring fed. This is supported by the fact that these areas are unfrozen during the winter months because of the inflow of relatively warm groundwater. The swampy areas along the Tanana River to the north of the East Training Area receive spring flow. Springs are also present near the mouth of the Delta River. The year-round groundwater discharge rate in the East Training Area is estimated to exceed 1,200 cubic feet per second not including the unmeasured seepage rates to the Tanana River (Wilcox 1980).

In general, the water table moves closer to the land surface the further it is distanced from the Alaska Range. The water table is more than 400 feet below the land surface near the front of the Alaska Range, 150 to 200 feet near Fort Greely, 50 to 100 feet near the City of Delta Junction and less than 10 feet near Clearwater Creek, Clearwater Lake, and Big Delta (Wilcox 1980). The water table near the East Training Area slopes northward at gradients between one foot and 25 feet per mile. This level can also fluctuate in response to seasonal recharge to the aquifer from river and stream channel losses and from precipitation. Seasonal fluctuation is on the order of 20 to 60 feet. Data from a well having a continuous four-year record, located in the northern portion of the East Training Area, indicate that water levels are lowest in late May or early June. River ice typically breaks up in April or May, and recharge from surface water begins. In response, the groundwater level rises until it reaches a peak in October. At this time, the rivers freeze and recharge ceases. The groundwater level recedes until May or June, when recharge begins again. The water table also indicates that groundwater recharged by the Delta River and Jarvis Creek flows northeast toward Clearwater Lake. Groundwater recharged by the Tanana River, the Gerstle River, and the small creeks draining the north face of the Alaska Range flows toward the springs near Clearwater Creek. In general, the groundwater flows in a northeasterly direction and may flow in a more northerly direction in winter (Wilcox 1980).

3.9.2 Groundwater Quality

In general, the chemical guality of groundwater reflects its geologic environment. Groundwater quality on the Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas is divided into three general areas based on geologic regime. The first set of wells drilled along the boundaries of the Tanana Basin, including the southern portion of Fort Greely along the northern flanks of the Alaska Range and the uplands of the Yukon Training Area, is typically high in magnesium bicarbonate or magnesium sulfate. Wells drilled in crystalline rock may have concentrations of magnesium and nitrate higher than the limit recommended by the Alaska Drinking Water Standards (18 AAC 80) as listed in Appendix 3.9. The second group of wells is located in the alluvial valleys of Fort Greely. Water is low in iron and exhibits moderate hardness values. Groundwater quality in this area is similar to the streams that flow across the alluvial fans. This area is the largest source of good quality water within the Tanana River Basin. The final set of wells, located in the organic-rich sediments of floodplains, terraces, and valley fills, including the uplands of the Yukon Training Area, is low in sulfate and moderate to high in hardness and iron. Chloride and fluoride concentrations are low throughout the withdrawal areas. Overall, groundwater temperatures stay relatively constant; values are less than 40°F and usually range from 32°F to 34°F (Anderson 1970).

Fort Wainwright Yukon Training Area

No groundwater monitoring wells have been drilled on the Fort Wainwright Yukon Training Area including the Stuart Creek Impact Area. As a result, an estimate of naturally occurring groundwater quality on the Yukon Training Area must be made based on information from groundwater wells in the surrounding area (Figure 3.9.a).

Appendix 3.9 contains measured values for various groundwater quality parameters collected at specific sites near the Yukon Training Area. The Alaska Drinking Water Standards (18 AAC 80) are also listed for comparison.

The only water quality parameter with measured values above the set standard is iron. Well G-14 had the lowest value of 7.11 milligrams per liter (mg/l) and well G-16 had the highest value of 25.0 mg/l. The secondary drinking water standard for iron is 0.3 mg/l. Most municipal water supplies require treatment for iron removal prior to use in the Fairbanks area (Defense Mapping Agency 1978). Sodium values ranged from 5.2 mg/l to 15.0 mg/l, well below the standard of 250 mg/l. The concentrations of sulfate, chloride, fluoride, and nitrate were also

well below their set standards. Well G-16 had the highest dissolved solids reading of 429.0 mg/l and well G-14 had a low concentration of 135 mg/l. The dissolved solids standard is 500 mg/l.

Fort Greely West and East Training Areas

Human inhabitation of Fort Greely is sparse. As a result, few wells have been drilled on the installation and groundwater quality data are limited to areas in the immediate vicinity of the Fort Greely Main Post. A majority of the available groundwater quality data date from the early 1950s through the 1970s. The most recent values available are from 1990, and were collected in the Main Post area (Appendix 3.9). These data provide a reasonable estimate of the region's natural groundwater quality. It should be noted that some groundwater wells within the Main Post area were drilled in response to specific spills or hazardous materials operations. Figure 3.9.b shows the location of groundwater wells in the Fort Greely vicinity. Groundwater monitoring wells have not been drilled on the Fort Greely West or East Training Areas. Thus, no groundwater quality data are available for the Impact Areas.

According to limited available data, Fort Greely groundwater quality is good. All of the water quality parameters measured were below the concentrations recommended by the Alaska Drinking Water Standards (18 AAC 80) as listed in Appendix 3.9. Measured pH values were within the acceptable range of 6.5 to 8.5 standard units. Sodium values ranged from 5.1 mg/l at Donnelly Flats to 3.2 mg/l at Black Rapids. Both values were far below the established standard of 250 mg/l. Sulfate, chloride, fluoride, nitrate, and iron values are also well below the set standards. The lowest dissolved solid value of 153 mg/l was recorded at well G-13 and the highest value of 225 mg/l was recorded at well G-10. All of these values were below the standard.

3.10 WETLANDS

Wetlands are lands transitional between terrestrial and deepwater habitats where the water table usually is at or near the land surface or the land is covered by shallow water (Cowardian et al. 1979). Wetlands are sociologically, ecologically, and economically valuable in Alaska. These areas provide resources for people in rural Alaskan villages to survive. Wetlands also serve as wildlife habitat areas for large mammals and especially migrating birds. Additionally, Alaskan wetlands sustain some of the richest commercial, sport, and subsistence fisheries.

Wetlands have important hydrologic and water quality functions including flow regulation, erosion control, sediment retention, nutrient uptake, and contaminant

removal. Wetland formation is influenced by local climate, basin morphometry, the ratio of watershed area to wetland volume, and the material properties of peats and their underlying mineral substrates (Bedford and Ford 1987). Alaskan wetlands are unique, as compared to wetlands found in the contiguous United States, due to the influence of high-latitude phenomena such as glaciers, permafrost, and aufeis (massive winter icings that occur in river valleys). These features determine wetland volume and areal distribution and the rate and time of water released.

Knowledge of the areal extent of wetlands in the withdrawal area is limited. The most descriptive wetland data that exist for the Fort Wainwright and Fort Greely area were developed by the U.S. Fish and Wildlife Service as part of the National Wetlands Inventory (NWI) program in 1992. This program identified wetlands using stereoscopic analysis of high altitude aerial photographs. Wetlands were identified based on vegetation, visible hydrology, and geography in accordance with Classification of Wetlands and Deepwater Habitats of the United States (Cowardian et al. 1979). These photographs represent the natural conditions occurring during the year in which they were taken. There is also a margin of error that exists when using aerial photographs for identification and mapping purposes. Some small wetlands and those obscured by dense forest cover may not be included in this inventory. The NWI program did not complete wetland delineation for the entire withdrawal areas.

Figures 3.10.a and 3.10.b show the location of wetlands and the extent of the NWI delineation on the withdrawal areas of the Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas. Wetlands are categorized by the U.S. Fish and Wildlife Service wetland classification system. This system places ecologically similar habitats into a hierarchal system based on dominant plants or substrates (as shown in Appendix 3.10) This system was designed to be used by Federal and State agencies for the inventory and mapping of wetland surveys. For purposes of this classification, wetlands must have one or more of the following attributes: at least periodically, the land supports predominantly hydrophytes; the substrate is predominantly undrained hydric soil; and the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year (Cowardian et al. 1979).

To compensate for the lack of detail associated with the NWI, U.S. Army Alaska (USARAK) has contracted with the U.S. Army Corps of Engineers Waterways Experiment Station (WES) and Cold Region Research Engineering Laboratory (CRREL) to delineate wetlands on Fort Wainwright and Fort Greely. Both projects will include digitization of all wetland boundaries. In addition, USARAK
is developing a classification system based on hydrogeomorphic characteristics of vegetative communities and will include a description of values and functions of wetlands on Fort Wainwright and Fort Greely. Wetland management recommendations will also be included.

Fort Wainwright Yukon Training Area

The majority of Fort Wainwright Yukon Training Area (72%) is classified as upland. Shrub wetlands can be found scattered throughout the Yukon Training Area. These wetlands are associated with slightly higher relief on the edges of marshes and in poorly-drained basins and depressions with cold, waterlogged soils typically located along or near stream corridors. A thick layer of peat over a mottled gray silt or silt loam with a water table a few inches from the surface is characteristic of the area. Depth to permafrost is often less than 30 inches. These wetlands are classified by the U.S. Fish and Wildlife Service as saturated palustrine scrub-shrub or forested systems. Approximately 14% of the Fort Wainwright Yukon Training Area is covered by this wetland type. Wetlands located in the South Fork Chena River Lowlands on the Stuart Creek Impact Area are similar to those found on the training areas. A large wetland cluster is located in the lowlands of the Chena River floodplain and the French-Moose Creek area. Appendix 3.10 contains the areal extent and individual wetland types identified on the Training Area.

Fort Greely West and East Training Areas

Shrub wetland is the dominant wetland variety found on Fort Greely. Little Delta Training Area, located in the northwest portion of Fort Greely West Training Area, is predominantly covered by scrub-shrub or forested palustrine wetland systems. Approximately 13% (of the area surveyed) of Fort Greely is covered by these types of wetlands. A small northern portion of the Lakes Impact Area was surveyed for wetlands. This area contains saturated palustrine scrub-shrub wetland systems. Even though approximately half of the Impact Area (54%) was not inventoried, it is likely that this type of wetland is dominant throughout the Training Area. Wetlands located along Delta and Little Delta Rivers and Jarvis Creek are riverine systems having unconsolidated bottoms. Very few wetlands other than those along Jarvis Creek are found on the Fort Greely East Training Area. Appendix 3.10 contains the areal extent and individual wetland types identified at Fort Greely.

3.11 VEGETATION

In 1980, a hierarchial land classification system was developed through the U.S. Department of Agriculture to describe and manage lands on a regional to local

scale. The term "ecoregion" was used to describe continuous geographical areas defined by climate and vegetation. An ecoregion is characterized by landform, soil, flora, fauna, and ecological climax. This classification based on ecosystems is now accepted and used by several federal agencies to manage lands in terms of biodiversity. The following general description of the withdrawn lands is from the hierarchial land classification (Bailey 1995, McNab and Avers 1994).

ECOREGION	FORT WAINWRIGHT YUKON TRAINING AREA	FORT GREELY WEST AND EAST TRAINING AREAS
DOMAIN	POLAR - low temperatures, severe winters, small amounts of precipitation mainly in summer.	POLAR - low temperatures, severe winters, small amounts of precipitation mainly in summer.
DIVISION	SUBARCTIC - cold snowy forest climate - boreal subarctic type, open lichen woodlands, taiga.	SUBARCTIC - cold snowy forest climate - boreal subarctic type, open lichen woodlands, taiga.
PROVINCE	UPPER YUKON TAIGA- MEADOW Vegetation complex, forests of white spruce, paper birch, quaking aspen covering most lower slopes on south and south- facing slopes in north. Black spruce at higher elevations on all north-facing slopes in south, on all but steep south-facing slopes in north and on lower slopes with impeded soil drainage throughout area. Above black spruce forest, land is either barren or alpine meadow (tundra) characterized by sedges and mosses on poorly- drained sites and low growing shrubs on drier sites.	ALASKA RANGE HUMID TAIGA- TUNDRA-MEADOW Dense bottom-land stands of white spruce and cottonwood on floodplains, black spruce in poorly- drained areas up to 1,000ft (300m), upland spruce-hardwood forests of white spruce, birch, aspen, and poplar, with undergrowth of moss, fern, grass, and berry to timberline at about 2,500-3,500ft (800- 1,100m).
SECTION	UPPER YUKON HIGHLANDS - See description above.	ALASKA MOUNTAINS - substantial portion of area barren of vegetation. In vegetated areas, alpine and moist tundra communities of prostrate plants are predominant. Riparian spruce-hardwood forests infrequently occur at low elevations.

$\mathbf{r}_{\mathbf{a}\mathbf{b}\mathbf{b}\mathbf{c}}$

Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas are part of the Polar Domain and Subarctic Division. Areas within the Polar Domain have low temperatures, severe winters, and small amounts of precipitation occurring mainly in summer. The Subarctic Division further describes the areas as having cold, snowy, forest climates of the boreal Subarctic type and open lichen woodlands called taiga.

The Subarctic Division encompassing the withdrawal lands is further divided into Provinces and then into Sections. The Fort Wainwright Yukon Training Area lies within the Upper Yukon Taiga-Meadow Province, Upper Yukon Highlands Section (Bailey 1995, McNab and Avers 1994). These are lands of complex vegetation with forests of white spruce (*Picea glauca*), paper birch (*Betula papyrifera*), and quaking aspen (*Populus tremuloides*), dominating well-drained areas on lower and south-facing slopes. Black spruce (*Picea mariana*) is found where permafrost is present at higher elevations and on north-facing slopes. Black spruce is also found on lower slopes with impeded drainage. Above the black spruce tree line, areas are barren or alpine meadow (tundra) characterized by sedges and mosses in poorly-drained sites and low growing shrubs on drier sites (McNab and Avers 1994).

Fort Greely West and East Training Areas lie within the Alaska Range Humid Taiga-Tundra-Meadow Province and Alaska Mountains Section. The Province is characterized by dense bottomland stands of white spruce and cottonwood (*Populus sp.*) on floodplains and forests similar to those described for Fort Wainwright Yukon Training Area, with black spruce found on higher elevation north-facing slopes and in lower, poorly-drained areas. White spruce forests and spruce/hardwood forests are found on lower, well-drained slopes and southfacing slopes with an understory of low shrubs, forbs, grass, ferns, and moss. Barren areas are common in the Alaska Mountain Section. Portions of the withdrawal lands are barren at higher elevations, but vegetation associated with alpine and moist tundras are also present (Racine et al. 1997, Bailey 1995, McNab and Avers 1994). At lower elevations within the Section, riparian spruce-hardwood forests infrequently occur.

Viereck et al. (1992) has classified vegetation in Alaska into a five level system. Level I lists the general categories: forest (dense growth of trees), scrub (stunted trees or shrubs), and herbaceous vegetation (forbs, graminoids, mosses and lichens). This level is subsequently divided to Level 5 where associated plant species are listed. Most vegetation descriptions for the withdrawn lands use Viereck's classification system. The vegetation description in this section is an overview of information gathered from several reports of vegetation patterns on the withdrawal lands and is based on Viereck's classification system. Vegetation patterns of the withdrawal lands are determined by a number of natural influences including climate, topography, glaciation, flooding, depth of water table, permafrost, and fire. These areas are covered by forest, grassland, shrubs and/or scrub, bogs, fens, and alpine tundra (Racine et al. 1997). Mountainous areas create their own climates, influencing vegetation. Vegetation patterns change from the lowland areas to the high tundra. These vegetation types change according to slope, aspect, elevation, and permafrost. Bailey (1995) termed these vegetation pattern changes within mountainous areas "Vertical Vegetative Zonation". Throughout the Interior, interrelationships among the different elements creates complex patterns of vegetation.

The withdrawal lands contain pure stands of spruce or hardwoods to forests of mixed spruce/hardwood. The lowland black spruce/hardwood forest found on each post is the most common forest type in interior Alaska (U.S. Dept. of the Army Hdqtrs 1979 and 1980). In wet areas with permafrost, black spruce is dominant. Lowland black spruce is found in flat valley bottoms, lake sides, bog margins, and muskegs where drainage is poor.

Stands of white spruce are found mainly in areas of well-drained soils where permafrost is absent. White spruce/balsam poplar (*Populus balsamifera*) stands are found in floodplains, low river terraces, and south-facing slopes (Jorgenson et al. 1996, U.S. Dept. of the Army 1979 and 1980). White spruce is also found mixed with paper birch on high ridges and with quaking aspen at lower elevations. Quaking aspen is a fast growing tree common on south slopes, well-drained benches, and creek bottoms throughout interior Alaska to an elevation of 3000 feet. Tamarack (*Larix laricina*) is also found with white and black spruce in riverine areas and occasionally with paper birch (Jorgenson et al. 1996, Racine et al. 1997).

The withdrawal lands also contain areas of tundra (alpine and moist), barren lands, wetlands, and low and tall shrubs. Moist tundra is found in small scattered areas on the Fort Wainwright Yukon Training Area. Moist tundra, also called foothills tundra, occurs from about 2,500 to 3,500 feet on the Yukon Training Area. Vegetation in alpine and moist tundra consist of low, dwarf or procumbent shrubs, sedges, and grasses (U.S. Dept. of the Army Hdqtrs 1979). Fort Greely West Training Area has small areas of moist tundra in the northwest and southeast and alpine tundra in the west and south. Alpine tundra occurs above treeline at approximately 3,500 to 4,000 feet.

Barren lands are glaciers, snowfields, and bare exposed rock in river gravel bars and in mountainous areas (U.S. Dept. of the Army Hdqtrs 1980, Jorgenson et al. 1996). The Fort Wainwright Yukon Training Area contains river barrens consisting of stream channels and silt, sand, and gravel bars (Racine et al. 1997). Barren areas on Fort Greely West Training Area occur in the south at MacArthur and Patton Mountains, the Molybdenum Rim, and Trident Glacier.

Wetland areas are comprised of scrub bogs, bog meadows, lowland low scrub containing sedges (*Carex spp.*), tussock meadows, and lowland moist meadows with bluejoint reedgrass (*Calamagrostis canadensis*) and sedges. Willows (*Salix spp.*) and forbs may be present. Lowland areas also contain coniferous and deciduous forests (Jorgenson et al. 1996). On Fort Wainwright Yukon Training Area, wetlands are found in low lying areas and floodplains of all creeks. The northwest corner of the Yukon Training Area is part of the Chena River floodplain. Extensive wetlands are found on Fort Greely. See Chapter 3.10 for more detailed account of wetlands.

Transitional zones or ecotones commonly occur on the withdrawal lands. Low and tall shrub vegetation types form ecotones between forests and barren areas or tundra at high elevations, and forests and barren areas at lower elevations. They are usually found along floodplains or just above treeline. Species within low or tall shrub ecotones are alder (*Alnus sp.*), willow, cottonwood, birch, mountain ash (*Sorbus sp.*), and low growing white spruce with minimal ground cover. Subalpine areas contain grasses, mosses, dwarf shrubs, and lichens (Racine et al. 1997).

3.11.1 Ecological Land Classification

A further description of the withdrawal lands is needed to understand the complex vegetative compositions of the areas. U.S. Army Cold Regions Research and Engineering Laboratory contracted ABR, Environmental Research and Services Inc., to produce Ecological Land Classification maps for Fort Wainwright in 1996. ABR is working to complete maps for Fort Greely. The maps delineate Ecodistricts, Ecosubdistricts, and Ecosites.

Ecodistricts are physiographic units within a climatic region that influence moisture availability and exposure to radiant solar energy and have similar geology, geomorphology, and hydrology. Names of ecodistricts are based on prominent geographic features and broad physiographic land forms. Ecosubdistricts are smaller physiographic regions having distinct, repeating associations of vegetation, soils, permafrost characteristics, waterbodies, and fauna. The Fort Wainwright Yukon Training Area lies within the White Mountains Ecodistrict. There are four Ecosubdistricts within Fort Wainwright Yukon Training Area. They are the Chena-Salcha Highlands, French-Moose Creek Lowlands, Chena Floodplain, and South Fork Chena Lowlands. These areas are defined in Table 3.11.b and shown in Figure 3.11.a (Jorgenson et al. 1996).

Table 3.11.b Ecosubdistricts of Fort Wainwright Yukon Training Area.

Chena Salcha Highlands - Mountainous area of weathered bedrock in alpine areas. Permafrost is present on northern and lower slopes and absent on southern slopes. White spruce-birch-aspen forests on south slopes, black spruce forests on north slopes, riverine willows in drainages, and alpine tundra on high exposed ridges are common.

French-Moose Creek Lowlands - Rounded hills and mountains with low marshy land, collapse-scar and flat bogs present. Area generally above Tanana floodplain, but has numerous small streams originating in highlands. Permafrost nearly continuous: absent in collapse-scar bogs, thaw ponds, and ridges of well-drained sand dunes. Black spruce and birch forests, shrub-tussock meadows, sedge-moss bogs, and aquatic vegetation in shallow thaw ponds are common.

Chena Floodplain - Meandering stretch of lower Chena River with active and inactive floodplains. Permafrost is absent. Vegetation includes partially vegetated river barrens, riverine willow, and alder tall shrub, balsam poplar and white spruce forests, and wet sedge meadows. Forest productivity is high.

South Fork Chena Lowlands - Valley bottoms with active and inactive floodplain areas. Permafrost continuous, except under larger streams. Vegetation is dominated by black spruce, and birch forests, low shrubland, and tussock tundra. White spruce-balsam poplar forests are found along floodplains.

Ecosites are subgroups representing vegetation types or successional stages within a uniform soil and geomorphic class. The Fort Wainwright Yukon Training Area has 32 ecosites and descriptions of these are listed in Table 3.11.c (Jorgenson et al. 1996). Many of the ecosites described for Fort Wainwright Yukon Training Area apply to Fort Greely West and East Training Areas.

Within each of the ecosites listed in Table 3.11.c are vegetative communities. The Ecological Land Classification Report (Jorgenson et al. 1996) contains a table of the vegetative communities that were combined to create each of the ecosites.

Five forest ecosites dominate the landscape on Fort Wainwright Yukon Training Area covering over 75,000 acres. Four of the ecosites are upland forest: mixed (17,575 acres), south-facing broadleaf (17,559 acres), needleleaf (14,652 acres), and south-facing mixed (13,250 acres), and one is a lowland needleleaf forest (11,919 acres). Riverine barrens, and wet and moist meadows encompass the least amount of area.

The ecosite map of Fort Wainwright Yukon Training Area has been divided into four separate maps. The northwest portion of the Training Area is shown in

Figure 3.11.b, the northeast, Figure 3.11.c, the southwest, Figure 3.11.d, and the southeast in Figure 3.11.e.

Table 3.11.c Ecological	Land	Classifications	for	Fort	Wainwright	Yukon
Training Area.						

ECOSITE	DESCRIPTION
RIVERINE BARRENS	Unvegetated to partially vegetated (<30% cover) river-bars that are frequently flooded.
RIVER	Lower perennial river, both glacial or non-glacial.
RIVERINE BROADLEAF FOREST	Open or closed early-mid successional forests, with balsam poplar, paper birch, and aspen. Inactive flooding regime. Organic layer undeveloped.
RIVERINE MIXED FOREST	Typically mid-successional, closed white spruce-balsam poplar forest. Soils are riverine cover deposits. Inactive flooding regime.
RIVERINE TALL SCRUB	Dense stands of willow and alder, early successional plants on riverine silts that are regularly flooded.
RIVERINE WET MEADOW	Sedge wet meadows found in recently abandoned sloughs and channels. Organic horizons of sedge peat vary from shallow to moderate over riverine silts.
RIVERINE COMPLEX	Common on meander floodplains. Individual meanders may contain entire successional sequence. Vegetation includes scattered open to closed spruce stands, shrub stands and sedge-shrub areas.
LAKES OR PONDS	Lacustrine environments that may contain submerged vegetation. Lakes may be oxbows along rivers, bedrock controlled or thaw basins.
LOWLAND NEEDLELEAF FOREST	Open to closed forest of black spruce is common. White spruce and tamarack also occur. Terrain usually abandoned cover deposit or lowland retransported deposit. Organics moderate to thick. Permafrost generally present.
LOWLAND BROADLEAF FOREST	Most commonly characterized by a closed forest of paper birch. Also found are open and closed forests on lowland retransported deposits, and open to closed mixed broadleaf forests on lowland eolian deposits.
LOWLAND MIXED FOREST	Closed spruce-paper birch forest is dominant type. Other types are open to closed spruce-paper birch-quaking aspen forests on better drained lowland loess and closed spruce-paper birch forests on lowland eolian complex. Most types are unfrozen.

ECOSITE	DESCRIPTION
LOWLAND TALL SCRUB	Broadleaf woodland-shrub woodland (post fire) and closed tall shrub resulting from recent disturbance on abandoned-floodplain cover deposits. Typically organic layer is thin and permafrost is absent.
LOWLAND LOW SCRUB	Dominant communities are shrub birch- <i>Ericaceous</i> shrub on abandoned-floodplain cover deposits. Open, low mixed shrub-sedge tussock meadow also occur on cover deposits and recently burned shrub types. Scattered trees, particularly black spruce and tamarack may be present. Soils generally organic, saturated and frozen. Tussock patches and burned areas have variable organic development and permafrost.
LOWLAND MOIST MEADOW	Bluejoint reedgrass and sedges are dominant. Typically circular features associated with streams, recently abandoned drainages or old sand dunes. Scattered shrubs, usually willows, and forbs may be present. Soils are well-drained mineral or organic mineral, mesic and permafrost free.
LOWLAND EOLIAN COMPLEX	A mosaic of terrain unit types (lowland eolian deposits, lowland retransported deposits, organic bogs, and isolated sand dunes) that support a mixture of paper birch, black spruce, low shrub, mesic graminoid and wet tussock meadows, and bog vegetation types. Black spruce most common on frozen soil that vary from open to woodland densities. Small thermokarst ponds, sphagnum bogs, and tussock meadows also occur. Deciduous trees restricted to patchy areas of better drainage.
LOWLAND SLOPE DRAINAGE COMPLEX	Repeating associations of communities on variable lowland terrain (lowland eolian deposits, abandoned cover deposits, and lowland retransported deposits). Open spruce stands interrupted by linear features, such as abandoned channels and water tracks, which are populated by alder and paper birch on toe slopes and low shrubs and graminoids on the flats.
LOWLAND ABANDONED CHANNEL COMPLEX	Occurs on shallow, gravelly soils. Plant communities are open black spruce-tamarack forest, open and closed low shrub and sedge wet meadows.
SCRUB BOG	Lowland mixed conifer woodland types growing on organic deposits. Organic terrain includes lowland eolian complex, veneer bog and flat bog.

Table 3.11.c	Ecological	Land	Classifications	for F	ort	Wainwright	Yukon
Training Area	ì.						

ECOSITE	DESCRIPTION
BOG MEADOW	Open low willow-graminoid shrub bog, lowland sedge-moss bog meadow, and lowland sedge-herb bog meadow communities (including in-filling lakes) growing on saturated, organic deposits veneer bogs, shore bogs and collapse scar bogs.
UPLAND NEEDLELEAF FOREST	Open and closed black spruce and mixed spruce forests occurring on moderate to well-drained residual bedrock soils, upland retransported soils, and upland loess deposits on north, east and west-facing slopes. Permafrost may be present particularly on north- facing and lower slopes.
UPLAND BROADLEAF FOREST	Woodland to closed paper birch forests on moderate to well drained residual bedrock, upland retransported and upland loess deposits on north, east and west-facing slopes. Organic horizons shallow and permafrost absent. Woodland stands usually occur with dense tall scrub as an early successional stage after fire or other disturbance.
UPLAND MIXED FOREST	Open to closed spruce-paper birch forests on moderate to well drained residual bedrock, upland retransported and upland loess deposits on north, east and west-facing slopes. Organic horizons shallow, permafrost absent or discontinuous. Many stands are mid- successional communities that will eventually be replaced by closed spruce forest.
UPLAND NEEDLELEAF FOREST (SOUTH- FACING)	South-facing slopes populated by white spruce and mixed spruce forests. Residual bedrock or upland retransported soils. Drainage good and permafrost absent. Open black spruce forest can occur on lower south slopes where drainage may be impaired or soil temperatures low.
UPLAND BROADLEAF FOREST (SOUTH- FACING)	Open to closed quaking aspen and paper birch-quaking aspen forests. Residual bedrock, upland retransported or upland loess deposits. Drainage good, permafrost absent. May be maintained by fire or be mid-successional with white spruce in understory.
UPLAND MIXED FOREST (SOUTH- FACING)	Closed spruce-paper birch-quaking aspen forests on residual bedrock soils, upland retransported deposits or upland loess deposits. Drainage good and permafrost absent. Commonly are mid-successional forests that will be replaced by spruce stands.
UPLAND TALL SCRUB	Dense, tall scrub thickets of alder and willow usually a result from disturbance but may also occur at headwaters of small drainages. Understory often solely alder leaf litter. Permafrost absent, soils residual bedrock and upland loess deposits.

Table 3.11.c Ecological Land Classifications for Fort Wainwright Yukon Training Area.

Table 3.11.c Ecological Land Classifications for Fort Wainwright Yuko	n
Training Area.	

ECOSITE	DESCRIPTION
UPLAND LOW SCRUB	Open and closed shrub birch communities, post-fire scrub patches and dry midgrass-shrub. Shrub birch and early successional scrub occur on residual bedrock soils, upland loess and upland retransported soils. Organic layer thickness thin to moderate. Midgrass-shrub is restricted to dry, steep, south-facing bluffs.
UPLAND SLOPE DRAINAGE COMPLEX	Successive drainages produce an alternating pattern of tall shrub, deciduous forest and spruce forest on upland retransported and residual bedrock soils.
SUBALPINE FOREST	Found at elevational limit of tree growth. Permafrost is usually present. Forest is mature, but trees (white and black spruce, and rarely, paper birch) are small and scattered. Grades into dwarf tree scrub as growing conditions become more severe.
SUBALPINE SCRUB	Rare in study area. Tall shrubs, usually willow and glandular birch, form closed communities on residual bedrock soil or weathered bedrock at or just below treeline. Permafrost common.
ALPINE SCRUB	Occurs above upper limit of tree growth on weathered bedrock or a thin layer of residual bedrock soil. Vegetation may be discontinuous due to rocky soils and outcroppings. Plants low growing. Dwarf shrubs and lichens provide most of cover at higher sites, low shrubs dominate just above treeline and in protected areas.
HUMAN MODIFIED	Barren or partially vegetated areas that have been excavated or filled.

In 1995, a floristic survey of Fort Wainwright was conducted. The study provided a baseline inventory of the existing flora (Racine et al. 1997). A complete floristic survey of Fort Greely has not been conducted, but many of the plant species found on Fort Wainwright occur on Fort Greely. Floristic surveys have been conducted on Fort Greely in areas east of the Delta River. Two plants have been identified on Fort Greely that have not been found on Fort Wainwright. They are *Bupleurum americanum* and *Elaeagnus communtata*. For a complete list of plants found on Fort Wainwright and Fort Greely see Appendix 3.11.

No Federal or State listed endangered or threatened plant species are listed by the Alaska Natural Heritage Program as occurring within or near the withdrawal lands. Five plants listed as rare or major range extensions were found on Fort Wainwright during the 1995 survey. Detailed information on the findings can be reviewed in Chapter 3.14 Threatened or Endangered Species and Species of Concern.

3.11.2 Timber Management

The Military Lands Withdrawal Act (Public Law 99-606) identified the Secretary of the Interior and Secretary of the Army as managers of the withdrawn lands. U.S. Army Alaska is required under the Sikes Act (Public Law 105-85) to complete and implement Integrated Natural Resources Management Plans for Fort Wainwright and Fort Greely.

The Sikes Act also mandates management of forest resources. The Integrated Natural Resources Management Plans are five year planning documents that have identified management needs for the installations. One of the goals of the plans is to implement Forest Ecosystem Management Plans. U.S. Army Alaska plans to implement a ten year project, in 1999, to inventory forest resources on Fort Wainwright and Fort Greely.

The Military Lands Withdrawal Act authorizes the Secretary of the Interior, through the Bureau of Land Management, (after consultation with the Secretary of the military department concerned) to develop a plan for the management of the withdrawal lands. The Bureau of Land Management and Army wrote Resource Management Plans for Fort Wainwright and Fort Greely (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a,b). The management plans include provisions necessary for proper management and protection of resources and values of such areas. Forest management is covered under these plans.

Sales of forest products are the responsibility of the Bureau of Land Management (BLM). Sales of forest products will require additional National Environmental Policy Act (NEPA) review and documentation, requires military concurrence, and compliance with Federal Regulation, Sales of Forest Products (43 CFR 5400). Authorization for non-military free use of timber is also the responsibility of the BLM and requires a permit pursuant to Federal Regulation, Free Use of Timber (43 CFR 5510), and military concurrence.

3.12 WILDLIFE

The Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas support a large diversity of wildlife. Wildlife populations on the withdrawal lands are managed by the Alaska Department of Fish and Game. Past management emphasis has been directed toward big game populations. Habitat for some of these species has been identified and protected on the withdrawal lands. Little information is available on habitat availability for small game, non-game species, and migratory birds. Most habitat important for these species has not been identified for management or protection on the withdrawal lands. Species known to occur on the posts are listed in Appendix 3.12.

The Alaska Department of Fish and Game organizes its Game Management Areas into units and subunits. The withdrawn lands are within Alaska Department of Fish and Game, Game Management Unit (GMU) 20, and lie within three Game Management Subunits. The Fort Wainwright Yukon Training Area is within GMU 20B, Fort Greely West Training Area, west of the Delta River, is within GMU 20A, and lands east of the Delta River including Fort Greely East Training Area are within GMU 20D (Figure 3.12.a).

The Alaska Department of Fish and Game has categorized wildlife species in its Alaska Hunting Regulations 1997-1998. The following categories of big game, small game, and furbearing species are listed according to these regulations.

Big game species on both posts include: black bear (*Ursus americanus*), grizzly bear (*Ursus arctos*), moose (*Alces alces*), wolf (*Canis lupus*), and wolverine (*Gulo gulo*). Fort Greely also has Dall sheep (*Ovis dalli*), caribou (*Rangifer tarandus*), and bison (*Bison bison*) (ADF&G 1998).

Small game species on the withdrawal lands include: willow ptarmigan (*Lagopus lagopus*), rock ptarmigan (*Lagopus mutus*) and white-tailed ptarmigan (*Lagopus leucurus*), ruffed grouse (*Bonasa umbellus*), spruce grouse (*Dendragopus canadensis*) and sharp-tailed grouse (*Pedioecetes phasianellus*), and snowshoe hare (*Lepus americanus*) (ADF&G 1998, U.S. Dept. of the Army Hdqtrs 1979 and 1980).

State listed furbearing animals found on the withdrawal lands include: coyote *(Canis latrans)*, red fox *(Vulpes vulpes)*, lynx *(Lynx canadensis)*, beaver *(Castor canadensis)*, land otter *(Lutra canadensis)*, marten *(Martes americana)*, mink *(Mustela vison)*, short-tailed weasel *(Mustela erminea)*, muskrat *(Ondatra zibethicus)*, hoary marmot *(Marmota caligata)*, northern flying squirrel *(Glaucomys sabrinus)*, Arctic ground squirrel *(Spermophilus parryii)* and red squirrel *(Tamiasciurus hudsonicus)*.

Unclassified game species found on the withdrawal lands include four species of shrew (*Sorex* sp.), the deer mouse (*Peromyscus maniculatus*), meadow jumping mouse (*Zapus hudsonicus*) and porcupine (*Erethizon dorsatum*) (ADF&G 1998).

Non-game mammal species found on the posts include five species of vole (*Microtus* sp. and *Clethrionomys* sp.), northern bog lemmings (*Synaptomys* borealis), and the little brown bat (*Myotis lucifugus*). One amphibian, the wood frog (*Rana sylvestris*), is common.

The withdrawal lands provide a diversity of habitats for many species of birds. Some of the most common non-game birds found are: alder flycatcher *(Empidonax alnorum)*, American kestrel *(Falco sparverius)*, northern hawk owl *(Surnia ulula)*, great horned owl *(Bubo virginianus)*, yellow-rumped warbler *(Dendroica coronata)*, orange-crowned warbler *(Vermivora celata)*, common redpoll *(Acanthis flammea)*, and hoary redpoll *(Carduelis hornemanni)* (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a). Waterfowl are numerous in the Chena floodplain area of Fort Wainwright Yukon Training Area and throughout the wetland areas on Fort Greely.

3.12.1 High Use Areas and Sensitive Habitats

Several documents have identified high use areas and sensitive habitats for wildlife species on the withdrawal lands. The Final Environmental Impact Statement for the withdrawal of Fort Wainwright Yukon Training Area (U.S. Dept. of the Army 1979) identified moose concentration areas and waterfowl habitat areas (Figure 3.12.b). The Final Environmental Impact Statement for the withdrawal of Fort Greely West and East Training Areas (U.S. Dept. of the Army 1980) identified a grizzly bear high spring use area and grizzly bear range, and the bison calving area, and summer and winter range.

A Cooperative Agreement for the Management of Fish and Wildlife Resources on Army Lands in Alaska (U.S. Army Alaska Hdqtrs 1979) established protection of sensitive habitats for bison, moose, and caribou. The cooperative agreement was revised in 1986 and identified changes in the bison and caribou sensitive habitat boundaries. A sandhill crane roosting area was also designated through the 1986 agreement.

The Resource Management Plan for Fort Greely (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a) designated sensitive grizzly bear and Dall sheep habitats. The sensitive grizzly bear range has been corrected, and is shown as the high use grizzly bear range with only riparian and ridge habitat identified as sensitive in Figure 3.12.c. The Dall sheep habitat was the same habitat identified in the Final Environmental Impact Statement (U.S. Dept. of the Army Hdqtrs 1980).

Consultation with the Alaska Department of Fish and Game (ADF&G) for this Legislative Environmental Impact Statement has culminated in identification of

boundary changes for sensitive species on Fort Greely. Caribou, moose, grizzly bear, Dall sheep, and bison sensitive habitats and sensitive time periods have been updated. An additional sandhill crane roosting area was also identified. This information and the documents listed above were used to delineate habitats on maps shown in this chapter.

3.12.2 Big Game Species

Hunting big game species on the withdrawal lands is an important recreational activity. The following summaries for six big game species gives general information on harvest numbers, population estimates, and habitat use.

Black Bear - Black bear are found throughout the withdrawal lands but most hunting occurs in the Fort Wainwright Yukon Training Area. Bears are usually harvested by using bait stations in the spring. Data for 1997 shows that 11 bears were taken in the Fort Wainwright Yukon Training Area during the spring, while none were harvested in the fall. Fifty-three hunters registered for the spring hunt on Fort Wainwright Yukon Training Area and only five hunters registered for Fort Greely. No bears were taken during the spring hunt on Fort Greely and only one was harvested in September (Reidsma, pers com. 1998). No habitat on the withdrawn lands has been identified as sensitive for black bears by the Alaska Department of Fish and Game (Dale, pers. com. 1998). Population estimates are not available for black bears inhabiting the withdrawn lands.

Grizzly Bear - Grizzly bears are found throughout Fort Wainwright Yukon Training Area and Fort Greely. Harvest reports for Fort Wainwright state that zero to three bears are taken annually. Approximately five bears are harvested annually from the Fort Greely West Training Area. No habitat within Fort Wainwright Yukon Training Area is considered sensitive by the Alaska Department of Fish and Game (ADF&G) for grizzly bears (Reynolds, per. comm. 1998).

The 1980 Final Environmental Impact Statement for the withdrawal renewal of Fort Greely identified an "intensive spring use area" located in the southeast portion of the West Training Area within the bison calving and summer range. The Bureau of Land Management identified sensitive habitat within the Fort Greely West Training Area. The habitat lies between the Little Delta River (west) and Delta Creek (east) and the southern post boundary, north to Dinosaur Ridge (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a). The habitat information identified in these documents has been reviewed by ADF&G, and current sensitive grizzly bear habitat on Fort Greely has been identified (Figure 3.12.c).

Grizzly bears still use the intensive spring use area. The ridge habitat between the Little Delta River, Delta Creek, south to the post boundary, and north to Dinosaur Ridge, and riparian areas along the East Fork of the Little Delta River, Delta Creek, and a portion of Buchanan Creek are important feeding areas. Sensitive periods for bears in these areas are from 1 May - 31 May, and 1 September - 30 September. The southern portion of Fort Greely West Training Area has been identified as a cub rearing and breeding area with the sensitive period from 1 May - 20 June. The grizzly bear range identified in the 1980 Final EIS, and shown in Figure 3.12.c, is not listed as sensitive.

Moose - Moose are found throughout the withdrawal lands. The Final Environmental Impact Statement (U.S. Dept. of the Army Hdqtrs 1979) for the withdrawal of Fort Wainwright Yukon Training Area identified moose concentration areas. These include Moose Creek and the Chena floodplain in the northwest, Hunts and Horner Creeks in the north, the South Fork Chena River drainage and Beaver Creek in the northeast, Ninety-eight Mile Creek in the southeast, and the Little Salcha River drainage as it enters the southern boundary for Fort Wainwright Yukon Training Area (Figure 3.12.b).

The cooperative agreement (U.S. Army Alaska Hdqtrs 1979) for management of wildlife at Fort Greely identified the East Training Area as seasonal moose range. The Final Environmental Impact Statement (U.S. Dept. of the Army Hdqtrs 1980) also identified spring, summer, fall, and winter concentration areas. Consultation with Alaska Department of Fish and Game (ADF&G), in 1997 and 1999, further defined boundaries for concentration areas. These include additional fall, winter, and spring concentration areas. Habitat shown in Figure 3.12.d is considered sensitive. Minimum disturbance periods are 15 May - 10 June for calving, and 10 September - 20 October for fall rut.

Population estimates for the Fort Wainwright Yukon Training Area are unknown, but the Tanana Flats of Fort Wainwright is the largest known moose calving area in interior Alaska (Nakata Planning Group 1987). The 1995 fall population estimate for moose on Fort Greely was 700 to 1,100 animals. In the southern portion of the East Training Area, moose numbers appear to be slowly increasing (Dubois, pers. com. 1997). In 1997, 37 moose were taken within Fort Wainwright Yukon Training Area, and 38 moose were harvested on Fort Greely (Von Rueden and Bruce 1997). Game Management Unit 20 has the State's largest moose harvest.

Dall Sheep - Dall sheep are found on the Fort Greely West Training Area (Figure 3.12.e). The Molybdenum Ridge within the southern portion of the West Training Area was identified as a sheep concentration area. The Dall sheep

range was also shown to extend onto the West Training Area in the extreme southwest corner and again in the south, within the Delta Creek/Trident Glacier area (U.S. Dept. of the Army Hdqtrs 1980).

U.S. Army Alaska and the Alaska Department of Fish and Game conducted a study of Dall sheep movements on and near Fort Greely (Spiers and Heimer 1990). Researchers identified five subpopulations totaling 150 sheep on Fort Greely West Training Area in winter and 100 in summer. The Dall sheep are found in the southwestern portion of the West Training Area in the mountainous areas at elevations above 3,000 feet. These areas include MacArthur Mountain, Patton Mountain, and the Molybdenum Ridge. Three winter and three summer ranges were identified. Two of the winter ranges lie within the summer ranges. A separate winter range is the Molybdenum Ridge. The current sensitive habitat areas, identified by ADF&G in 1997, are shown in Figure 3.12.e.

The Dall sheep ranges on Fort Greely are the northern extension of distribution for the five subpopulations. Although migration routes were not observed, researchers inferred that one route is between the Molybdenum Ridge and Hayes Glacier and the southern portion of Whistler Creek, both located south of the post boundary (Spiers and Heimer 1990).

Fort Greely and Fort Richardson, Alaska, are the only military posts in the world with Dall sheep. Fort Greely is the only post open for hunting Dall sheep, according to Spiers and Heimer (1990). Although hunting is allowed, few sheep are taken on Fort Greely and the annual harvest is near zero.

Caribou - The Fortymile Caribou Herd historically ranged over 85,000 square miles including Fort Wainwright and Fort Greely. The herd was estimated at 568,000 animals in the 1920s, but in 1995 the population was approximately 22,000 (U.S. Dept. of the Interior 1995). Today few caribou are seen on Fort Wainwright Yukon Training Area, and those found on Fort Greely are part of the Delta Creek Herd.

The Delta Creek Caribou Herd is estimated at 4,600 animals that range over 3,000 square miles encompassing Fort Greely. Portions of the West Training Area have been designated as sensitive pre-calving, calving, and post-calving habitat. Consultation with Alaska Department of Fish and Game in 1997 identified recent habitat boundaries and these areas are restricted for military use during 15 May - 31 May when there are concentrations of caribou present. Sensitive winter habitat for the herd was identified by the ADF&G in 1999 (Figure 3.12.f).

Caribou hunting is allowed on Fort Wainwright Yukon Training Area, but no caribou have been harvested since 1995. Hunting is also allowed on Fort Greely, but few caribou are taken since most of the herd has moved west, off the post, by hunting season (Dale pers. com. 1997).

Bison - Twenty-three bison were transplanted in 1928, from the National Bison Range in Montana to the vicinity of Big Delta-Delta Junction Area. The Delta Bison Herd once ranged over an area from the hills north of the Tanana River south to the Alaska Range, east to Healy Lake and as far west as the Little Delta River (ADF&G 1993, U.S. Dept. of the Army Hdqtrs 1980).

The 1979 cooperative agreement designated areas on the Fort Greely West Training Area as important bison calving and summer range. The agreement also listed a portion of Fort Greely West Training Area and all of Fort Greely East Training Area as important late summer and early winter range. The 1986 cooperative agreement identified bison calving and summer range within the West Training Area, with minimal disturbance dates of 1 May - 31 August, if large numbers of animals are present. The agreement did not identify the East Training Area habitat. (Figure 3.12.g).

Consultation with the ADF&G for this LEIS identified current bison range that includes sensitive calving areas around Buffalo Dome and the Texas Range. The sensitive period for bison in these areas is mid-February to early September. The fall/winter migration route was also identified, which includes the entire East Training Area and a small area of the extreme West Training Area.

The herd normally uses the floodplain of the Delta River mainly on Fort Greely, starting mid-February to March with calving occurring from late April to early June. Bison summer range is along the floodplain and adjacent uplands between Black Rapids Glacier and the mouth of the Delta River. These areas are used until August or September. Bison also use an area on Fort Greely, west of the Delta River, that burned in 1990 (ADF&G 1993).

During the months of July, August, and September, bison migrate from the floodplain of the Delta River to the Delta Junction Bison Range east of the Delta River and then to the Delta Agricultural Project farms north of the East Training Area. The bison migrate through the Fort Greely East Training Area (Figure 3.12.g. The animals winter on the farmlands and the Delta Junction Bison Range. A map of these areas is in the Delta Bison Management Plan (ADF&G 1993) and also identified in Figure 3.12.g.

The Alaska Department of Fish and Game has a pre-calving herd size objective of 360 animals with 430-440 animals before the hunting season. Hunting is the main management practice to maintain the size and composition of the herd (ADF&G 1993).

Wolf - Information is not available on wolf populations on and near Fort Wainwright Yukon Training Area and Fort Greely. The Alaska Department of Fish and Game is monitoring wolves throughout GMU 20A which includes Fort Greely, to determine the number of wolf packs in the area and relationships between wolves and moose. Wolves are hunted on the withdrawal lands.

Wolverine - Wolverines are hunted on the withdrawal lands but no information is available on wolverine populations on Fort Wainwright Yukon Training Area and Fort Greely.

3.12.3 Sandhill Crane

The 1986 cooperative agreement identified an area along the Delta River on the Fort Greely West Training Area as important for migrating sandhill cranes (Figure 3.12.h). The area provides necessary roosting habitat. This habitat has a minimal disturbance period of 25 April - 15 May and 1 September - 30 September when cranes are present.

Consultation with Alaska Department of Fish and Game for this Legislative Environmental Impact Statement resulted in the identification of an additional sandhill crane roosting area that encompasses land within the Fort Greely West Training Area. This habitat lies in the northwestern portion of the Training Area. It is the Delta Creek wash that parallels Delta Creek (Figure 3.12.h). The Delta Creek Assault Landing Strip is located within this habitat. Restricted activity dates are 25 April - 15 May and 1 September - 30 September when cranes are present.

3.12.4 Migratory Birds

Breeding Bird Surveys have been conducted on Fort Wainwright Yukon Training Area since 1982. No Breeding Bird Surveys have been conducted on Fort Greely. Swan surveys have been conducted on Fort Greely since 1978. Migratory species have been identified on the withdrawal lands and a list of species can be found in Appendix 3.12.

Two major migration routes extend through the Northern Interior Region of Alaska. Fort Wainwright Yukon Training Area lies within one major migration route with two million waterfowl and 12,000 raptors migrating in the spring (April 10-May 20), and five million waterfowl and 23,000 raptors migrating in the fall

(August 1-October 10). The other route encompasses a portion of Fort Greely. Two million waterfowl and 25,000 raptors follow this route in the spring, and nine million waterfowl and 48,000 raptors follow it in the fall. Information was not given for other migratory species (USAF 1995).

3.13 FISHERIES

The Fort Wainwright Yukon Training Area and Fort Greely West Training Area are within the Alaska Department of Fish and Game, Sport Fish Division, Fairbanks Management Area for fisheries. The Fort Greely East Training Area is within the Delta Junction Management Area.

3.13.1 Fish Stocking

Most ponds or lakes on the withdrawal lands are too shallow to support year round fish populations due to complete freezing or lack of oxygen in winter. The Alaska Department of Fish and Game, Fairbanks Office, stocks lakes on the withdrawn lands through the Statewide Stocking Plan (ADF&G 1997). One lake on Fort Wainwright Yukon Training Area and sixteen lakes on Fort Greely West Training Area are stocked (Figures 3.13.a and 3.13.b). Table 3.13.a and Table 3.13.b list the location, species stocked, life-stage, year stocking will occur, and number of fish stocked.

Location	Species	Size	1998	1999	2000	2001	2002
Manchu Lake	Arctic Char	Fingerling	0	8,600	0	8,600	0
Manchu Lake	Rainbow Trout	Fingerling	0	8,600	0	8,600	0

Table 3.13.a Fish Stocking for Fort Wainwright Yukon Training Area (1998-2002).

 Table 3.13.b
 Fish Stocking for Fort Greely West Training Area (1998-2002).

Location	Species	Size	1998	1999	2000	2001	2002
Koole Lake	Rainbow	Fingerling	16,000	16,000	16,000	16,000	16,000
Bolio Lake	Rainbow	Catchable	1,500	2,500	2,500	2,500	2,500
Mark Lake	Rainbow	Fingerling	0	3,600	0	3,600	0
Mark Lake	Coho	Fingerling	3,600	0	3,600	0	3,600

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Location	Species	Size	1998	1999	2000	2001	2002
Weasel Lake	Rainbow	Fingerling	1,600	0	1,600	0	1,600
Bullwinkle Lake	Rainbow	Fingerling	0	800	0	800	0
Chet Lake	Rainbow	Fingerling	0	1,600	0	1,600	0
Chet Lake	Lake Trout	Fingerling	800	0	800	0	800
Ghost Lake	Rainbow	Fingerling	0	1,000	0	1,000	0
Ghost Lake	Lake Trout	Fingerling	1,000	0	1,000	0	1,000
South Twin Lake	Rainbow	Fingerling	4,000	4,000	4,000	4,000	4,000
Rockhound Lake	Rainbow	Fingerling	0	600	0	600	0
No Mercy Lake	Rainbow	Fingerling	0	600	0	600	0
Nickel Lake	Rainbow	Fingerling	0	1,000	0	1,000	0
Nickel Lake	Grayling	Fingerling	0	250	0	250	0
Nickel Lake	Lake Trout	Fingerling	500	0	500	0	500
North Twin Lake	Rainbow	Fingerling	2,000	2,000	2,000	2,000	2,000
North Twin Lake	Lake Trout	Fingerling	2,000	0	2,000	0	2,000
Doc Lake	Rainbow	Fingerling	0	500	0	500	0
Luke Lake	Grayling	Fingerling	0	400	0	400	0
J Lake	Grayling	Fingerling	0	750	0	750	0
J Lake	Coho	Fingerling	3,000	0	3,000	0	3,000
Sheefish Lake	Grayling	Fingerling	0	400	0	400	0

Table 3.13.b Fish Stocking for Fort Greely West Training Area (1998-2002).

Location	Species	Size	1998	1999	2000	2001	2002
Sheefish Lake	Arctic Char	Fingerling	0	800	0	800	0

Table 3.13.b Fish Stocking for Fort Greely West Training Area (1998-2002).

3.13.2 Wild Fisheries

On Fort Wainwright Yukon Training Area, the Chena and Salcha River drainages support Arctic grayling (*Thymallus arcticus*), chinook salmon (*Oncorhynchus tshawytscha*), chum salmon (*O. keta*), sheefish (*Stenodus leucichthys nelma*), humpback whitefish (*Coregonus pidschian*), round whitefish (*Prosopium cylindraceum*), Arctic lamprey (*Lampetra japonica*), least cisco (*Coregonus sardinella*), burbot (*Lota lota*), longnose sucker (*Catostomus catostomus*), northern pike (*Esox lucius*), sculpin (*Cottus cognatus*), and lake chub (*Couesius plumbeus*).

Stuart Creek, Globe Creek, and Beaver Creek support Arctic grayling and round whitefish. Ninety-eight Creek contains several species of fish including chinook and chum salmon. Other waterways on the post contain several species of fish mentioned above but do not contain anadromous species.

The South Fork of the Chena River, the Little Salcha River, and Ninety-eight Creek on the Fort Wainwright Yukon Training Area are listed as anadromous (migrate from sea to rivers to breed) waterways by the State of Alaska (Viavant, pers. com 1998).

Horseshoe Lake, located in the northwest corner of the Yukon Training Area, supports a native population of northern pike (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994b). Manchu Lake, located near the posts western boundary, is stocked by Alaska Department of Fish and Game.

Fort Greely West Training Area is bordered by Buchanan Creek on the southwest and the Little Delta River to the west and northwest. The East Fork of the Little Delta River and Delta Creek flow through the western portion of the West Training Area. Jarvis Creek flows through the East Training Area with Granite Creek boarding its eastern boundary. These waters are glacier fed and flow from the north slope of the Alaska Range, north to the Tanana River. They are generally silt laden and do not support large fish populations. A few clear streams on the post provide summer habitat for grayling. Naturally occurring populations of lake chub, northern pike, sculpin, and longnose sucker are found

in lakes on the post (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a).

No anadromous fish species are found in the waters on Fort Greely. The Little Delta River and Delta Creek are listed by the State of Alaska as anadromous streams but chum, chinook, and coho *(Oncorhynchus kisutch)* salmon are not reported in the installation area (Parker, pers. com. 1998).

A list of fish species recorded for the posts is provided in Appendix 3.12.

3.14 THREATENED OR ENDANGERED SPECIES (State and Federal) AND SPECIES OF CONCERN (State)

3.14.1 Vegetation

No Federal or State listed threatened or endangered plant species have been listed as occurring within the area of Fort Wainwright or Fort Greely and no species have been found on the withdrawal lands (ANHP website ADF&G 1998, Sousa, pers. com. 1998).

During the 1995 floristic survey of Fort Wainwright, several populations of three plants listed as imperiled in the State or rare by the Alaska Natural Heritage Program were located. Two plant species were found that are considered major range extensions of more than 90 miles. The Nature Conservancy has created a "Ranking System", assigning each taxon a global (G) and a state (S) ranking from one (critically imperiled) to five (demonstrably secure), based on several factors such as abundance, range, degree of threat, existing protection, and the number of occurrences. The rare plants with their appropriate global and state listing and those plants with major range extensions are listed in Table 3.14.a. The global and state ranking system definitions are found below the table. The land-type where the populations were found is also listed.

Table 3.14.a Plants Found in the Fort Wainwright Yukon Training Area During Floristic Survey (1995) that are Major Range Extensions or Rare and Being Tracked by Alaska Natural Heritage Program.

PLANT SPECIES	GLOBAL ¹ AND STATE ² RANKING	NOTES	LAND TYPE
Water plantain <i>(Alisma triviale)</i> is a semi- aquatic species that is imperiled in the state with approximately 6-20 occurrences or few remaining individuals or acres. This species is disjunct by over 100 miles from its main range. It may become more common as more aquatic sites within Alaska are surveyed.	G5S2	Rare - Major Range Extension	Lowland
Crawford's sedge <i>(Carex crawfordii)</i> is found at dry sites and roadsides. It is slowly being found in more areas in Alaska and may be more common than first thought. At present it can be considered state imperiled, rare, or uncommon.	G5S2S3	Rare - Tracked	Lowland
English sundew (Drosera anglica) was found in the northwest corner of Fort Wainwright Yukon Training Area near a lake. Due to this extreme distance from the nearest population, researchers believe populations will be located between the two disjunct populations and the species will probably be found more common than presently thought.	None	Major Range Extension	Lowland
Bog addersmouth orchid <i>(Hammarbya paludosa)</i> is a bog orchid that has a very discontinuous distribution and has never been reported as common. The populations found in the Fort Wainwright Yukon Training Area are located in the southwest corner of the post. Several additional populations have been located in interior and southern Alaska.	None	Major Range Extension	Lowland
Northern kittenstails <i>(Synthyris borealis)</i> is not uncommon but has a limited range. It is found in moist alpine sites in interior Alaska.	G3G4 S3S4	Rare - Tracked	Alpine

¹ Global Rankings:

G1: Critically imperiled globally (typically 5 or fewer occurrences, or very few remaining individuals or acres). G2: Imperiled globally (typically 6-20 occurrences, or few remaining individuals or acres).

G3: Either very rare and local throughout its range or found locally in a restricted range (typically 21-100 occurrences).

G4: Apparently secure globally.

G5: Demonstrably secure globally.

G#Q#: Taxonomically questionable.

G#T#: Global rank of species and global rank of the described variety or subspecies.

G#G#: Global rank of species uncertain; best described as a range between the two ranks.

² State Rankings

S1: Critically imperiled in state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state (typically 5 or fewer occurrences, or very few remaining individuals or acres)

S2: Imperiled in state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state (typically 6 to 20 occurrences, or few remaining individuals or acres)

S3: Rare or uncommon in the state (typically 21-100 occurrences).

S4: Apparently secure in state, with many occurrences.

S5: Demonstrably secure in state, with many occurrences.

SR#: Reported from the state, but not yet verified.

SP: Occurring in nearby state or province; not yet reported in state, but probably will be encountered with further inventory.

S#S# State rank of species uncertain; best described as a range between the two ranks.

MRE: Major Range Extension - Considered to be significant range extensions of more than 150 km (90mi) based on maps of Hulten (1968).

T: Tracked in the Alaska Natural Heritage Program's Biological Conservation Database.

3.14.2 Wildlife

Pursuant to Section 7 of the Endangered Species Act of 1973, U.S. Army Alaska completed informal consultation with the U.S. Fish and Wildlife Service (USFWS) concerning the withdrawal renewal of Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas. Based on the project description and the fact that no new Impact Areas are proposed, the U.S. Fish and Wildlife Service concluded that the land withdrawal renewal is not likely to adversely impact listed species (Sousa, pers. com. 1998). The informal consultation response letter from the U.S. Fish and Wildlife Service (USFWS) is in Appendix 3.14.

The USFWS now places species into four categories; endangered, threatened, proposed, and candidate. In the past, the USFWS had a category for species that could be imperiled but required further studies to determine if they warranted being proposed for listing. The list was termed "Category 2" and later "species of concern". The Service no longer keeps a list of these species but now has a cooperative agreement with The Nature Conservancy's Natural Heritage Program. The program evaluates all native species and assigns global, national, and state ranks to each species. The USFWS reviews the list and recommends additions, deletions, and changes in ranking according to recent research findings (Donaldson, pers. com. 1998).

The U.S. Fish and Wildlife Service has listed one federally endangered species, the American peregrine falcon *(Falco peregrinus anatum)*, and one federally delisted species, the Arctic peregrine falcon *(Falco peregrinus tundrius)* as occurring within the area of Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas. Although the American peregrine falcon is listed as endangered, it is no longer considered in danger of extinction by the USFWS. On August 25, 1998, the Secretary of the Interior proposed delisting the American peregrine falcon. The USFWS is presently working on the final ruling which could result in delisting in 1999 (Donaldson pers. com. 1998). The Arctic peregrine falcon was removed from the federal listing on October 5, 1994, but the species will be monitored for a minimum of five years from the time of delisting. At any time during the remaining period, the falcon could be emergency listed if surveys indicate a reversal in recovery (Sousa, pers. com. 1998).

The American peregrine falcon nests in interior Alaska in forested areas. Although no nests have been identified on the withdrawal lands, suitable nesting habitat may exist and falcons do migrate through the areas. The Arctic peregrine falcon nests in the tundra areas of northern and western Alaska and may also migrate through the withdrawal lands (Sousa, pers. com. 1998, ADF&G et al. 1994).

The Army will consult with the USFWS and follow all regulatory management recommendations listed in the *Peregrine Falcon Recovery Plan - Alaska Population* (USFWS 1982) if an American peregrine falcon nest is found on military land. The Integrated Natural Resources Management Plans for Fort Wainwright and Fort Greely will also contain management guidelines.

Confirmed sightings of American peregrine falcons at Fort Wainwright and Fort Greely have occurred. It is not known if these were migrating birds, singles or pairs. American peregrine falcons are known to nest along the Tanana River and Salcha River north of Fort Greely. Suitable nesting habitat may exist along the bluffs of the Little Delta River on the western boundary of Fort Greely West Training Area (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a).

Habitat requirements for falcons are divided into four categories: nesting, feeding, migration, and wintering. Nesting in interior Alaska mainly occurs on cliffs and rarely in trees (two records). In interior Alaska, falcons feed in open areas that include rivers and muskegs, and they have been seen aerial hunting high above the tree canopies. In tundra regions, they prefer the marshy, boggy, or wet tundra over dry tundra. Exact migration habitat requirements have not been documented, but migrating falcons need an abundant prey source and

roosting areas (trees, poles, buildings). Peregrine falcons do not winter in Alaska (USFWS 1982).

The U.S. Forest Service (USFS) lists the trumpeter swan *(Cygnus buccinator)* and American osprey *(Pandion haliaetus carolinensis)* as sensitive species. The U.S. Forest Service lists species as sensitive when concerned about viability. Species are listed when populations and/or habitats have been reduced, restricted, or are vulnerable to resource development, or the species require special management to maintain viable populations (ANHP website USFS 1998).

Trumpeter swans have not been found on the Fort Wainwright Yukon Training Area but are known to nest on the Tanana Flats and within Fort Greely West Training Area (Bruce, pers. com. 1998). Trumpeter swans require wetlands with dense vegetation for nesting. In Alaska they create nests of horsetail and sedges (Bellrose 1980), and feed on a variety of marsh and aquatic plants.

Osprey nests are found in snags and living trees near waters with abundant fish populations (Harrison 1979, Udvardy 1988). Osprey have been identified on each post.

Four passerines listed as "species of concern" by the State of Alaska have been confirmed on the withdrawal lands. They are the olive-sided flycatcher (*Contopus borealis*), gray-cheeked thrush (*Catharus minimus*), Townsends warbler (*Dendroica townsendii*), and blackpoll warbler (*Dendroica striata*). A species of concern listing was generated to bring attention to the needs of vulnerable species before they require more extreme and costly management actions. Alaska Department of Fish and Game created the new category in 1993. Attention should be given to protecting habitats (ANHP website ADF&G 1998).

These migratory birds nest mainly in the coniferous forests of Alaska. The olivesided flycatcher is also found in open woodlands, forest burns, boreal bogs, and muskegs. The grey-cheeked thrush nests in conifers and dense stands of alder or willow (Harrison 1979, Udvardy 1988).

The osprey, swan, sandhill crane, and four passerines are protected under the Migratory Bird Treaty Act (16 U.S.C. 703-721), (MBTA). The Act specifically addresses the "taking" of migratory birds. The definition of taking includes disturbance and habitat destruction.

SPECIES	USFWS	STATE	USFS	FORT WAINWRIGHT	FORT GREELY
American peregrine falcon	E	ASC		х	х
Arctic peregrine falcon	D	ASC			
olive-sided flycatcher		ASC		Х	Х
gray-cheeked thrush		ASC		Х	Х
Townsend's warbler		ASC		Х	
Blackpoll warbler		ASC		х	Х
Osprey			S	Х	Х
Trumpeter Swan			S	х	Х
E=Endangered ASC=Alaska Species of Concern X=Confirmed Sightings D=Delisted S=Sensitive					Sightings

Table 3.14.b Species Listed as Endangered, Threatened, Species of Concern or Sensitive.

D=Delisted

Partners in Flight is an organization with members from Federal and State

agencies, non-governmental conservation organizations, academia, and private industry. The organization was developed to promote wise land management practices for the preservation of landbirds. The program has evaluated species using several parameters and developed a list showing species likelihood of extinction in the near future. The birds are grouped into three categories by priority: highest, high, and moderate. The Boreal Partners in Flight Working Group has compiled a list of species for Alaska. Table 3.14.c lists the Alaska species and if they have been identified on the withdrawal lands. The Alaska list does not have birds grouped by priority, but several of the species are also on the national list and their rankings are listed below in Table 3.14.c.

There are no legal habitat management requirements for the species listed, but conserving habitat will help ensure their survival. For a list of species found on the withdrawal lands see Appendix 3.12.

Table 3.14.c Species Listed By Boreal Partners in Flight (--Rankings not available).

SPECIES	RANKING	FORT WAINWRIGHT	FORT GREELY
Arctic warbler	·	Х	Х
Black swift	High Priority		

SPECIES	RANKING	FORT WAINWRIGHT	FORT GREELY
Blackpoll warbler		Х	Х
Blue grouse			
Bohemian waxwing		Х	Х
Boreal owl		Х	Х
Chestnut-backed chickadee			
Golden-crowned kinglet		Х	Х
Gray-cheeked thrush		Х	Х
Gyrfalcon		Х	Х
Hammond's flycatcher			
MacGillivray's warbler			
McKay's bunting	High Priority		
Northern shrike		Х	Х
Northern goshawk		Х	х
Northwestern crow			
Olive-sided flycatcher	Moderate Priority	Х	
Pacific slope flycatcher			
Red-breasted sapsucker			
Rufous hummingbird	Moderate Priority	Х	Х
Rusty blackbird		Х	X
Siberian tit (Gray-headed chickadee)		х	Х
Smith's longspur	High Priority	Х	Х
Townsend's warbler		Х	
Varied thrush		Х	X
Vaux's swift			
Western screech owl			
Western wood-pewee	Moderate Priority	Х	Х
White-tailed ptarmigan		Х	X

Table 3.14.c Species Listed By Boreal Partners in Flight (--Rankings not available).

3.15 FIRE MANAGEMENT

The Military Lands Withdrawal Act states that the secretary of the military department managing the withdrawn lands shall take necessary precautions to prevent and suppress brush and range fires resulting from military activity, occurring within and outside the lands withdrawn, and may seek assistance from the Bureau of Land Management to suppress the fires. The law requires the Secretary of the Interior and the Secretary of the Army to enter into a Memorandum of Understanding for fire management on military lands. Under the Memorandum, the Bureau of Land Management of the Army may transfer funds to the Bureau as compensation. The duration of the Memorandum is the same as the land withdrawal period. A Memorandum of Understanding was signed by the Bureau of Land Management and U.S. Army Alaska (BLM and USARAK 1995).

Various documents establish management for fire protection and suppression on the withdrawal lands. U.S. Army Alaska and the Alaska Fire Service of the Bureau of Land Management have entered into two Interservice Support Agreements (Dept. of the Interior and USARAK 1995, USARAK and DOI 1995). The agreements establish that the Army shall provide the Alaska Fire Service with use of certain buildings, utilities, land, training services, air support, and other support services in exchange for fire protection services. Under the agreement the Alaska Fire Service is responsible for all fire detection and suppression on withdrawal lands.

The Alaska Fire Service has a Reciprocal Fire Protection Agreement (Dept. of the Interior and State of Alaska 1998a) with the State of Alaska, Department of Natural Resources, Division of Forestry. Under this agreement the agencies implement a coordinated fire suppression effort within the State of Alaska, identifying "Protection Areas" (pre-determined areas within the State) where each agency has agreed to provide wildland fire suppression on State and Department of the Interior lands, regardless of ownership. The agencies agree to provide fire protection services on Protection Responsibility Lands (lands designated for wildland fire protection due to Alaska Fire Service or Division of Forestry legal mandates).

This Reciprocal Fire Protection Agreement states that the Alaska Fire Service, through various agreements with the military, is responsible for wildland fire suppression on military lands administered by U.S. Army Alaska and the 11th Air Force. The lands include withdrawal properties on Fort Wainwright and Fort Greely.

The agreement defines general guidelines for the Alaska Fire Service and the Division of Forestry to negotiate an Annual Operating Agreement (Dept. of the Interior and State of Alaska 1998b), establishing standard operating procedures and providing detailed guidance for implementing the Reciprocal Agreement. The latest Operating Agreement was finalized June 15, 1998. Through the Reciprocal Fire Protection Agreement and the Annual Operating Agreement, the Division of Forestry has agreed to provide detection and initial attack suppression services upon request, and subject to available forces, for Fort Greely West and East Training Areas, which lie within the Division of Forestry Protection Area. "No Entry Areas" are excluded. The request to the Division of Forestry will be made by the Military Fire Chief or the Alaska Fire Service, Military Fire Management Officer.

In 1980 the Alaska Land Use Council, now called the Alaska Interagency Fire Management Council, authorized the creation of Alaska Interagency Fire Management Plans. The Council was formed by a provision in the Alaska National Interest Lands Conservation Act. Interagency Fire Management Plans were prepared for 13 geographic areas in the state. The plan for the Upper Yukon-Tanana Planning Area (BLM 1984) covers Fort Wainwright and Fort Greely. U.S. Army Alaska is a cooperative land manager under the plan.

The Alaska Wildland Fire Management Plan (BLM 1998) contains common elements from the approved 13 plans. The plan was written to coordinate fire related land use objectives, through cooperative planning, in the most cost effective manner. The plan designates wildland fire protection areas. Under the plan, land managers are allowed to establish fire management options according to their land use objectives and constraints. The plan is reviewed yearly and any revisions to fire management by land managers are made during the review. Changes in fire protection options can be made between 30 September and 31 March.

The Alaska Fire Management Plan establishes four fire protection options. Land managers may select among these options, based on evaluation of their individual legal mandates, policies, regulations, resource management objectives, and local conditions (BLM 1996). The fire protection status options are:

Critical Protection - Lands receive maximum detection coverage and are highest priorities for attack response. Immediate and aggressive initial attack is provided. Land owners/managers are notified of the situation as soon as possible. These areas receive priority over adjacent lands and resources in the event of escaped fires.

Full Protection - Areas receive maximum detection coverage and immediate and aggressive initial attack response. If initial attack is successful or the fire is otherwise controlled within the first burning period, special agency notification is not required. If the fire escapes and requires additional suppression, affected land owners/managers are notified to develop further fire suppression strategies.

Modified Protection - A level of protection is provided between Full and Limited. A high degree of protection is provided during critical burn periods, decreasing as risk to higher protection areas is diminished. These areas receive maximum detection coverage. Initial attack action is based on potential for damage, constraints on affected land, and/or discussions with the land owner/manager. If there is no initial attack, the land owner/manager is apprised of the situation daily and unmanned fires are monitored.

Limited Protection - Areas where the values at risk do not warrant the expense of suppression and are areas where natural fire is important to ecosystem sustainability. Fires within these areas receive routine detection effort. Attack response is based on the need to keep the fire within Limited protection areas and the need to protect Critical sites. Land owners/managers are immediately notified and unmanned fires are monitored.

Two fire protection status categories have been developed for Army lands in Alaska. **Unplanned** areas are lands which have not been given an official designation but receive protection equal to that given lands in Full Protection. The Alaska Fire Service has responsibility for initial response in these areas (Jandt, pers. com. 1998). The second category is **Restricted Areas or Hot Zones** and includes Impact Areas and other places where no "on the ground" fire fighting can be accomplished due to danger of unexploded ordnance (Figures 3.15.a and 3.15.b). High Hazard Impact Areas are managed as Hot Zones with Limited protection. One Small Arms Range that extends onto withdrawal lands on Fort Yukon Training Area is also listed as a Hot Zone. These areas can be suppressed through backburning and aerial-dropped retardants (BLM 1996).

U.S. Army Alaska has established fire protection boundaries for the Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas. (Figures 3.15.a and 3.15.b). In 1998, U.S. Army Alaska changed the fire protection status for the eastern portion of Fort Wainwright Yukon Training Area from Modified to Limited in response to the State of Alaska's change in fire management status for lands adjoining the Training Area.

3.15.1 Fire History

The Alaska Fire Service retains incident reports for fires on the withdrawn lands. Data from the reports were used to create maps and tables of fires occurring on Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas. The maps show most fires greater than 1,000 acres between 1954 and 1992 inclusive and fires greater than 100 acres between 1993 and 1996 inclusive (Figures 3.15.c and 3.15.d). Mapping information for 11 fires was not available. Fires less than 100 acres have occurred on the withdrawn lands, but data are only available from 1986-1997. Information on these fires, and those fires 100 acres or greater, will be presented separately for Fort Wainwright Yukon Training Area and Fort Greely.

In 1998, a lightning-caused fire began on Fort Greely West Training Area and spread to State land. The fire is shown in Figure 3.15.d but data were not added to tables 3.15.c and 3.15.d. The fire burned 23,476 acres within the West Training area.

The two major causes of fires on the withdrawal lands are incendiary devices and lightning. A total of 95 incendiary fires and 13 lightning fires have been recorded since 1954. Nineteen of the incendiary fires and six of the lightning fires were 100 acres or greater. Information on the cause of five fires that were greater than 100 acres was not available. Other causes of fire on the withdrawal lands are, field burning, exhaust, recreation, trash burning, and warming fires. Only 13 acres have burned as a result of these causes.

Fort Wainwright Yukon Training Area

Eleven fires, 100 acres or more, occurred on Fort Wainwright Yukon Training Area from 1959-1997. Nine fires, totaling 7,208.40 acres were caused by incendiary devices within the Stuart Creek Impact Area and Buffer Zone. Two fires occurred in the northern portion of the Training Area. The fire in 1959 (#50) totalled 5,872.03 acres and the cause is not known. This fire moved beyond the Fort Wainwright Yukon Training Area boundary onto State land. A lightning caused fire in 1987 (#B078) covered 10,960 acres and was contained within the Training Area.

Table 3.15.a Fires 100 Acres or Greater Occurring from 1959 - 1997 onFort Wainwright Yukon Training Area. (* Fires not shown on map)

FIRE NUMBER	YEAR	CAUSE	ACRES
B262*	1997	INCENDIARY	940.00
A454*	1992	INCENDIARY	200.00

Table 3.15.a Fires 100 Acres or Greater Occurring from 1959 - 1997 on Fort Wainwright Yukon Training Area. (* Fires not shown on map)

FIRE NUMBER	YEAR	CAUSE	ACRES
B508	1991	INCENDIARY	220.00
B323*	1991	INCENDIARY	100.00
B306	1991	INCENDIARY	1,000.00
A128	1990	INCENDIARY	880.00
A083*	1986	INCENDIARY	200.00
8505	1980	INCENDIARY	1,769.91
8505	1980	INCENDIARY	1,898.49
B078	1987	LIGHTNING	10,960.00
50	1959	UNKNOWN	5,872.03
TOTAL ACRES BURNED			24,040.43

Table 3.15.b Number of Fires by Cause on Fort Wainwright Yukon Training Area (1959-1997).

CAUSE OF FIRE	NUMBER OF FIRES BY CAUSE	TOTAL ACRES BURNED	PERCENT TOTAL ACRES BURNED
INCENDIARY	37	3,929.80	26%
LIGHTNING	5	11,002.50	74%
FIELD BURNING	0	0	INSIGNIFICANT
EXHAUST	0	0	INSIGNIFICANT
RECREATION	0	0	INSIGNIFICANT
TRASH BURN	1	7.0	INSIGNIFICANT
UNKNOWN	0	0	INSIGNIFICANT
WARMING FIRE	1 .	3.0	INSIGNIFICANT
INFORMATION NOT AVAILABLE	1	5,872.03	NOT ADDED IN
TOTAL	44	20,814.33	100%

Fort Greely West and East Training Areas

Nineteen fires, 100 acres or more, occurred on Fort Greely from 1954-1997. Two were in the East Training Area and occurred in 1954 (#111) and 1987

(#B023). The cause of the fire in 1954 was not available and the fire in 1987 was caused by incendiary devices. The remaining 17 fires were within the West Training Area. Five of the fires were caused by lightning, ten by incendiary devices, and causal information on four is not available.

FIRE NUMBER	YEAR	CAUSE	ACRES
A145	1996	INCENDIARY	14,200.00
A321	1996	INCENDIARY	66,560.00
A416	1996	INCENDIARY	2,000.00
A034	1992	INCENDIARY	1,410.00
A035	1992	INCENDIARY	960.00
A132	1990	INCENDIARY	22,762.22
B001*	1989	INCENDIARY	150.00
B002*	1987	INCENDIARY	100.00
B023	1987	INCENDIARY	43,500.00
612002	1986	INCENDIARY	174.00
B320*	1997	LIGHTNING	2,500.00
B265*	1993	LIGHTNING	300.00
B266*	1993	LIGHTNING	895.00
A009*	1990	LIGHTNING	100.00
A310	1990	LIGHTNING	21,760.00
8476	1981	UNKNOWN	20,418.74
8656	1971	UNKNOWN	15,209.41
45	1956	UNKNOWN	12,049.41
111	1954	UNKNOWN	16,185.78
TOTAL ACRES BURNED			241,234.56

Table 3.15.c Fires 100 Acres or Greater Occurring From 1954 - 1997 onFort Greely. (* Fires not shown on map)

Alaska Army Lands Withdrawal Renewal

CAUSE OF FIRE	NUMBER OF FIRES BY CAUSE	TOTAL ACRES BURNED	PERCENT TOTAL ACRES BURNED
INCENDIARY	58	154,099.80	86%
LIGHTNING	8	25,619.60	14%
FIELD BURNING	1	1.5	INSIGNIFICANT
EXHAUST	1	0.6	INSIGNIFICANT
RECREATION	1	0.1	INSIGNIFICANT
TRASH BURN	1	0.5	INSIGNIFICANT
UNKNOWN	1	0.1	INSIGNIFICANT
WARMING FIRE	1	0.1	INSIGNIFICANT
INFORMATION NOT AVAILABLE	4	63,863.34	NOT ADDED IN
TOTAL	72	243,585.64	100%

Table 3.15.d Total Number of Fires by Cause on Fort Greely (1954-1997).

3.15.2 Prescribed Burns

U.S. Army Alaska, in cooperation with the Alaska Fire Service, conducts prescribed burns on the withdrawal lands to improve wildlife habitat, decrease potential for ignitions and fire escape from live firing, and to increase military Training Areas. Five controlled burns are scheduled for the 1999 season, four in the Fort Wainwright Yukon Training Area and one in the Fort Greely West Training Area. For a complete description of the proposed burns, see the Alaska Fire Service Proposed Prescribed Burning Projects Report (1998) which can be obtained from the Alaska Fire Service, Fort Wainwright. Table 3.15.e lists the fires, acres, and proposed schedule.

Table 3.15.e Prescribed Burn Projects (1998).

Withdrawal Renewal Lands	Acres	Proposed Schedule
Fort Wainwright Grouse Project	5	Not Scheduled
Fort Wainwright Stuart Creek Basin	2,300	May-July 1999
Fort Wainwright Stuart Creek Perimeter	2,000	May-July 1999
Fort Wainwright Stuart Creek Camera Site 1	2,650	May-July 1999
Fort Greely Oklahoma Range	10,000	Not Scheduled

Alaska Army Lands Withdrawal Renewal

3.16 PUBLIC ACCESS

The Military Lands Withdrawal Act addresses the management of Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas for public use. The Act states that to the extent consistent with applicable law and Executive Orders, the lands may be managed to permit recreation. U.S. Army Alaska has maintained areas on the withdrawal lands for public use. Recreational activities include hunting, fishing, trapping, aerial tours, hiking, wildlife viewing, berry picking, and off-road recreational vehicle use (ORRV).

The law also states that the lands are to be used primarily for military purposes and that the Secretary of the military department concerned may close any road, trail, or portion of lands withdrawn by the Act for military operations, public safety, or national security. The closure is limited to the minimum areas and periods that the Secretary determines are necessary. Appropriate warning signs and notices must be posted before and during any closure and the public must be notified.

3.16.1 Applicable Regulations

Access on the withdrawal lands is a significant issue with the public. To meet public demands for access while insuring public safety and continued use of the lands for military purposes, the Army has written several regulation documents addressing public use and access. U.S. Army Alaska Regulation 350-2, Range Regulation, covers range regulations and public access. Department of Defense 4715.3, Environmental Conservation, directs environmental conservation on withdrawn lands including access to the public for educational and recreational uses. U.S. Army Regulation 200-3, Natural Resources-Land, Forest, and Wildlife Management and U.S. Army Regulation 190-13, Enforcement of Hunting, Trapping, and Fishing on Army Lands in Alaska, address access, hunting, trapping, and fishing on Army lands in Alaska.

Chapter 16 of U.S. Army Alaska Regulation 350-2 describes the use of withdrawal lands for recreational activities. It states that portions of the range/training complex may be used for recreational purposes and that every effort will be made to ensure multiple use of military lands; however, safety is the main consideration and military training has priority. Section 1-14.a states that "areas not authorized for recreation include Impact Areas, rappelling towers, small arms ranges, and areas published in the installation weekly bulletin as being a danger area, restricted area or off-limits area." Chapter 5 states that all Impact Areas be marked with warning signs, barriers and/or guards. Passing any of these hazard warnings without permission from the Office of Range Control
permission is forbidden. Entry into an Impact Area must be approved by Range Control.

U.S. Army Alaska Regulation 190-13 lists areas that are permanently closed to the public. Within the Fort Wainwright Yukon Training Area, these areas include Stuart Creek Impact Area (High Hazard), the Air Force Technical Applications Center (AFTAC), Charley Battery Site, Bravo Battery Site, and the Manchu Firing Range. Charley and Bravo Batteries, and the Manchu Firing Range are on lands permanently withdrawn but not under the Military Lands Withdrawal Act. The Fort Wainwright Hunting, Trapping, and Fishing Regulation Supplement (U.S. Dept. of the Army 1998) also lists the Military Assault Course (MAC) Range site on Brigadier Road as off-limits and the Arctic Survival Training Site as off-limits while training is being conducted (Figure 3.16.a).

The Air Force Technical Applications Center (AFTAC) is located east of Transmitter Road in the northwest section of Fort Wainwright Yukon Training Area. The area contains ground sensors and is used to detect seismic disturbances. Public access is restricted because ground disturbance can disrupt the instruments. The public is allowed to drive on the west boundary on Transmitter Road and through the site on Beaver Creek Road. No off-road access is allowed (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994b, O'Neal, pers. com. 1998).

High Hazard Impact Areas are closed to the public. Impact Areas on Fort Wainwright Yukon Training Area and Fort Greely West Training Area are listed in Table 3.16.b with their associated category listing. These areas are shown in Figure 3.16.a and Figure 3.16.b. Sections of the Lakes Impact Area (Kansas, Arizona, Nevada, Oregon, and Michigan) are closed during military training. Information on the closures can be obtained from Range Control or the military police upon entering the post.

Withdrawal Land	Closure Category
Fort Wainwright Yukon Training Area, Stuart Creek	High Hazard Permanently Closed
Fort Greely, Texas Range	Dedicated Permanently Closed
Fort Greely, Washington Impact Area and Range	Dedicated Permanently Closed
Fort Greely, Mississippi Impact Area	High Hazard Permanently Closed

Table J. To.a Impact Areas and Orosure Oalegon	Table 3.16.a	Impact Are	eas and Closure	Categories
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Withdrawal Land	Closure Category
Fort Greely, Lakes Impact Area	Dedicated Limited Closure
Fort Greely, Oklahoma Impact Area	Dedicated Permanently Closed
Fort Greely, Delta Creek Impact Area	Dedicated Permanently Closed

Table	3.16.a	Impact	Areas	and	Closure	Categories
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3.16.2 Other Closed Lands

A two mile wide Buffer Zone around the Impact Areas is closed during firing maneuvers. The Buffer Zones are used to contain the safety fan of weapons (maximum area required for the firing of weapons or detonation of munitions) used against targets within the Impact Areas. All or part of these Buffer Zones may be temporarily closed to the public during firing.

The Trans-Alaska Pipeline corridor through Fort Wainwright Yukon Training Area and Fort Greely West Training Area is closed to ORRV traffic.

On the Fort Greely West Training Area, all lands west of Meadows Road to the Mississippi Impact Area, south to the Texas Range, are closed; this includes land north of Meadows Road between the Richardson Highway to the boundary of the Mississippi Impact Area and the Allen Army Controlled Fire Area (Figure 3.16.b).

The withdrawn lands are divided into Training Areas. Training Areas are subject to temporary closures based on training schedules. Closures are listed in the Fort Wainwright and Fort Greely Weekly Bulletins. Information on closures can also be obtained from the military police.

3.16.3 Warning Signs

The military is required to post warning signs near all permanently closed and/or dangerous areas. On Fort Wainwright Yukon Training Area, signs are posted at the two roads going into the Stuart Creek Impact Area. The restricted access signs state that it is an Active Army and Air Force Bombing Range and that the area contains dud munitions (Figure 3.16.a). Signs have been placed every 200 meters around the perimeter of the Air Force Technical Applications Center (AFTAC). These signs state that it is an AFTAC facility and the area cannot be entered without permission from the Post Commander.

A total of 36 warning signs have been placed on Fort Greely with the majority being west of the Delta River. Several signs are located to the north of Fort

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Greely West Training Area. Eleven gates have been constructed along the eastern boundary of the Delta River and one is located in the north portion of Allen Army Controlled Fire Area. The lands between Meadows Road and the Impact Area boundary are off-limits and are posted accordingly. No signs have been posted along the southern boundary of the Oklahoma and Lakes Impact Areas. These areas are very remote and there is no road access (Figure 3.16.b).

3.16.4 Airspace Access

Federal Aviation Administration regulations require the military to generate Notices to Airmen when a hazard exists to the safe flow of air traffic. U.S. Army Alaska Regulation 350-2 addresses use of Restricted Areas over Fort Wainwright Yukon Training Area and Fort Greely West Training Area. Further information on the use of airspace on the posts by the U.S. Air Force can be found in Air Force Instruction 13-212 Volume 1, 11th Air Force Supplement 1 (USAF 1998), Environmental Assessment for Major Flying Exercises in Alaska (USAF 1993a), and the Environmental Impact Statement-Alaska Military Operations Areas (USAF 1995).

The Department of Defense identified the Stuart Creek and Oklahoma/Delta Creek Impact Areas as military aircraft training and operating locations. Both Impact Area locations are major bombing ranges, supporting tactical air-toground training missions, and have been designated as air Restricted Areas. Restricted Areas are closed to all civilian aviation during periods of scheduled activity. Complete Restricted Area descriptions can be found in U.S. Department of Transportation, Federal Aviation Administration Order 7400.8 (1997).

Restricted Area R2205 covers the eastern portion of Fort Wainwright Yukon Training Area including the Stuart Creek Impact Area. R2205's vertical limit is surface to 20,000 feet mean sea level (MSL). R2202 is subdivided into segments R2202A, R2202B, and R2202C. R2202A and R2202B cover the Fort Greely West Training Area. R2202B covers the Oklahoma/Delta Creek Impact Area, and R2202A covers the Mississippi and Washington Impact Areas to the east (Figures 2.d and 2.e). The vertical limit of both areas is surface to 10,000 feet above MSL. R2202C lies above both R2202A and R2202B with vertical limits from 10,000 feet MSL up to unlimited.

Military Operations Areas (MOAs) adjoin the restricted airspace boundaries over the Training Areas. The MOAs are established for military air activity in order to minimize interaction between high speed military and civilian air traffic. Some airspace restrictions are imposed when MOAs are in use (Figure 1.b). The Air Force provides a service to the civil aviation community to increase safety in the Military Operations Areas and Restricted Areas above Fort Wainwright and Fort Greely. The Special Use Airspace Information Service (SUAIS) is a 24-hour service to assist civilian pilots planning flights through or around Military Operations Areas and Restricted Areas in interior Alaska. The SUAIS provides information on which MOAs are active, Army artillery firing, and known helicopter operations (USAF 1995).

3.16.5 General Access

The public is required by the military to obtain permission before entering military lands. Persons must check in with the military police in person or by telephone before entering and leaving. When checking in, individuals can obtain the latest information on closures. This information is also listed in weekly bulletins and radio announcements.

3.16.6 Hunting, Trapping, and Fishing

U.S. Army Alaska Regulation 190-3 describes in detail the requirements and restrictions associated with hunting, trapping, and fishing on withdrawal lands. Regulations specific to these activities can also be found in the Fort Wainwright Hunting, Trapping, and Fishing Regulation Supplement (1998). In general, anyone planning to conduct these activities on military lands must obtain a Hunting, Trapping, and Fishing (HTF) permit for the post on which the activity will occur. To obtain a permit, individuals 16 years of age and older must attend a briefing at the post of intended activity. Information on permanent and temporarily closed areas is distributed at the briefing. Permits must be renewed annually.

3.16.7 Off-Road Recreational Vehicle Use (ORRV)

Off-road recreational vehicle (ORRV) use is allowed on maintained roadways in designated areas on the withdrawal lands. U.S. Army Alaska Regulation 190-3 describes the restrictions for each post. General guidelines state that during ice break-up, all areas are closed to ORRV use because of spring thaw. Dates are determined through offices of U.S. Army Alaska. Additional closures and openings can occur each day and are listed in the posts Weekly Bulletins. Daily closure information is also available at the Military Police Office (See Figures 3.16.a and 3.16.b for locations of areas listed below).

On Fort Wainwright Yukon Training Area, ORRVs may be operated year-round but are prohibited from the following areas: Stuart Creek Impact Area, Air Force Technical Applications Center (AFTAC), except Beaver Creek Road, Bravo Battery on Quarry Road, Charlie Battery on Johnson Road, and the Firebird Assault Strip. On Fort Greely West and East Training Areas, public ORRV use is authorized at Twelve-Mile Crossing, Thirty-three Mile Loop, and Donnelly Flats.

Off-road recreational vehicle use is prohibited from Range and Training Areas unless permission is obtained from the military police. Persons are required to contact the military police after departing the area.

3.16.8 Privately Owned Vehicles

Privately owned vehicle access to recreational areas by the most direct route is authorized, but no deviation into Training Areas or onto Ranges is permitted.

3.16.9 Unauthorized Structures

Nonmilitary use of the withdrawal lands requires authorization from the Secretary of the Interior and Secretary of the Army. Structures constructed on the withdrawal lands require prior authorization. Unauthorized structures exist on Fort Wainwright and Fort Greely, ranging from tent platforms to cabins. Fort Wainwright Yukon Training Area has seven known unauthorized structures; Fort Greely has nine. U.S. Army Alaska is working with the Department of the Interior, Bureau of Land Management, to identify the owners of the trespass structures to have them removed from military lands.

3.17 RECREATION

Primary recreation activities on the withdrawal lands include hunting, trapping, fishing, and off-road recreational vehicle (ORRV) use. Hunting, trapping, and fishing are administered by U.S. Army Alaska Department of Public Works, Natural Resources Branch and the Alaska Department of Fish and Game, and are regulated through the State's hunting and fishing regulations, and U.S. Army Alaska Regulations 190-13, Enforcement of Hunting, Trapping, and Fishing on Army Lands in Alaska and U.S. Army 200-3, Natural Resources-Land, Forest, and Wildlife Management. Areas on the posts are closed when necessary to ensure proper game management as instructed by the Public Works wildlife managers, and Alaska Department of Fish and Game biologists.

Hunting and trapping seasons and licensing requirements are published by the Alaska Department of Fish and Game. The Military Police Office is the point of contact for daily information on available hunting and fishing areas on post, and for sportsman check-in and check-out (U.S. Army Regulation 190-13 1994).

3.17.1 Hunting

Hunting permits for the posts are annually issued by the military police. The number of hunting permits for Fort Wainwright has decreased from 2,963 in 1989 to 2,470 in 1997. Approximately 350 permits are issued at Fort Greely annually (U.S. Army 1998).

Hunting on the withdrawal lands is very popular among local residents. Moose is the most visible and economically important game species on the posts. The withdrawal lands are in Game Management Unit 20, which has the State's largest moose harvest. Table 3.17.a shows the game harvest for Fort Wainwright Yukon Training Area from 1991-1995. Harvest records for Fort Greely are not available.

Species	1991	1992	1993	1994	1995	1996	1997
Moose	72	35	77	42	60	47	37
Black bear	2	2	4	4	6	12	9
Grizzly bear	1	1	1	0	2	1	0
Grouse	1,270	511	889	1,828	3,360	2233	2239
Ptarmigan	156	214	100	169	261	256	301
Hare	874	420	121	37	137	379	448
Squirrel	258	166	443	533	187	560	251
Duck	176	98	79	79	112	150	76
Fox	N/A	N/A	2	0	2	2	1
Goose	0	° 0	0	3	0	2	0

Table 3.17.a	Game Harves	ts for Forl	Wainwright	Yukon	Training	Area.
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3.17.2 Trapping

Trapping occurs on Fort Wainwright and Fort Greely. Fort Wainwright issues 16-22 permits annually. Fort Greely averages 10 permits annually. Martens are the most common furbearer caught.

Trapper harvest data for Fort Wainwright Yukon Training Area is listed in Table 3.17.b. Data were not available for harvests on Fort Greely.

SPECIES	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97
Lynx	17	18	16	9	3	12
Fox	47	18	22	21	40	50
Wolf	1	0	2	3	4	13
Coyote	3	3	0	8	7	1
Marten	130	46	123	98	78	141
Mink	NT	NT	0	8	22	34
Weasel	NT	NT	3	0	15	56
Wolverine	1	0	3	2	2	0
Muskrat	NT	1	0	NT	0	3
Otter	NT	NT	0	0	NT	0
Beaver	NT	0	0	0	3	4
Hare	NT	NT	0	NT	NT	0

Table 3.17.b Trapper Harvests on Fort Wainwright Yukon Training Area (Starting with 1991-92 and ending with 1996-97) (NT = No Trapping).

3.17.3 Fishing

At the present time, there is no angler use data available for Fort Wainwright. Within Fort Wainwright Yukon Training Area, Manchu Lake is stocked by the Alaska Department of Fish and Game and is accessible via Manchu Road. Horseshoe Lake has a natural population of northern pike and is accessed over an unimproved road. The Chena River and Beaver Creek in the northeast portion of Fort Wainwright Yukon Training Area offer catch and release Arctic grayling fishing (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994b).

Fort Greely receives 25% of the angler use for the Alaska Department of Fish and Game, Delta Junction Fisheries Management Area. The data also show that angler use is increasing in the area. Fifteen stocked lakes are located on the east side of the Delta River within the Fort Greely West Training Area and are accessible by Meadows Road and trails. Koole Lake, located in the northwest corner of the West Training Area, is accessible by air. Fort Greely is considered the best place in the Delta Management Area to catch Arctic char. Table 3.17.b shows angler use for the stocked lakes in the Meadows Road area of Fort Greely West Training Area.

Year	Number of Anglers	Number of Trips	Number of Days
1991	562	2,261	2,975
1992	734	1,856	2,058
1993	1,096	3,856	6,523
1994	867	4,558	5,270

Table 3.17.c Angler Use for Stocked Lakes on the Fort Greely West Training Area.

3.17.4 Camping and Picnicking

No camping or picnic areas are located within Fort Wainwright Yukon Training Area, but camping is allowed at two sites on the Main Post. Two cabins are located on North Twin Lake in the Fort Greely West Training Area to serve the trail system used for hiking and skiing. Another cabin was built on South Twin Lake for use by the Boy Scouts and the general public. There are several firepits between North and South Twin Lakes and a few picnic tables at Bolio Lake (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a).

3.17.5 Hiking and Off-Road Recreational Vehicle (ORRV) Use

Access and use restrictions for off-road recreational vehicles (ORRVs) is discussed in Chapter 3.16.7. The Fort Wainwright Yukon Training Area contains approximately 90 miles of roads and trails used by the public for (ORRVs). The trails are not designated for hiking or biking although they do receive some use.

Fort Greely contains many roads and trails east of the Delta River within the West Training Area and throughout the East Training Area. The most common hike at Fort Greely is to the top of Donnelly Dome, east of the Washington Range near the east boundary of the West Training Area along the Richardson Highway.

Snowmachiners use trails in the Fort Wainwright Yukon Training Area and Fort Greely. A popular trail is located in the northwest area of the Fort Greely West Training Area. Snowmachiners travel the Winter Trail from Blair Lakes in the southern portion of the Tanana Flats on Fort Wainwright to the northwest boundary of Fort Greely West Training Area, to Koole Lake. Some continue on the trail across the northern boundary of the West Training Area (Heidorn, pers. com. 1997).

3.17.6 Aerial Tours and Guide Service

Information is not available on the use of Fort Wainwright Yukon Training Area by aerial tour and guide services. The Fort Greely Provost Marshal Office estimated that guide services provide flights into the Fort Greely West Training Area for approximately 500 people annually to hunt the roadless areas.

Public flight service personnel, guides, and outfitters must register as a business with the Director of Personnel and Community Activities and the Fish and Wildlife Office at Fort Greely and may need to be permitted by the Bureau of Land Management under Special Recreation Use Permit guidelines before they are authorized to fly within military boundaries (USARAK 1994 and Gates, pers. com. 1999).

3.17.7 Visual Resources and Ecotourism

In 1994, U.S. Army Alaska entered into a cooperative agreement with several State and Federal agencies regarding watchable wildlife and ecotourism in Alaska (ADF&G et al. 1992a). The purpose of the agreement was to encourage partnerships, cooperation, and coordination of sustainable watchable wildlife and ecotourism opportunities on Federal, State, and private lands. As part of this program, the military has developed several project proposals for the posts. A proposal to develop viewing platforms along the Chena River where salmon and resident freshwater fish are found has been proposed for Fort Wainwright. Although this does not include Fort Wainwright Yukon Training Area, increased visitor use of certain areas of the post may also increase use within Fort Wainwright Yukon Training Area. On Fort Greely there are plans to improve bison food plots in areas that are visually accessible to the public from the Richardson Highway. The food plots will increase bison use of the area and the probability of viewing the animals.

Fort Wainwright Yukon Training Area

The landscape within the Fort Wainwright Yukon Training Area is not ideal for visual resource opportunities. Large areas of the landscape are dense forests. From the air, the forested landscape is broken by clearings, military Maneuver Areas and Drop Zones, roads and trails, and firebreaks. The roads and trails do offer the public access to the backcountry where many wildlife species can be observed (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994b).

Fort Greely West and East Training Areas

The Fort Greely East Training Area and the northern part of the West Training Area contain dense stands of spruce and some deciduous trees, shrubs, and muskegs. These areas do not offer visual vantage points.

To the south of Fort Greely is the Alaska Range. This is the dominant visual feature of the southern portion of the West Training Area. Visual vantage points along the Richardson Highway and areas with roads within the West Training Area, east of the Delta River, offer views of the Alaska Range and Mt. Hayes. Areas east of the Delta River offer views of natural lakes, wetlands, and kettle lakes in contrast to the dense forest vegetation.

The southern portion of the West Training Area has rolling plateau lands with lakes, bogs, and tundra areas, level riparian areas, and widely braided abandoned channels contrasting to steep canyons and rock outcroppings. Donnelly Dome is another prominent feature on the Fort Greely West Training Area and can be viewed from the Richardson Highway.

The Delta River Valley running through Fort Greely contains summer range for the Delta Bison Herd. This area offers the only road accessible viewpoint in the State to see free roaming bison. The State maintains a viewpoint just south of Donnelly Dome on the Richardson Highway.

The Trans-Alaska Pipeline runs through Fort Greely and is above ground at an area beginning west of Donnelly Dome, running south until it leaves the installation. The pipeline can be seen from the viewing point south of Donnelly Dome along the Richardson Highway (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994b).

3.17.8 Other Recreational Activities

Berry picking, wildlife viewing, hang gliding, cross country skiing, and dog sledding are other recreational activities occurring on the withdrawn lands. Beaver Creek, located in the northeast area of Fort Wainwright Yukon Training Area is used for dog sledding. The winter trail in the northwest area of the Fort Greely West Training Area is also used for dog sledding. Some mushers continue to Koole Lake for winter camping. The Alaska Division of Parks and Recreation and several private groups would like to develop a maintained trail through the Beaver Creek area (Plager, pers. com. 1997).

Chapter 16 of U.S. Army Regulation 350-2, Range Regulation, states that recreational swimming in any stream, pond, or lake is prohibited year-round on withdrawal lands.

Range Control provides Ranges for the off-duty firing of privately owned weapons for military and retired military personnel. The Ranges are also used by civilian groups, such as the state police. Information on requirements may be obtained from Range Control.

3.18 CULTURAL RESOURCES

Fort Wainwright and Fort Greely contain historic (after white man and at least 50 years old) and prehistoric (before white man) resources of significance in the cultural record of interior Alaska. Since it was ice free during the Late Wisconsin glacial period, interior Alaska contains the oldest verifiable prehistoric cultural remains in the State. Lands proposed for withdrawal renewal by U.S. Army Alaska have been used by humans for at least 12,000 years.

The Chena and Little Delta River drainages were used intermittently for subsistence by Athapaskan natives well into the 1900s. In 1847, the Hudson Bay Company established a trading post on the banks of the Yukon River near the mouth of the Porcupine River and called it Fort Yukon. Fort Egbert was established at Eagle, Alaska, and occupied by the military from 1899 through 1911. Fort Gibbon was established at Tanana, Alaska and occupied by the military from 1899 through 1923. Current military occupation of interior Alaska officially began on March 31, 1937, when President Roosevelt signed Executive Order 7596, withdrawing 960 acres near Fairbanks for establishment of what is now Ladd Field on Fort Wainwright.

U.S. Army Alaska, in cooperation with the State Historic Preservation Office, Alaska Department of Natural Resources, is preparing an Integrated Cultural Resources Management Plan (ICRMP) for Fort Wainwright and Fort Greely (Alaska State Historic Preservation Office 1998a,b), which includes lands proposed for withdrawal renewal. Appendix 3.18.A contains a summary of regional prehistory and history excerpted from the draft ICRMP.

The Alaska State Historic Preservation Office has been contacted regarding potential impacts of the Proposed Action on cultural resources and possible compliance requirements per Section 106 of the National Historic Preservation Act. The Preferred Alternative would continue the existing management practices on the withdrawal lands, therefore the State concluded that this action is not an undertaking for Section 106 purposes. A response letter is located in Appendix 3.18.B.

Archeological sites on lands proposed for withdrawal have produced no human remains, funerary items, or other objects of cultural patrimony requiring consultation with Native Alaskans, per the Native American Graves and Repatriation Act of 1990 (NAGPRA). In addition, U.S. Army Alaska does not curate any artifacts subject to consultation per NAGPRA (Alaska State Historic Preservation Office 1998a,b). Coordination with Native Alaskans has identified

no sacred sites or other resources of religious significance on lands proposed for withdrawal that would require consultation per the American Indian Religious Freedoms Act of 1978 or Executive Order 13007, Indian Sacred Sites.

Fort Wainwright Yukon Training Area

Only a small portion (less than 5%) of the Fort Wainwright Yukon Training Area has been inventoried for archeological resources. Three archeological investigations on the Yukon Training Area have documented nine archeological sites (Table 3.18.a). All but one of the sites were identified by Holmes (1979) as part of a survey of areas west of Johnson Road and Skyline Road. All sites are prehistoric lithic scatters that have produced no diagnostic artifacts. Five sites have been determined ineligible for listing in the National Register of Historic Places. The remaining four sites require further investigation to determine eligibility.

Table 3.18.a	Archeological	Sites on Withd	Irawn Lands at F	Fort Wainwright
Yukon Training	g Area. (Reyno	olds 1986, Alas	ka State Historio	Preservation
Office 1998b).				

Sites	Eligible	Eligible Listed	Potentially Eligible	Ineligible
Prehistoric	0	0	4	5
Historic	0	0	0	0

Fort Wainwright Yukon Training Area is an area of ridges (2,000 - 3,000 feet above mean sea level) rising above alluvium-filled valleys. Prehistoric sites are concentrated primarily along ridges and hilltops, although the value of site distribution data is limited by the scarcity of archeological findings. In 1986 the Historic Preservation Plan for Fort Wainwright identified the Yukon Training Area as having moderate to low potential to contain archeological sites (Bacon et al. 1986).

Although the Yukon Training Area was likely used for subsistence by native villages well into the 1900s and was prospected by Euroamericans around the turn of the century, no historic archeological sites have been identified (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994b). The Yukon Training Area contains no historic architectural properties.

Fort Greely West and East Training Areas

Approximately 5% of lands proposed for withdrawal renewal on Fort Greely have been inventoried for archeological resources. Ten archeological investigations

on these lands have identified 81 archeological sites (Table 3.18.b). Seventyeight are prehistoric, and three are historic. Fourteen sites have been listed or determined to be eligible for listing in the National Register of Historic Places. Thirty-one sites have been determined ineligible for the National Register. The remaining 36 sites require further investigation to determine eligibility.

Sites	Eligible	Eligible Listed	Potentially Eligible	Ineligible
Prehistoric	2	11	34	31
Historic	1	0	2	0

Table 3.18.b Archeological Sites on Withdrawn Lands at Fort Greely. (Reynolds 1986, Alaska State Historic Preservation Office 1998b).

Archeological sites are primarily concentrated in three physiographic settings: high points, bluffs or terraces overlooking drainages, and lake margins. Only a small portion of the withdrawal lands at Fort Greely have high potential to contain archeological sites. These areas of high archeological sensitivity include portions of Big Delta Training Area, Lakes Impact Area, East Fork Training Area, Molybdenum Training Area, and Granite Training Area. Other withdrawal lands at Fort Greely have low to moderate sensitivity (Bacon et al. 1986).

Prehistoric archeological resources on the withdrawal areas have provided valuable data on the life ways of prehistoric Alaskans. Eleven of the National Register-eligible sites occur within the Donnelly Ridge Archeological District. Artifacts of the district, used to delineate the Denali Complex, are among the most influential archeological findings of the Paleoarctic Tradition (11,000 - 8,000 years before present (BP)). Some undated materials from Donnelly Ridge resemble artifacts dating to 12,000 BP. However, the oldest radiocarbon date on Fort Greely, from the Delta River Overlook Site, is $8,555 \pm 380$ BP (Reynolds 1986). The withdrawal areas contain 20 sites affiliated with the Paleoarctic Tradition (6,500 - 1,000 BP).

Historic sites are fewer. The most significant historic site, the National Registereligible Ptarmigan Creek Cabin, probably dates to a molybdenum mining operation begun in 1914 (U.S. Dept. of the Interior and U.S. Dept. Of Defense 1994a). The two remaining historic sites, Gordon's Roadhouse and Sullivan Roadhouse, are associated with the Washburn-Donnelly winter sled trail, an alternate route on the Valdez-Fairbanks trail used in the early 1900s. Gordon's Roadhouse Site is in ruins but remains potentially eligible for the National Register. The Sullivan Roadhouse Site, a National Register property, is the former location of the Sullivan Roadhouse. The Roadhouse was moved to Delta Junction in 1996.

There are no historic architectural properties on the withdrawal renewal property on Fort Greely. However, two National Register-eligible Cold War properties occur on the withdrawal property but were owned and managed by Alaska Communications, Inc. (an RCA subsidiary). These are microwave relay stations associated with the historic White Alice Communication System.

3.19 SOCIOECONOMICS

The Bureau of Land Management Withdrawal Regulation (43 CFR Parts 2300-2310) requires consideration of national as well as local socioeconomic costs and benefits for withdrawals of public land. Nationally, defense preparedness and local jobs are important social resources and are net benefits from the Alaska Army lands withdrawal renewal.

A socioeconomic history of interior Alaska is provided in Appendix 3.19.A.

3.19.1 The Fairbanks North Star Borough

Fort Wainwright is located within the census district of the Fairbanks North Star Borough (Figure 3.19.a). The Fairbanks North Star Borough was incorporated in 1964. Large by U.S. standards at 7,362 square miles, it includes the incorporated cities of Fairbanks and North Pole.

The Fairbanks North Star Borough is a second class borough with an elected assembly of 11 and an elected mayor. The fiscal year budget in 1997 was \$71 million. There is a property tax, but no sales tax. Because Federal lands are exempt from local property taxes, an annual payment in lieu of taxes is provided to the Borough by the Federal government. In 1997, \$300,000 was transferred to the Borough. The Borough and the military cooperate on a wide range of services from schools to solid waste disposal.



Figure 3.19.a Alaska Census Districts.

Military demographics affect local census data by influencing the age structure of the local populations (Table 3.19.a). A population and ethnic group profile of Fairbanks North Star Borough is shown in Table 3.19.b.

Table 3.19.a Age Profile of the Fort Greely and Fort Wainwright Vicinities (Fried and Windish-Cole 1995, Fairbanks North Star Borough CRC 1996 and 1998).

	Alaska	Fairbanks North Star Borough	Delta Junction and Vicinity	Fort Greely and Vicinity
Median Age	29.4 yrs.	27.6 yrs.	32.4 yrs.	23.2 yrs.
Under 5	10%	12.4%	8.3%	15.9%
21 & over	64.5%	63%	61%	56.2%
65 & over	4.1%	3.2%	4.1%	None

Male	41,506
Female	36,214
Total Population	77,720
African American	5,553
Aleut	120
American Indian	3,663
Asian/Pacific Islands	1,998
Caucasian	63,751
Eskimo	1,547
Other Ethnic	1,088

Table 3.19.b 1990 Population and Ethnic Groups of Fairbanks North StarBorough.

The economy of the Borough is largely dependent upon government, with nearly half of the direct local employment provided by City, State, and Federal agencies. Alaska State Department of Labor statistics for January 1998 show non-uniformed employment at 30,400 for the Borough. Adding the 7,517 military personnel at Fort Wainwright and Eielson Air Force Base results in total Borough employment of 37,917. Military personnel and other governmental employees account for 47% of total Borough employment (Appendix 3.19.B). Sources vary somewhat regarding employment figures for the Borough, as it depends on the month and the concept of employment used.

The 1998 employment figures for Fort Wainwright and Eielson Air Force Base show the military as the single largest employer in the Borough accounting for almost 25% of the direct employment. The 7,517 uniformed military positions and 1,984 civilian positions on the post and base combine for 9,501 total positions. Additionally, there are 2,200 Army retirees in the Fairbanks North Star Borough along with a substantial number of Air Force retirees.

Figure 3.19.b shows percentage of total employment in the Fairbanks/Delta area from Fort Wainwright, Eielson Air Force Base, and Fort Greely. Jobs may shift between the Army installations as a result of the realignment, but will not generate much of a change in the aggregate. Total percent of military employment has decreased in the period from 1987 to 1994.



Figure 3.19.b Military Employment as a Percentage of Fairbanks/Delta Employment from 1987-1994.

The second largest governmental employer in the Borough is the University of Alaska at Fairbanks with 2,855 employees and a total fiscal year 1997 authorized budget of \$223.7 million. The Fairbanks North Star Borough School District, the third largest, has 1,651 employees, a fiscal year 1997 budget of \$115 million, and a payroll of \$60.3 million. The Fairbanks North Star Borough government, the fourth largest governmental employer, had a fiscal year 1997 budget of \$71 million and employment of 319.

The Fairbanks Memorial Hospital was the largest private employer in the Borough during 1996 with 1,012 employees. The hospital is a service dependent upon the economic base of Fairbanks. Tanana Chiefs (525 employees), a nonprofit social service organization, including a regional health authority, is the second largest private employer. The third largest private employer is the HC Price Company (523 employees), which services the oil industry. ARA Mark (413 employees) is a service concessionaire to government and university facilities and is the fourth largest private employer in the Borough.

Reviewing employment by industry classification demonstrates further the dominance of government in general and the military in particular. Services, wholesale and retail trade, communications, finance, insurance and real estate are all driven by the economic base. That is, they are multiplier effects. Using

a generally accepted employment multiplier of 1.8 on military base employment, about 45% of total Fairbanks North Star Borough employment is contingent upon Fort Wainwright and Eielson Air Force Base (Table 3.19.c).

PRIVATE EMPLOYERS	20,313
Mining	571
Construction	1,740
Manufacturing	545
Transportation, Communications, Utilities	2,304
Wholesale Trade	793
Retail Trade	5,958
Finance, Insurance, Real Estate	852
Services	7,457
Agriculture, Fisheries, Forestry	83
Nonclassified Establishments	11
GOVERNMENT	10,091
Federal	3,014
State	4,290
Local	2,788

Table 3.19.c Fairbanks North Star Borough Employment by Industry.

The total payroll for both uniformed military and civilian post positions is about \$311 million or almost 26% of the total Borough payroll. For 1996, total base uniform personnel payroll was \$300.6 million. Fairbanks North Star Borough payroll total, according to the labor department, was \$893 million. Together they total approximately \$1.1 billion. Total installation expenditures for Fort Wainwright and Eielson Air Force Base were \$508 million in 1996.

Total military payroll in the Borough has increased while the percentage of total military employment has slightly decreased. This is due to the shift from lower paid uniformed positions to higher paid civil service positions. Figure 3.19.c shows the percentage of total employment and total payroll in the Fairbanks North Star Borough directly attributed to the military.



Figure 3.19.c Percentage of Total Employment and Total Payroll Directly Attributed to the Military in the Fairbanks North Star Borough.

In 1996, average monthly earnings for nonmilitary government employees were \$3,039. Monthly earnings in private employment were \$2,202. Uniformed military employees received average monthly pay of \$2,527. This was not a great deal more than the average, but military personnel do not pay Federal income tax on their 25% cost of living differential for Alaska. This leaves about 4% more income in the local economy per dollar of income earned at a 15% Federal tax bracket, and up to 8% more for officers in the 30% Federal tax bracket.

The seasonality of employment in the Fairbanks economy is seen in Figure 3.19.d. Whereas Figure 3.19.c shows annual employment averages, Figure 3.19.d shows the monthly fluctuations. It demonstrates that the Fairbanks economy has been steadily improving in recent history.





Fort Wainwright and Eielson Air Force Base are within the Fairbanks North Star Borough School District. The School District had 16,426 students enrolled in 32 schools for the 1997-1998 school year. Fort Wainwright and Eielson AFB each have three schools. All schools are administered by the District. Table 3.19.d provides a comparison of student populations.

Table 3.19.d Fairbanks North Star Borough School District Comparison(FNSB School District 1997). P = Preschool K = Kindergarten

			Percentage			
	Grades	Students	White	Black	AK Native	Other
Eielson AFB Schools						
Anderson	P-2	482	84	8.9	0.8	6
Crawford	3-6	566	80	12.2	0.4	7
Ben Eielson	7-12	600	81	12	0	7
Total	P-12	1,648	82	11	0.5	7

3-100

Alaska Army Lands Withdrawal Renewal

			Percentage			
	Grades	Students	White	Black	AK Native	Other
Fort Wainwright Schools						
Arctic Light	P-6	583	52	32	1	15
Chinook Charter	K-8	91	78	3	9	10
Tanana Satellite	7-8	123	59	23	8	10
Total	P-8	797	65	19	6	10
District Total	K-12	16,426	73.5	8.6	9.8	8.1

Table 3.19.d Fairbanks North Star Boroug	h School District Comparison
(FNSB School District 1997). P = Preschool	K = Kindergarten

3.19.2 Fort Greely Vicinity

Fort Greely is contained within the Southeast Fairbanks census district (Figure 3.19.e) and is part of the Greely-Delta economic region. There is no well-defined political or geographic boundary for this region because most of it is unincorporated. The Alaska Department of Labor conducted a study of the Delta Area in August of 1995. For the study, the Delta Area consisted of Delta Junction, Big Delta, Fort Greely, the Clearwater Area, and Healy Lake (Fried and Windish-Cole 1995).

Figure 3.19.e Alaska Census Districts



Alaska Army Lands Withdrawal Renewal

Military demographics affect local census data by influencing the age structure of the local populations (Table 3.19.a). Fort Greely and vicinity had a total population of 1,299 in the 1990 census, and the distribution contrasted with other Alaska communities in the lower percentage of native Alaskans (1%) and higher percentage of African-Americans (18%) (Table 3.19.e).

Table 3.19.e Population and Ethnic Groups of Fort Greely, Delta Junction, and Big Delta (1990 Census, Alaska Department of Community and Regional Affairs).

	Fort Greely	Delta Junction	Big Delta
Male	598	343	208
Female	549	309	192
Total Population	1,147	652	400
African-American	207	20	1
Aleut	0	0	0
American Indian	11	18	8
Asian/Pacific Islands	39	9	2
Caucasian	828	592	381
Eskimo	0	11	8
Other Ethnic	62	2	0

Fort Greely's military and dependent population peaked in 1982 at just over 2,000 and declined to under 1,000 by 1995 (Appendix 3.19.B). By 1997, a certified count by the Alaska Department of Community and Regional Affairs reported Fort Greely's population at 740.

The largest employers in the Delta Area (excluding uniformed personnel) are listed in Table 3.19.f. The military (including uniformed personnel) accounted for 69% of Delta Area jobs in 1987 and had fallen to 57% in 1994 (Figure 3.19.f and Appendix 3.19.B). The Delta Area study in 1995 showed Fort Greely generated approximately 750 direct jobs, or over 50% of all employment in the area. One effect of the realignment of Fort Greely is reflected in the declining percentage of military employment as shown in Figure 3.19.f.

EMPLOYER	EMPLOYEES
Federal Government	306
Delta/Greely School District	134
Alyeska Pipeline Service Company	74
State of Alaska	65
Alaska Motor Coaches, Inc.	31
Delta Shop-Rite	31
Family Medical Center	28
Tag Company (Military Contractor)	27
Alaska Steak House	21
City of Delta Junction	16

Table 3.19.f Largest Employers in the Delta Area (excluding uniformed personnel).

Figure 3.19.f Percentage of Delta Jobs Accounted for by the Military 1987-1994.



Median household income in Delta Junction was \$31,250 in 1990, with 8.4% of the resident families having incomes below the poverty level. Thirty-five percent

Alaska Army Lands Withdrawal Renewal

of the adult population were not employed. Bureau of Land Management fire suppression provides seasonal employment. Extensive use of local game and fish for personal consumption exists.

In 1998, the Delta/Greely School District has a student population of 932, with 67 teachers, and five schools (Delta/Greely School District, pers. com. 1998). In 1995, 48% of the school district students were dependents of uniformed military personnel and federal workers on Fort Greely.

As Fort Greely realigns, jobs will be eliminated and student enrollment will more than likely decline. The Fairbanks North Star Borough School District estimated in 1996 that an additional 200 K-12 students would enter its district schools by the year 2001 as a result of the realignment of Fort Greely.

The median home value in 1990 was \$86,900 for Delta Junction. It is too dispersed a community for a single centralized water system, but only 6.9% of the homes lacked complete plumbing. Most homes have wells, and the school is on its own water system. Forty-three percent did not have phones and 91% of homes used wood or fuel oil for heat.

There is a health care clinic in Delta Junction that is a qualified emergency care provider, and there is a local rescue squad/ambulance service. The municipal government of Delta Junction has an elected mayor and city council form of government. Total operation and capital project expenditures were \$346,276 in 1995. The City operates a landfill. Electricity is provided by Golden Valley Electric Association of Fairbanks.

Delta Junction is accessible by the Richardson and Alaska Highways, and buses service the routes to Fairbanks and Whitehorse, Yukon Territory. There is a 2,400 foot gravel airstrip and charter flight services are available. There are six privately owned airstrips in the vicinity.

Fort Greely is a self contained post for Army personnel and their families. It differs from nearby communities in that almost 100% of the population has plumbing, and electricity is provided by a utility.

Fort Greely will be undergoing realignment pursuant to Base Realignment and Closure, 1995. The realignment is to be completed by July 2001. Economic reuse options for facilities on the Main Post Area are being explored. The realignment does not involve any of the withdrawal renewal lands.

3.19.3 Nearby Communities Healy Lake

Healy Lake is north and east of Delta Junction, and off the road system (Figure 1.a). Healy Lake showed no census population figure until 1980 when it had 33 people. In 1990 that population had increased to 47 and was 85% Native. Its 1997 population totaled 60. Doyon is the Regional Native Corporation. Mendas Cha-ag is the local Village Corporation and its offices are in Fairbanks.

The median home value was \$16,300 in 1990. Census data showed 70% of the housing was indicated as vacant, possibly indicating the seasonal use of homes. Over one-third of the homes did not have complete plumbing, and 63% of the households had no phone. There is a local power company, and 43% of the community was on the public water system in 1990. Wood or fuel oil for heat was used in 90% of homes.

Seventy percent of the resident families had incomes below the poverty level. Four residents are listed as involved in mining and providing professional services for summer visitors at the lake. The remaining population is dependent upon subsistence activities, with 85% of the adults not in the work force.

There is one school in Healy Lake attended by 15 students. The Healy Lake Clinic provides some medical services, with a river crossing necessary to the Delta Junction Clinic or to Fairbanks for additional care.

Dot Lake

Dot Lake is on the Alaska Highway east of Delta Junction, about 155 miles from Fairbanks (Figure 1.a). There are two settlements, the Federally recognized Upper Tanana Athapaskan Village, and a non-native area one mile from the village. A census population figure first appeared in 1960 at 56 and grew to 70 in 1990 with 54% Native. The current population is estimated at 80. Doyon is the regional Native Corporation. The local Village Corporation is Dot Lake.

The median valued home in 1990 was \$42,500. Nine out of 30 housing units were listed as vacant in 1990. A piped water system serves part of the community. Electricity is provided by a power station in Tok. There is one school, which serves 15 students. The village council operates a health clinic, with additional care located in Delta Junction and Fairbanks.

Median income was \$38,333 in 1990, and only 3.2% of resident families had incomes below the poverty level. Employment is limited to a lodge, motel, children's home, school, and clinic. Residents sell parkas, moccasins, beadwork, and other handicrafts. Subsistence activities include hunting for moose, caribou,

ducks, geese, ptarmigan, porcupines; and fishing for whitefish and salmon from the Copper River.

There is regular bus service to Fairbanks, and the nearest public airstrips are in Tok and Delta Junction. Snowmachines and off road recreational vehicles are used for local transportation.

Big Delta

Big Delta is an area surrounding Delta Junction on the Richardson Highway, at the junction of the Delta and Tanana rivers (Figure 1.a). Big Delta was a construction camp for the Alaska Highway, and first showed a census count of 155 in 1950. No census population was registered again until 1980 when it was recorded at 285. Its current population is estimated to be 508. There is a religious settlement known as "Whitestone Farms" which pools assets and income. A school, YMCA, and visitor center are among the town's facilities.

The median valued home in 1990 was \$55,000. Approximately half of the homes did not have phones. Ninety-three percent of the homes had individual wells and 21% lacked complete plumbing systems. In 1990 the median household income was \$32,813 with 23% of the resident families having incomes below the poverty level. Fifty-four percent of the adults were not in the work force.

Big Delta has no municipal government, and is not an Alaska Native Claims Settlement Act (ANCSA) organization. It is unincorporated.

3.19.4 Tourism

Alaska is a tourist destination, and interior Alaska is a direct beneficiary of tourism exports. Tourism is a difficult issue to measure because its economic influence is indirect. While visitor counts sound impressive, what is important economically is the money tourists spend, the number of jobs created, and the consequent payroll.

Statewide, almost 30% of the tourism industry is a result of visiting friends and relatives and tourism incidental to business travel, whereas vacation tourism accounts for about 70% (Alaska Visitor's Association 1997). About 35% of the visitor tourism in the State is in the Interior and northern regions of Alaska.

The Alaska Visitor's Association (AVA) data suggests tourism is the number two employer in the State and the number three industry by sales volume. But the military and government are not included on the AVA list of employers. Interior Alaska tourists mostly come in the spring and summer months of May through September. By observing transportation, trade and service sector differentials over these summer months, the maximum possible influence of the tourist industry at its peak can be estimated. In the five months of May through September during 1997, total Fairbanks North Star Borough employment rose by 2,745 workers as compared to the remainder of the year. Most of this was in trade (1,019), services (796), construction (746), transportation, communications, and utilities. School district employment falls during this period.

If 2,000 jobs can be attributed to tourism, since they are available only five months of the year, they translate into a full time average annual equivalent of 833 jobs. The most optimistic forecast would place direct employment somewhere in the 1,000 job annual equivalent category after adding in winter tourism. At most this results in 3% of the local jobs being attributed to tourism.

The Alaska Visitor's Association Survey examined regional tourist patterns and per trip expenditures and identified the top 25 visited sites in the State. Chena River trips were taken by 13% of visitors, Alaska Highway visitors at 20%, the University of Alaska Museum at 22%, and the pipeline at 26% all are within interior Alaska.

The Alaska Visitor's Survey shows 1.2 million visits by tourists statewide with a per trip expenditure of \$714. If we assume 25% of those visits were in the Fairbanks North Star Borough, this would account for approximately \$150 million total expenditures in Alaska from tourists visiting the Fairbanks area. Some portion of this amount is spent in the Fairbanks North Star Borough.

The monthly wage in the two primary tourist industries is lower than average. The primary industry affected is trade, with a monthly earnings average of \$1,583. The service industry monthly average is \$2,053, but not for tourist related services. The hotel/motel average is \$1,256.

While tourism grew at 10-12% statewide from 1989 through 1994, visitor volume increased only 4% in 1995 and 3% in 1996. The tourist industry is roughly comparable to the Interior mining industry in terms of employment. The mining industry is much more important in terms of payroll dollars. The school district is a larger industry in terms of numbers employed.

3.19.5 Mineral Resources

Oil and gold are important resources for Alaska. Recently, mining activity has rebounded from historic lows. Fort Knox, just north of Fort Wainwright, is currently one of the largest operating gold mines in the world. Tru North and Neumont are gold mining developments in the same vicinity. The Pogo prospect, north of the Delta Region, is the most recent significant gold find.

All of these mining developments are hard rock operations in the vicinity of old placer mine activities. These deposits are the original mineral sources of the placer deposits of the early gold rush. The combination of gold prices near \$300 per ounce and improved technology has made these mineral deposits economic to mine.

In 1990, mining had an average annual employment of 160 and a payroll of \$6.8 million. By 1996, employment figures increased to 571 and payroll increased to \$34 million. Fort Knox is currently fully operational. January mining employment for 1998 was 850, resulting in 100 more jobs than in the same month the previous year.

Activity by the oil industry is also improving. Recent developments on the North Slope have brought additional mineral-related employment growth in Fairbanks. Oil drilling is the highest it has been since the Prudhoe Bay drilling activity of the 1970s. ARCO announced in March of 1998 a total of \$2.5 billion in Alaska exploration projects over the next five years (Petroleum Information Corporation 1997).

Historically, no oil development has occurred in interior Alaska. Fairbanks is a service and transportation hub for North Slope development, and it receives income from State expenditures stemming from oil royalties. North Slope oil production was 1.4 million barrels a day in 1997. That average is projected to be 1.33 million in 1998, and 1.31 million barrels per day in 1999.

3.19.6 Agriculture

No prime or unique farmlands occur on the withdrawal lands. Interior Alaska has the capability of producing barley, oats, hay, potatoes, and a variety of vegetables. Beef, sheep, and pigs are raised for the local market. Alaska, in general, has no significant agricultural exports. Over time, the cost of shipping agricultural products into Alaska has declined. As the population base expanded, a rail link established, shipping technology improved, and the relative cost of land in Alaska paradoxically increased.

Less than 1% of Alaska's land is privately owned and much of what is owned has limited rights. Any land that came into private possession through statehood entitlement does not include rights to the subsurface minerals such as gravel, gold, and oil. When the State provided land for agricultural projects such as those at Delta and Fairbanks, the State further restricted rights to agricultural production only.

The State of Alaska attempted an agricultural project in the Delta Region, which offered over 100,000 acres for cultivation in the late 1970s and early 1980s. The program was unsuccessful with many of the farms failing. Land in the Delta Region sells for under \$100 per acre (Geier, pers. com. 1998). Agricultural production has increased since the 1980s. In 1995 there were estimated to be 75 farms, ranging from 25 to 5,000 acres. According to the Alaska Department of Community and Regional Affairs, 40,000 acres are classified as agricultural land and only 7,000 acres are farmed.

It is not unusual to see land in the Fairbanks area with agricultural covenants selling for low \$100s per acre adjacent to fee simple title land selling closer to \$1,000 per acre. Agriculture has a difficult time competing with alternative uses of the land when private land is so scarce and therefore expensive. If more lands were available to the private sector, the cost of land would fall making local agriculture more competitive. Recent crop data from the Tanana Valley suggests an average per acre total revenue of nearly \$500 an acre (Table 3.19.g).

	1995	1996	1997	
Acres Planted	7,760	7,450	7,400	
Value \$4.5 million		\$2.58 million	NA	
Cattle & Calves		1,380	1,440	
Value		\$.89 million	\$.92 million	
Hogs & Pigs 1,600		1,200	1,400	
Milk Production	3.7 mil pounds	4.5 mil pounds	4.8 mil pounds	

Table 3.19.g Tanana Valley Agricultural Production (Alaska Farm Reporter February 1997 and February 1998 Issues).

The Delta, Fairbanks, and south central Alaska regions were studied by the Globe Meat Industries in the mid 1990s for the possibility of intensive pork production (Globe Meat Technology 1994). The feasibility study took over five years to complete with the State of Alaska and Globe Meat Technology splitting the cost of the study. Delta Region proved unsatisfactory for several reasons: increased transportation costs, construction costs, heating costs in the winter, cooling costs in the summer, and lack of cheap fuel. Fairbanks area lacked sufficient acreage at a competitive cost.

Pleasant Valley has the closest agricultural activity in the vicinity of the Fort Wainwright Yukon Training Area. There is one potato farm and limited hay and vegetable production in the area. Bedding plants from the valley are sold to the local Fairbanks residents at a local store. Pleasant Valley is surrounded by military lands, the City of Fairbanks, the Chena River State Recreation Area, and both State and Borough government lands. The only possibility for projects of the scope contemplated by this study are for one or more of these governments to release land in a meaningful quantity. No substantial agricultural export industry has the possibility of developing otherwise.

The State is presently harvesting only 6%-10% of the allowable harvest in interior Alaska (Mackey, pers. com. 1998). A modest timber industry has developed in interior Alaska, but it is not a significant source of employment or income.

3.19.7 Guiding Industry

No studies on the big game guiding industry are known to have been conducted for the Fort Wainwright or Fort Greely areas. However, information is available statewide. In 1991, a study of big game guides from all over Alaska indicated that the entire industry generated about \$20 million in 1989 and \$28 million in 1990. When multiplier effects were accounted for, about \$28 million in 1989 and \$39 million in 1990 were generated in Alaska through big game guiding (Yu 1991).

An overview of big game harvests provides some additional insight into the economic potential of big game guiding. According to Yu (1991), the species that interested clients were caribou, brown bear, grizzly bear, moose, Dall sheep, and black bear. Game Management Unit 20 surrounds the withdrawal lands. This management unit produced 63% of the bison harvest, 18% of the black bear and moose harvests, 9% of the sheep harvest, and under 5% of the brown bear and caribou harvests for the State during the 1994-1995 hunting season (Appendix 3.19.B).

3.20 SUBSISTENCE

Lands of Fort Wainwright and Fort Greely were used for subsistence by Athapaskans, the native inhabitants of interior Alaska, well into the 1900s. The withdrawal areas are within the historic ranges of the Salcha, Goodpaster-Wood River, and Chena bands of the lower Tanana Athapaskans and the Healy River-Joseph band of the Tanacross Athapaskans (McKennan 1981). In addition,

southern portions of Fort Greely were likely used intermittently by Ahtna Athapaskans of the Copper River drainage (Figure 3.20.a).

Organized into bands, Athapaskans of the Interior depended upon the seasonal exploitation of mammals and fish for subsistence. Settlement patterns reflected subsistence constraints. During the winter, small temporary upland camps were used for hunting caribou. As summer approached, populations moved to larger fishing camps along the Tanana River and its major tributaries. Caribou was the most important food source. Other game and fish utilized by natives included moose, Dall sheep, hares, marmots, ground squirrels, ptarmigan, ruffed grouse, sharp-tailed grouse, whitefish, and three varieties of salmon (chinook, chum, and coho) (McKennan 1981).

Euroamerican settlement led to sweeping changes in both the subsistence practices and social organization of native bands. Semi-permanent native villages, such as Healy Lake and Tanana Crossing, sprang up near trading posts along sled routes used by trappers. In the early 1900s trade with trappers and miners permanently altered traditional Athapaskan subsistence practices (McKennan 1981).

The discovery of gold in the Fairbanks area in 1901 led to further settlement, and by 1909, there were about 12,000 Euroamericans in the region. The town of Fairbanks drew native populations from traditional settlements. Demographic pressures, combined with a series of epidemics, from which natives had no immunity, led to the abandonment of most native camps and the traditional, semi-nomadic way of life by the 1920s (McKennan 1981). Although many residents of native villages, such as Healy Lake and Dot Lake, continued to rely on the exploitation of natural resources for survival, subsistence activity was more localized, and the exploitation of large subsistence ranges was no longer practiced.

Since 1980, native and non-native subsistence uses on Federal public lands in Alaska, including the withdrawal lands, have been regulated by Title VIII of the Alaska National Interest Lands Conservation Act (ANILCA). Title VIII addresses the rights of customary and traditional subsistence users by giving "rural" Alaskans, those who actually "depend upon subsistence uses," preference in the take of fish and wildlife on federal lands (Public Law 96-487; Sec. 801, Sec. 802). Regional populations with potential subsistence interests in the withdrawal areas reside in five rural communities: Healy Lake, Delta Junction, Big Delta, Dry Creek and Dot Lake. The previous time these lands were withdrawn, the Bureau of Land Management determined the withdrawal renewals did not significantly impact subsistence use (see Appendix 3.20).

Fort Wainwright

Fort Wainwright Yukon Training Area is within the historic subsistence ranges of two lower Tanana bands: the Chena and the Salcha (Figure 3.20.a). The Chena utilized northern portions of the Yukon Training Area within the Chena River drainage, while the Salcha utilized southern portions of the Yukon Training Area within the Salcha River drainage. Historic development in the region was devastating to the Chena and by the 1960s, the only two survivors of the band were living in Fairbanks (McKennan 1981).

Between 1991 and 1997, an average of 2,449 Hunting, Trapping, and Fishing permits were issued annually for all of Fort Wainwright and Eielson Air Force Base combined (of which the Yukon Training Area is less than 30%). Almost all of these permit holders would fail to qualify as subsistence users, and almost all hunting, trapping, and fishing use is for recreational purposes.

The Yukon Training Area is within the Fairbanks North Star Borough. Residents of the Borough are not considered rural residents and therefore, are not qualified Federal subsistence users. However, Game Management Unit 20B, within which this withdrawal is located, has several seasons and bag limits for Federal subsistence hunters, all of which overlap entirely with current State bag limits and seasons. Rural residents from outside the Borough may utilize the Yukon Training Area for subsistence use. Such use is infrequent if it occurs.

Fort Greely

The withdrawal lands are within the subsistence ranges of two lower Tanana bands of the 19th and early 20th centuries (Figure 3.20.a). Lands between the Little Delta River and Jarvis Creek are within the historic range of the Salcha band. However, ethnographic research has indicated that by the 1920s, the Salcha had ceased to use Delta River and Delta Creek drainages for subsistence (Andrews 1975). By 1962 there were no native settlements along the entire Tanana drainage from Healy Lake to Nenana (McKennan 1981).

Withdrawal lands east of Jarvis Creek are within the historic subsistence range of the Healy River-Joseph band (Figure 3.20.a). Descendants of the band reside at Healy Lake (population 60), a Tanana village 30 miles east of Fort Greely. According to the Alaska Department of Community and Regional Affairs, most residents of Healy Lake live a subsistence or public assistance lifestyle (Alaska Department of Community and Regional Affairs website 2/25/98). However, due to its distance from Healy Lake, Fort Greely is not within the general subsistence area of the village (Sherrod, pers. com. 1998). The native village of Dot Lake (population 80) is about 60 miles east-southeast of Delta Junction along the Alaska Highway. The historic subsistence area of the village terminates at least 20 miles east of Fort Greely (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a). Some residents of Dot Lake, however, travel the extra distance to hunt on Fort Greely.

Approximately 45 miles east-southeast of Delta Junction on the Alaska Highway, is the non-native community of Dry Creek (population 134). According to the Alaska Department of Community and Regional Affairs, at least 15 adult residents rely on the exploitation of natural resources. A number of Dry Creek residents can be characterized as subsistence hunters/trappers.

From 1996 through 1998, an average of 620 permits was issued for nonmilitary range use on Fort Greely, which includes hunting, fishing, and trapping. It is estimated that approximately one-half of these permit holders are civilians, mostly residents of Delta Junction and Big Delta, communities of 855 and 508 people respectively. A number of Big Delta and Delta Junction residents can be characterized as subsistence users (Good, pers. com. 1999). However, a considerable number of permit holders are recreational anglers from the Fairbanks area due to the stocked lakes on Fort Greely. Due to a lack of specific use information regarding permit holders (who may be berry pickers, hikers, birders, bicyclists, etc.), it is impossible to specifically determine recent subsistence use of the installation.

3.21 ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, requires each Federal agency achieve environmental justice by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States.

Minority populations as defined for this analysis are African American, Aleut, American Indian, Asian/Pacific Islanders, Eskimo, and those persons from other ethnic populations.

Low income populations as defined for this analysis are those persons at or below the poverty level as recorded in the 1990 census. Executive Order 13045 Protection of Children from Environmental Health Risks and Safety Risks, requires each Federal agency to identify and assess environmental health risks and safety risks that may disproportionately affect children, and address such risks in their policies, programs, activities, and standards.

Fort Wainwright

Fort Wainwright is located within the Fairbanks North Star Borough census district. In 1990, census data showed a total Borough population of 77,720, of which 18% (13,969) were minorities (see Table 3.19.b in Chapter 3.19.1). Table 3.19.a in Chapter 3.19.1 shows the current age profile of the Fairbanks North Star Borough. In 1990, 8% (5,574) of the population in the Fairbanks North Star Borough had incomes at or below the poverty level.

Fort Greely

Fort Greely is located within the Southeast Fairbanks census district and is part of the Greely-Delta economic region. There is no well-defined political or geographic boundary for this region because most of it is unincorporated. For this analysis, the study area consisted of Fort Greely and the communities of Delta Junction and Big Delta.

In 1990, the total population of the study area was 2,199. Eighteen percent (398) were from minority populations (see Table 3.19.e in Chapter 3.19.2). Table 3.19.a in Chapter 3.19.1 shows the age profile of the Fort Greely and Delta Junction vicinities in 1995. In 1990, 11% (232) of the population in the study area had incomes at or below the poverty level.

3.22 NOISE

Sound is a small scale fluctuation of air pressure that typically follows a repetitive pattern (Olishifski 1975). Noise is unwanted sound that can cause behavioral change, impair speech and normal activities, and damage hearing. General audible noises are those sounds heard everyday. Sound levels are typically measured using a decibel, A-weighted scale (dBA). The threshold of human hearing is 0 dBA. The threshold of pain for the human ear is approximately 140 dBA. Table 3.22.a shows some common sound levels.

Table 3.22.a Typical Decibel Levels for Noise (Thurman and Miller 1990, Powell and Forrest 1988).

Threshold of Hearing	0 dBA
Soft Whisper	30 dBA
Background Noise for Wilderness and Rural Areas	35-50 dBA
Freeway Auto Traffic	65 dBA
Jet Takeoff	120 dBA
Service Rifle	168 dBC
Medium Howitzer	174 dBC
Medium Mortar Max Charge at Crew Positions	188 dBC

Impulse noise is a loud single event sound that lasts for a short duration. Impulse noise is measured using a decibel, C-weighted sound level (dBC). Examples of impulse noises are artillery fire, sonic booms, and explosions. Helicopter blade slap would be an example of loud repetitive impulse noise.

The primary means of assessing noise impacts is to define noise zones which relate to a level of human annoyance based on sound levels. The day-night level (DNL) is the primary noise descriptor which is measured temporarily. ADNL and CDNL are day-night levels for A-weighted and C-weighted sound levels respectively. The DNL receives a 10 dB penalty for nighttime sound levels. Table 3.22.b shows the noise level zones.

Table 3.22.bNoise Limits and Zones for Land Use Planning (ArmyRegulation 200-1 1997).DBP are decibels unweighted.

Noise	Population	Transportation	Impulsive	Small Arms	
Zone Highly Annoye		ADNL	CDNL	dBP	
I	<15%	<65 dBA	<62 dBC	<87 dBP	
	15%-39%	65-75 dBA	62-70 dBC	87-104 dBP	
888	>39%	>75 dBA	>70 dBC	>104 dBP	

Noise levels in Zone I would be compatible with housing, hospitals, and schools. Few people would be annoyed by noise in this zone. Zone II is normally not compatible with these land uses, and these uses are always incompatible in Zone III.










	Figure 3.2.a				
A	Climate Sampling				
Size	Locatione				
MA	Withdrawal Lands				
并分	Legend				
K - X	Climate Station				
A AN	PL99-606 Withdrawal Boundary				
東京	Other Military Withdrawal Boundaries				
- AND	∕∕∕ Stream				
	Glacier				
așt					
Area	SCALE 1:550,000 202468101214161820222426Kilometers 20246810121416182022426Kilometers 2024681012141618				
ANY A	Sources: Earth Info, 1993				





Figure 3.3.b
Terrain
Fort Greely
Legend
<i>∕</i> √ Stream
N Roads and Trails
PL99-606 Withdrawal Boundary
Other Military Withdrawal Boundaries
* Vertical Exaggeration = 5x
SCALE 1: 360,000 2 0 2 4 6 8 10 12 14 16 Kilometers 2 0 2 4 6 8 10 12 14 16 Kilometers
Sources: Wahrhaftig, 1965 USGS, 1998







Figure 3.4.b

Geology-Fort Greely

Legend

Ωs. Quaternary surficial deposits including alluvium, colluvium, glacial, fluvial/ lacustrine, rock glaciers, snow and ice

Tn. Late Tertiary Nenana gravel; thick bedded to massive, poorly sorted conglomerates with some sandstone and siltstone interbeds

Ts. Early to middle Tertiary sandstone, graywacke, and poorly consolidated siltstones and mudstones. This unit overlies sedimentary rocks of the Jarvis Creek coal fields just to the east of the Fort Greely area. Unit occurs in fault bounded prisms along the northern edge of the Alaska range

TKg. Early Tertiary to mid-Cretaceous granitic plutonic rocks

Kgd. Cretaceous granitic and granodioritic plutonic rocks, local intense hydrothermal alteration

MDt. Early Mississippian to Middle Devonian schistose volcanic rocks and pelitic schists, marble and greenstone. Polydeformed, greenschist metamorphic grade. This unit is formally known as the Totalanika schist.

Dmv. Devonian fine-grained schistose volcanic rocks and pelitic schists. Polydeformed, greenschist metamorphic grade, locally intense iron staining with disseminated and massive sulfide minerals

DPzmp. Devonian and older fine-grained, metasedimentary rocks including pelitic schists and quartzites. Polydeformed and generally greenschist facies metamorphic grade

Pzg. Early to mid-Paleozoic fine to medium grained gneissic granitic rocks, hornblende-biotite diorite and granodiroite. Ductilely deformed and regionally metamorphosed to amphibolite facies

Pzs. Early to mid-Paleozoic schist, quartz mica schist with marble and quartzite

Indefinite Northern Extent of Quaternary Surficial Deposits

PL99-606 Withdrawal Boundary

Other Military Withdrawal Boundaries Stream

Earthquakes of Magnitude ≥4.0

Earthquake (magnitude, year)





Figure 3.5.b **Locatable Minerals Fort Greely** Legend Areas with Favorable Geology for Placer Gold Areas with Favorable Geology for Placer Tin Areas with Favorable Geology for Lode Gold and/or Sediment-hosted Cu, Pb, Zn, Ag and/or Porphyry Cu-Mo As Above, but Bedrock Buried Beneath Surficial Deposits tenters com Indefinite Southern Extent of Buried Bedrock Ptarmigan Creek Molybdenum 0 Prospect Historic Placer Mine Locations (approximate) PL99-606 Withdrawal Boundary \square Other Military Withdrawal Boundaries \wedge Stream SCALE 1:300,000 1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Kilometers 1 0 1 2 3 4 5 6 7 8 9 Miles Weber et al, 1978 Nokleberg et al, 1990 Foster et al, 1987 Cobb, 1972 Sources:





Figure 3.6.a	
Soils	
Fort Wainwright Yukon Training Area	
Legend*	
Soil Map Unit 2 Histic Pergelic Cryaquepts	
Soil Map Unit 3 Histic Pergelic Cryaquepts in association with Typic Cryofluvents	
Soil Map Unit 4 Alfic Cryochrepts in association with Histic Pergelic Cryaquepts	
Soil Map Unit 5 Typic Cryochrepts in association with Histic Pergelic Cryaquepts	
PL99-606 Withdrawal Boundary	
Other Military Withdrawal Boundaries	5
<i>ℕ</i> Stream	
*see Table 3.6.a for further soil descriptions	
SCALE 1: 165,000 1 - 0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 Kilometers 1 - 0 - 1 - 2 - 3 - 4 Miles	
Sources: Reiger et al, 1979	

Soil Map Unit	Soil Type	Location	Description
2	Histic Pergelic Cryaquepts	This soil association is found in broad valleys and basins in the Upper Salcha River Basin and to the southwest of Fort Wainwright Yukon Training Area.	Over 60% of this soil type is found on level to rolling land with pod drainage. The soil is dominantly silt loam, with textures ranging from sand loam to clay loam and is fairly gravelly in areas. The permafrost table is shallow.
			The remaining 40% of the soil is composed poorly drained peat, silty to gravelly loams with permafrost and gravel.
	Histic Pergelic Cryaquepts in association with Typic	This soil association is found in the nearly level flood plains of the Chena and Tanana Rivers northwest of Fort Wainwright Yukon Training Area.	Approximately 45% of the soil association is characterized by poorly drained loam soils with textures of either silt loam or sandy loam.
3	Cryofluvents		On 35% of the area, alluvial soils composed of stratified silt loam and sand can be found along streams.
			The remainder of the soil consists of peat deposits with shallow loamy materials over very gravelly sand located in depressions within the flood plain.
	Alfic Cryochrepts in association with Histic	This soil association is found in the rolling to steep uplands which composed a majority of Fort Wainwright Yukon Training Area.	On approximately 35% of the area, well drained deep silt loams occur on slopes other than north facing.
4	Cryaquepts		On 20% of the area, poorly drained silt loams occur on foot slope and in valley bottoms. An overlying peat layer and a shallow permafrost table exists.
			Moderately drained silt loams occupy foot slopes on 15% of the area and well drained shallow silt loam over bedrock occupies slopes on 10% of the area. The remainder of the area is occupied by poorly drained shallow silt loam underlain by permafrost in nor facing areas.
	Typic Cryochrepts in association with	The soils are found in the hilly uplands to the northeast of Fort Wainwright Yukon Training Area.	Soil is very gravelly silt loam or very gravelly loam on 30% of the area. It occurs on low slopes that are other than north facing.
5	Histic Pergelic Cryaquepts		On approximately 25% of the area, poorly drained silt loams with overlying peat can be found in valley bottoms and along north facing slopes.
			A mixture of soil types is present in the remaining area including gravelly and stony silt loams to silt soils.





Figure 3.6.b

Soils - Fort Greely

Legend*

Soil Map Unit 1 Typic Cryochrepts in association with Aeric Cryaquept

Soil Map Unit 2 Histic Pergelic Cryaquepts

Soil Map Unit 3 Histic Pergelic Cryaquepts in association with Typic Cryofluvents

Soil Map Unit 4 Alfic Cryochrepts in association with Histic Pergelic Cryaquepts

Soil Map Unit 5 Typic Cryochrepts in association with Histic Pergelic Cryaquepts

Soil Map Unit 6 Pergelic Cryaquepts in association with Pergelic Cryochrepts

Soil Map Unit 7 Histic Pergelic Cryaquepts

Soil Map Unit 8 Typic Cryochrepts in association with Histic Pergelic Cryaquepts

Soil Map Unit 9 Typic Cryochrepts

Soil Map Unit 10 Typic Cryochrepts

Soil Map Unit 11 Rockland

Soil Map Unit 12 Typic Cryochrepts in association with Histic Pergelic Cryaquepts

PL99-606 Withdrawal Boundary

Other Military Withdrawal Boundaries

Stream

*see Table 3.6.b for further soil descriptions

 SCALE
 1:300,000

 1
 2
 3
 4
 5
 6
 7
 8
 9
 10
 11
 12
 13
 14
 15
 Kilometers

 1
 0
 1
 2
 3
 4
 5
 6
 7
 8
 9
 Miles

Soil Map Unit	Soil Type	Location	Description
1	Typic Cryochrepts in association with Aeric Cryaquept	These solls are found on high terraces, outwash plains, and foot slopes south of the Tanana River extending into the northerm	Moderately to well drained silt loams with underlying gravely sand occur on nearly level to gentl outwash plains and low moraines on 60% of the area.
			The remainder of the area is covered an assortment of poorly drained sandy gravels and clays. present in low lying areas.
2	Histic Pergelic Cryaquepts	This association occupies the broad rolling hills and valleys in the northwest portion of Fort Greely.	Over 60% of this soil type is found on level to rolling land with poor drainage. The soil is domina textures ranging from sand loam to clay loam and is fairly gravelly is areas. The permafrost table
			The remaining 40% of the soil is composed poorly drained peat, silty to gravelly loams with perm
3	Histic Pergelic Cryaquepts in association with Typic Cryofluvents	This association is found along the level flood plains of the Delta and Tanana Rivers.	Approximately 45% of the soil association is characterized by poorly drained loam soils with text loam or sandy loam.
			On 35% of the area, alluvial soils composed of stratified silt loarn and sand can be found along
			The remainder of the soil consists of peat deposits with shallow loamy materials over very grave depressions within the flood plain.
4	Affic Cryochrepts in association with Histic Pergelic	These soils are located in the uplands to the north of the withdrawal area	On approximately 35% of the area, well drained deep silt loams occur on slopes other than north
			On 20% of the area, poorly drained silt loams occur on foot slopes and in valley bottoms. An ova a shallow permafrost table exists.
			Moderately drained silt loams occupy foot slopes on 15% of the area and well drained shallow s occupies slopes on 10% of the area. The remainder of the area is occupied by poorly drained sl underlain by permafrost in north facing areas.
5	Typic Cryochrepts in association with Histic Pergelic Cryaquepts	ssociation with Histic Pergelic These soils are located in the uplands to the north of the withdrawal area.	Soil is very gravelly slit loam or very gravelly loam on 30% of the area. It occurs on low slopes t north facing.
			On approximately 25% of the area, poorly drained silt loams with overlying peat can be found in along north facing slopes.
			A mixture of soil types is present in the remaining area including gravelly and stony silt loams to
6	Pergelic Cryaquepts in association with Pergelic Cryochrepts	This association occupies the foothills and moraines of the Alaska Range which lies within the southern portion of Fort Greely.	Poorly drained gravelly and stony loams occur on north facing slopes, lower parts of hillsides, an approximately 40% of the area.
			Well drained gravelly and stony loams occur on steep slopes and ridge tops in 35% of the area.
			The remaining area consists of poorly drained silt loams located on north slopes, lower slopes a
7	Histic Pergelic Cryaquepts	The soils occupies low slopes subject to seepage and occurs in drainageways in the southwestern and southeastern portions of Fort Greely.	These soils are poorly drained shallow loarns with permafrost over very gravelly and stony loam layer is also present
8	Typic Cryochrepts in association with Histic Pergelic Cryaguents	These soils occur on the hilly portions along the Delta River in the eastern portion of Fort Greek.	Well drained shallow sit loams occur on south facing slopes of hills and ridges on 45% of the a
	Ciyaquepis		Poorly drained shallow silt loams occur on north facing slopes and hills and in valleys bottoms in
		2	A mixture of very gravelly loams and silt loams occur in the remainder of the area.
9	Typic Cryochrepts	Cryochrepts These soils can be found on the terraces, outwash plains and low moraines along Jarvis Creek.	Shallow sitt loams occur on plains, terraces, and low moraine hills of 70% of the area.
			The remaining 30% is composed of shallow loams or gravels and poorty drained sitty to gravelly drainageways.
10	Typic Cryochrepts	This soil occupies areas of hilly to steep moraines northeast of the Air Drop Zone.	On slopes other than north facing, shallow silt loams occupy 65% of the area.
			The remainder of the area consists of gravelly loams located on ridges and south slopes of hills
11	Rockland	This soil type occurs on the mountainous areas and foothills of the Alaska Range in the southern portion of Fort Greely.	Rockland occupies 75% of the area. The remaining area is covered by very gravelly shallow sol
12	Typic Cryochrepts in association with Histic Pergelic Cryaquepts	This soil association is found on the moraines and footslopes to the east of Jarvis Creek	Gravely silt loams over very gravely loams occupy moraines and steep south facing slopes bell the area.
			In the remaining area, gravelly, stony silt loarn or sand loarn exist on steep north facing slopes, seepage areas on foot slopes.

1	
	Table 3.6.b
sloping terraces,	
Peat layers are	Gonoral
ntly silt loam, with is shallow.	Description of
afrost and gravel.	Soil Types
ires of either silt	
treams.	
ly sand located in	
facing.	
erlying peat layer and	Fort Greely
lt loam over bedrock allow silt loam	
nat are other than	
valley bottoms and	
silt soils.	
d in drainageways in	
nd valley bottoms.	
An overlying peat	
ea.	
30% of the area.	
soils in	
e	
ə.	
w treeline on 65% of	Source:
valleys bottoms, and	Adapted from U.S. Dept. Of Army 1980, Rieger et al. 1979
Charles and Property in the second	3-132



/	Figure 3.7.a
	Permafrost
7	Fort Wainwright Yukon Training Area
	Legend
4	Continuous
	Discontinuous
	Permafrost Free
	PL99-606 Withdrawal Boundary
	Other Military Withdrawal Boundaries
1 a la	<i>∾ Stream</i>
	SCALE 1: 165,000 1 + 0 + 1 + 2 + 3 + 5 + 6 + 7 Kilometers 1 + 0 + 1 + 2 + 3 + 5 + 6 + 7 Kilometers 1 + 1 + 0 + 1 + 2 + 3 + 5 + 6 + 7 Kilometers
>	Sources: U.S. Army, Alaska, 1998



	Tanana River	Chena River	South Fork Chena River	Other Streams within Wainwright Yukon Train
General	Major perennial stream flowing westward. Bordering terrain is flat to the south and rolling uplands to the north . Heavily braided upstream and meandering downstream of Fairbanks.	Major perennial stream meandering westward. Located in northwest corner of Fort Wainwright Yukon Training Area.	Perennial stream that meanders through narrow valley and dissected hills. Flow northwestward across the northeastern portion of Fort Wainwright Yukon Training Area. Empties into Chena River off-base.	Perennial streams mostly o on-base as straight streams narrow valleys. Flowing off-base to the nor and south as meandering s fairly narrow valleys.
Regime	High water - June to September Low water - January to March Frozen surface - late October to mid May Flooding - May to September, especially on south side of river	High water - May to September Low water - January to March Frozen surface - late October to May Flooding - May to September, mostly in May	High water - May to August Frozen surface - late October to mid May Frozen to bottom - December to April No flooding	High water - May to August Frozen surface - late Octob mid May Frozen bottom - December Flooding occasionally on lo reaches of Moose and Free Creeks.
Width	<i>Upstream of Fairbanks -</i> 0.3 to 0.9 miles <i>Downstream of Fairbanks -</i> 0.2 to 0.3 miles	300 to 400 feet through cantonment Maintained by dredging	<i>Upper reaches -</i> 20 to 30 feet <i>Lower reaches -</i> 30 to 40 feet	Moose and French Creeks Ninety-eight Creek - 25 fee Other streams - 10 feet
Depth	Upstream of Fairbanks - Low water - 1 to 5 feet High water - 12 feet Downstream of Fairbanks - Low water - 6 feet High water - 18 feet	5 feet through cantonment Maintained by dredging	<i>Upper reaches -</i> 1 foot <i>Lower reaches -</i> 1 to 2 feet	<i>Moose and French Creeks All others</i> - <1 foot
Velocity and Discharge	Velocity at Fairbanks - 3.6 feet per second at low water Average annual discharge at Fairbanks - 19,970 cubic feet per second Estimated peak flow - 125,000 cubic feet per second on 8/16/67	Velocity - 1.5 to 2.3 feet per second at low water Average annual discharge at Fairbanks - 1,395 cubic feet per second Recorded peak flow - 74,400 cubic feet per second on 8/15/67	Velocity - 0.5 to 1.5 feet per second at normal water Estimated discharge - 200 cubic feet per second	Velocity - 0.5 to 1.5 feet per at normal water Average discharge at Moos French, and Ninety-eight C 100 cubic feet per second Average discharge at other 25 cubic feet per second Discharges usually double water.
Bank Composition	Mostly sand and gravel with a top layer of silt Slopes >60% <i>Upstream height -</i> 3 to 5 feet <i>Downstream height -</i> 6 to 9 feet	Mostly sand and gravel with top layer of silt Slopes - 45% to vertical Height - 10 to 15 feet	Mostly sand and gravel with top layer of silt Slopes - 30% to vertical <i>Upper reach height -</i> 1 to 2 feet <i>Lower reach height -</i> 1 to 3 feet	Mostly sand and gravel with top layer of silt <i>Moose and French Creeks</i> Slopes - 30% to vertical <i>Other streams -</i> Slopes - 30% Height - 2 to 5 feet
Bottom Composition	Mostly gravel and some sand.	Gravel and sand with some silt.	Sand and gravel with some silt.	Sand and gravel with some particularly in lower reache Silt heavier in lower reache Moose and French Creeks

Fort ng Area	Table 3.8.a
riginating in h, west treams in	Drainage Characteristics of Selected Streams
er to to April wer ch	Fort Wainwright Yukon Training Area
- 20 feet	
- 2 feet	
r second e, reeks -	
<i>streams -</i> n high	
-	
silt, s. s of	Source: Adapted from Defense Mapping Agency 1978
	3-135



X	Figure 3.8.b
JAK -	Surface Water
TTIN.	Fort Greely
~	Legend
XIX	Stream Gaging Station
S S S S S S	PL99-606 Withdrawal Boundary
	Other Military Withdrawal Boundaries
2	∕∕∕ Stream
5	Lake
	Glacier
4.24.	SCALE 1: 375,000 2 0 2 4 6 8 10 12 14 16 Kilometers 2 0 2 4 6 8 10 12 14 16 Kilometers
Y	Sources: USGS 7.5 Minute Quadrangles USGS, 1998



Figure 3.8.c

Floodplains

Fort Wainwright Yukon Training Area

Legend



Zone A Special Flood Hazard Areas Inundated by 100-year Flood No base flood elevations determined

Zone X

Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100year flood



 \wedge

Zone XO Areas determined to be outside the 500-year floodplain

PL99-606 Withdrawal Boundary

Other Military Withdrawal Boundaries

Stream

SCALE 1: 185,000 <u>1 2 3 4 5 6 7 8 Kilometers</u> <u>1 0 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 0 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 0 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 0 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 0 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 0 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 0 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 0 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 0 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 1 2 3 4 5 6 7 8 Kilometers</u> <u>1 1 2 3 4 5 6 7 8 Kilometers</u>





,	
sofre .	Figure 3.9.a
1/	Groundwater
	Fort Wainwright Yukon Training Area
1	Legend
	Tanana-Chena Rivers Floodplain (1,500,000-15,000,000 gallons per day) Very large quantities available from floodplain deposits of the Tanana and Chena River
5	Creek Valley Bottoms
14	(15,000-1,500,000 gallons per day) Moderate to large quantities available from gravel deposits in creek valley bottoms
N I	Upland Hills (< 15,000 gallons per day) Small quantities available from joints and fractures in upland bedrock
Ì.	<i>Groundwater Quality Station</i>
FGX	Boundary
~	Other Military Withdrawal Boundaries
	[∧] ∕ Stream
XX.	SCALE 1: 270,000 1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 Kilometers 1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 Kilometers 1 0 1 2 3 4 5 6 7 8 Miles
N X	Sources: Defense Mapping Agency, 1978 EarthInfo, 1993

	Tanana-Chena Rivers Floodplain	Creek Valley Bottoms	Upland Hills
Quantity and Yield	Very Large - 2.35 to 23.50 cfs Yield - 4.5 to 6.7 cfs	Moderate to Large - 0.0235 to 0.235 cfs Yield - 0.17 to 0.45 cfs	Small - 0.00235 to 0.0235 cfs Yield - 0.0035 to 0.021 cfs
Aquifer Description and Depth	Lenses of water-bearing river sands and gravels under alluvial silt fans. Alluvial fill - 9.8 to 656.2 feet	Stream sorted gravel in major upland stream valleys, overlain by organic silt. Gravel fill - 32.8 to 328.1 feet.	Fractures and joints in crystall rocks. Depth unknown.
Depth to Water Table	9.8 to 26.2 feet	Water table beneath permafrost. Depth unknown.	98.4 to 196.9 feet
Quality	Poor - high iron and hardness. High potential for contamination of water above permafrost.	Very Poor - high organic content. Better quality from valley fill.	Good to Very Good - low iron content.
Development Potential	Excellent aquifer. Wells can be drilled almost anywhere. Wells are generally less than 98.4 feet deep.	Permafrost may cause difficulties. Valley muck prevents access to areas.	Sources difficult to find.





m	
	Figure 3.9.b
52	Groundwater
TT -	
in the second	Fort Greely
Jac a	
	Legend
- File	Groundwater Quality Station
Lowen	Groundwater Potential of 1000-3000 Gallons per Minute*
and the second	PL99-606 Withdrawal Boundary
2	Other Military Withdrawal Boundaries
J	│ Stream
F	Glacier
X.	*unshaded areas represent unknown groundwater potential
M -r	SCALE 1: 340,000 1012345678910111213141516 Kilometers 1012345678910111213141516 Kilometers 1012345678910 Miles
S	Sources: U.S. Army Alaska, 1980 EarthInfo, 1993



	Figure 3.10.a
	Wetlands
F Yul	ort Wainwright kon Training Area
	Legend
	Wetland
	Upland
	No Data
	PL99-606 Withdrawal Boundary
	Other Military Withdrawal Boundaries
	Stuart Creek Impact Area
	Impact Area Buffer Zone
\sim	Stream
	SCALE 1 : 165,000 1 2 3 4 5 6 7 Kilometers 0 1 2 3 4 Miles

National Wetlands Inventory, 1992







	rigare 0.11.a	
I	Ecosubdistricts	
Yu	Fort Wainwright Ikon Training Area	
	Legend	
	French-Moose Creek Lowlands	
	Chena-Salcha Highlands	
	South Fork Chena Lowlands	
	Chena Floodplain	
	PL99-606 Withdrawal Boundary	
<u> </u>	Other Military Withdrawal Boundaries	
\sim	Stream	
1 <u></u> 1 <u></u>	SCALE 1 : 165,000 1 2 3 4 5 6 7 Kilometere 0 1 2 3 4 Miles	
Source	IS:	



Figure 3.11.b

Ecosites - NW Fort Wainwright Yukon Training Area

Legend

Riverine Broadleaf Forest Riverine Mixed Forest Riverine Tall Scrub Riverine Wet Meadow Riverine Complex Lakes or Ponds Lowland Needleleaf Forest Lowland Broadleaf Forest Lowland Mixed Forest Lowland Tall Scrub Lowland Low Scrub Lowland Moist Meadow Lowland Eolian Complex Lowland Slope Drainage Complex Scrub Bog Bog Meadow Upland Needleleaf Forest (N, E or W-facing) Upland Needleleaf Forest (S-facing) Upland Broadleaf Forest (N, E or W-facing) Upland Broadleaf Forest (S-facing) Upland Mixed Forest (N, E or W-facing) Upland Mixed Forest (S-facing) Upland Tall Scrub Upland Slope Drainage Complex Subalpine Forest Alpine Scrub Human Modified

V Stream

SCALE 1:75,000 1 0 1 2 Kilometers 1 Mile





	Figure 3.11.d	-* .1(
N-1-10	Ecosites - SW	
-	Fort Wainwright Yukon Training Area	
	Legend	
	Riverine Mixed Forest	
	Riverine Tall Scrub	1
	Riverine Complex	
	Lakes or Ponds	12
	Lowland Needleleaf Forest	9.6
	Lowland Broadleaf Forest	3
	Lowland Mixed Forest	
	Lowland Tall Scrub	
	Lowland Low Scrub	
	Lowland Moist Meadow	
	Lowland Eolian Complex	
•••	Lowland Slope Drainage Complex	
	Lowland Abandoned Channel Complex	1
•	Scrub Bog	
	Bog Meadow	9
	Upland Needleleaf Forest (N, E or W-facing)	
	Upland Needleleaf Forest (S-facing)	
	Upland Broadleaf Forest (N, E or W-facing)	
	Upland Broadleaf Forest (S-facing)	
	Upland Mixed Forest (N, E or W-facing)	
	Upland Mixed Forest (S-facing)	
	Upland Low Scrub	
	Upland Tall Scrub	
82	Upland Slope Drainage Complex	
	Human Modified	
\sim	Stream	
	SCALE 1: 75,000 1 2 Kilometers 1 0 1 Mile	
So	urces:	





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Sensitive Moose Habitat

Fort Greely

Legend

	Moose Winter Concentration (1980 EIS)
	Moose Fall Concentration (1980 EIS)
	Moose Fall/Winter Concentration (1980 EIS)
	Moose Spring/Summer Concentration (1980 EIS)
	Seasonal Moose Range (1979 Cooperative Agreement)
	Moose Winter Concentration Areas (1997 ADF&G)
	Moose Fall/Winter/Spring Concentration Areas (1999 ADF&G
	PL99-606 Withdrawal Boundary
	Other Military Withdrawal Boundaries
N	Impact Area Boundary
\sim	Impact Area Buffer Zone Boundary
\sim	Stream

SCALE 1: 300,000 1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Kilometers 1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Kilometers 1 0 1 2 3 4 5 6 7 8 9 Miles Sources: Alaska Department of Fish and Game(1973) in 1980 EIS for Withdrawal of Fort Greely Alaska Department of Fish and Game, 1997, 1999










Sensitive Bison Habitat

Fort Greely

Legend

 \wedge

Bison Calving and Summer Range (1979 Cooperative Agreement)

Bison Late Summer-Early Winter (1979 Cooperative Agreement)

Bison Summer Range (1980 EIS)

Bison Winter Range (1980 EIS)

Bison Calving Area (1980 EIS)

Bison Calving and Summer Area (1 May - 31 Aug.) (1986 Cooperative Agreement)

Bison Fall/Winter Migration Route (1999 ADF&G)

Bison Range, Includes Sensitive Calving Areas Around Buffalo Dome and Texas Range (Mid-Feb. to Early Sept.) (1999 ADF&G)

PL99-606 Withdrawal Boundary

Other Military Withdrawal Boundaries

Impact Area Boundary

N Impact Area Buffer Zone Boundary

Stream

 SCALE 1: 280,000

 1
 0
 1
 2
 3
 4
 5
 6
 7
 8
 9
 10
 11
 12
 13
 Kilometers

 1
 0
 1
 2
 3
 4
 5
 6
 7
 8
 Miles

Sources:

Alaska Department of Fish and Game, 1973 and 1977 in the 1980 EIS for Withdrawal of Fort Greely Alaska Department of Fish and Game, 1986, 1999









Figure 3.15.a

Fire Protection Status Boundaries for Fort Wainwright Yukon Training Area and Surrounding Lands

Legend

Hot Zone

Critical

Full

Modified

Limited

PL99-606 Withdrawal Boundary



Other Military Withdrawal Boundaries



 \sim

Stuart Creek Impact Area Boundary

Stuart Creek Buffer Zone Boundary

Stream



Figure 3.15.b

Fire Protection Status Boundaries for Fort Greely and Surrounding Lands

Legend

Hot Zone

Critical Full

Modified

Limited

PL99-606 Withdrawal Boundary

Other Military Withdrawal Boundaries



 \mathbf{N}

Impact Area Boundary

Impact Area Buffer Zone Boundary



Roads and Trails

 SCALE
 1:300,000

 1
 0
 1
 2
 3
 4
 5
 6
 7
 8
 9
 10
 11
 12
 13
 14
 15
 Kilometers

 1
 0
 1
 2
 3
 4
 5
 6
 7
 8
 9
 Miles

Sources: Alaska Fire Service, 1998 Bureau of Land Management





Fire Occurrences by Year

Fort Wainwright Yukon Training Area

Legend

	1991 (B306, B508)
	1990 (A128)
	1987 (B078)
	1980 (8505)
	1959 (50)
	PL99-606 Withdrawal Boundary
	Other Military Withdrawal Boundaries
N	Stuart Creek Impact Area Boundary
\wedge	Stuart Creek Buffer Zone Boundary
	Stream
'see T	able 3.15.a for further fire descriptions

SCALE 1: 165,000 <u>
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SCALE 1: 1</u></u></u></u></u>





by Year

Fort Greely

Legend

- 1998 (A188) 1996 (A321,A145,A416) \square 1992 (A035,A034) 1990 (A132,A310)
- . . 1987 (B023)
- 1986 (612002)
- 1981 (8467)
- 1971 (8656)
- \square 1956 (45)
- 500 1954 (111)
- PL99-606 Withdrawal Boundary
- Other Military Withdrawal Boundaries
- Impact Area Boundary N
- N Impact Area Buffer Zone Boundary
 - Stream

Bureau of Land Management

*see Table 3.15.c for further fire descriptions

SCALE 1:300,000 1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Kilometers 1 0 1 2 3 4 5 6 7 8 9 Miles Sources: Alaska Fire Service, 1998





Restricted Access

Fort Wainwright Yukon Training Area

Legend

	Restricted Access Sign			
Ж	Battery Site			
٠	Military Assault Course			
11	Restricted Access Signs Posted every 200 meters			
	Air Force Technical Applications Center (AFTAC)			
	High Hazard Impact Area			
	Impact Area Buffer Zone			
	PL99-606 Withdrawal Boundary			
	Other Military Withdrawal Boundaries			
\approx	Improved Road or Highway			
<u>A</u> li	Unimproved Road			
~;	Trail			
N	Trans-Alaska Pipeline			
1_0	SCALE 1: 165,000			
1 0 1 2 3 4 Miles				
Sources: U.S. Army, Alaska, 1998				



Figure	3.	16.	b
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Access - Fort Greely

Legend

Restricted Access

 \mathcal{N} Impact Area Boundary

1 the second

 \square

Dedicated Impact Area

High Hazard Impact Area

Impact Area Buffer Zone

Restricted Access Sign



N

Access Gate

Meadows Road - Restricted Access Between Meadows Road and Impact Area Boundary



Trans-Alaska Pipeline

Off-Road Recreational Vehicle (ORRV) Access Allowed*



33 Mile Loop, 12 Mile Crossing

Donnelly Flats

*All trails on Fort Greely East Training Area

 \mathbb{N} RU

Improved Road or Highway

Unimproved Road

~; Trail



PL99-606 Withdrawal Boundary

Other Military Withdrawal **Boundaries**

SCALE 1: 280,000 1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 Kilometers 1 0 1 2 3 4 5 6 7 8 Miles

Sources: U.S. Army, Alaska, 1998



X	Figure 3.20.a
A F	Traditional Subsistence
HX.	Withdrawal Lands
FKK/	Legend Salcha Subsistence
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	Healy River-Joseph Subsistence
A A	Wood River Subsistence
(III)	Chena Subsistence
	PL99-606 Withdrawal Boundary
The second	Other Military Withdrawal Boundaries
	N Road
X	<i>ℕ</i> Stream
a	Glacier
The state	SCALE 1 : 575,000 2 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 Kilometers 2 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 Kilometers
L'.VC	Sources: McKennan, R. 1981

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

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ENVIRONMENTAL CONSEQUENCES

This section includes a discussion of the environmental impacts of the alternatives including the proposed action, any adverse environmental effects which cannot be avoided should the proposal 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 proposal 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.

Only a limited number of studies for many resources have been conducted by the military or Federal and State agencies. In many instances, comparative data were incomplete and/or unavailable. Thus, the ability to conduct quantitative evaluations was limited. Where data were available, site specific references are included within the individual resource sections.

Various programs have been implemented by the Army on the withdrawal lands. The Army would continue these programs for the duration of the proposed withdrawal renewal. The function of these programs is to provide mitigation for achieving the military's mission while offering environmental protection. Proposed mitigation in this LEIS involves the collection of necessary data to assess military impacts and determine the rehabilitation and restoration to be implemented through the Integrated Natural Resources Management Plans under the Army's Integrated Training Area Management (ITAM) program. Please refer to Appendix 2.D for a detailed description of the ITAM program. Existing and proposed mitigation measures are explained in detail in Chapter 4.23.

4.1 LAND USE

Preferred Alternative

The Army and Air Force would continue to use the withdrawal renewal lands for 50 years to fulfill their military training and testing mission. U.S. Army Alaska and the Bureau of Land Management would continue to manage the natural resources on the withdrawal renewal lands, recognizing their primary use for the military. Management of the natural resources would follow the new Integrated Natural Resources Management Plans in accordance with the Sikes Act (Public Law 105-85) as revised in 1997.

Rights-of-way would continue in effect for the Trans-Alaska Pipeline System, Alaska Natural Gas Transportation System, and the proposed Trans-Alaska Gas System. The Bureau of Land Management would continue to grant rights-of-way on the withdrawal renewal lands with Army concurrence.

Submerged Lands

Under the Preferred Alternative, military use of the withdrawal lands would continue for 50 years. The question over ownership of the submerged lands would most likely need to be resolved between the State and Federal government in court.

Existing Mitigation

Land management for the withdrawal renewal lands will continue under the ITAM program and the Integrated Natural Resources Management Plans, which will be reviewed and updated every five years.

Proposed Mitigation

No additional land use mitigation measures are recommended.

No Action Alternative

If the withdrawal renewal lands are decontaminated sufficiently to be opened to public land laws and the State of Alaska selections become valid, the lands would be adjudicated by the Bureau of Land Management for conveyance to the State. Until conveyed to the State, the Bureau of Land Management will manage the lands in accordance with the existing Resource Management Plans (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a and 1994b).

The Fort Wainwright Yukon Training Area and the Fort Greely West and East Training Areas are contained within the *Tanana Basin Area Plan for State Lands* (1991) management area. Upon conveyance, management and use of the withdrawal renewal lands would be determined by the State. Section 2.2 and Figure 2.a summarize the resource management actions most likely to be implemented on the withdrawal lands based on the State's determination of resource values existing on the lands during the selection process, and reviewing the State's management of surrounding State land parcels.

Land parcels on the Fort Wainwright Yukon Training Area and the Fort Greely West and East Training Areas which are not withdrawn under the Military Lands Withdrawal Act, would continue to be used by the military and managed by the Army under their Integrated Natural Resources Management Plans.

Submerged Lands

Under the No Action Alternative, the withdrawal renewal lands would be adjudicated by the Bureau of Land Management for conveyance of the lands to the State of Alaska. The State would become owner of the withdrawal lands, and thus owner of the submerged lands on the withdrawal lands.

Loss of submerged lands would decrease the training capabilities of the Army and Air Force. The U.S. Army Alaska would be unable to fulfill its' military mission in Alaska.

4.2 CLIMATE

Preferred Alternative

4.2.1 Air Quality and Emissions

The Preferred Alternative involves the renewal of existing military withdrawals for 50 years under the same conditions as provided in the Military Lands Withdrawal Act. Military use would vary little from current use (as discussed in Chapter 2.1.3).

Under the Preferred Alternative, military operations in the future would remain the same as current operations. Thus, pollutant concentrations resulting from U.S. Army point and non-point sources and Air Force aircraft operations would remain essentially the same as described for the baseline conditions (Chapter 3.2.1).

Specific air quality data has not been collected at the Fort Wainwright Yukon Training Area or Fort Greely. As a result, the contribution of pollutants resulting from military activities conducted on the withdrawal lands is unknown. No point emission sources are located on the withdrawal lands. The primary non-point sources of air pollution on the withdrawal lands are forest fires and motor vehicles. Forest fires could result in temporary episodes of poor air quality. The operation of motor vehicles in combination with other point and non-point sources, including civilian populations located off the withdrawal lands, could influence local air quality. The largest level of Air Force aircraft operations would continue to occur during the summer months of June, July, and August, when the majority of the Major Flying Exercises (MFEs) are conducted. The Yukon 1 Military Operations Area (MOA) (as shown in Figure 1.b) has the largest number of operations below the mixing height (the point where air inversions switch) of the MOAs. 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).

Fort Wainwright Yukon Training Area

Primary air pollution sources on the Yukon Training Area result from forest fires, and mobile sources, such as motor vehicles. A number of point sources near Main Post in Fairbanks and on Eielson Air Force Base (AFB) emit over 100 tons of pollutants per year, and are classified as major point sources. These major point sources are not located on the withdrawal lands but could affect the air quality of the Yukon Training Area (U.S. Dept. of the Army 1997a). Combined, the Main Post and Eielson contribute approximately 65% of the total nitrogen dioxide emissions measured at Fairbanks. Approximately 50% of the total sulfur dioxide and particulate matter emissions measured in Fairbanks are also produced by Fort Wainwright and Eielson AFB (AIRSWeb 1998).

The major point emission source on Fort Wainwright is the power plant, which is located on the Main Post. Other potential emission sources on Main Post include auxiliary standby power generation facilities, vehicle maintenance shops and parking lots, storage piles and unvegetated areas, small space heaters in isolated buildings, the laundry and dry cleaning facility, and the petroleum storage facilities (U.S. Dept. of the Army et al. 1979). These point sources may contribute to the air quality of the Yukon Training Area.

Mobile source emissions from vehicular exhausts and fugitive dust from off-road traffic is expected to occur on the Fort Wainwright Yukon Training Area and could affect air quality (U.S. Dept. of the Army et al. 1979).

Air Force emission studies were not conducted specifically for Fort Wainwright. Since Eielson AFB and Fort Wainwright are within the Southern Interior Region, Eielson AFB values are presented as an estimate for the entire area. Current Air Force activities at Eielson AFB, including motor vehicle use, electrical power generation, and aircraft operations, have the potential to impact air quality on the Yukon Training Area. Aircraft operations effect local air quality when they occur below the mixing height. Mixing heights are influenced by the intensity of solar radiation, wind speeds, cloud cover, and the presence of snow on the ground. The mixing height can vary a great deal from one day to the next and from the morning to the afternoon. The mean seasonal mixing heights provided in Table 4.2.a are very general and represent the conditions that may be present for some of the days during the year. These figures show that, in general, mixing heights are lowest in the winter and highest in the summer (USAF 1995).

Season	Mixing Height (feet)			
Season	Morning	Afternoon		
Winter (December through February)	649	725		
Spring (March through May)	991	4,572		
Summer (June through August)	1,637	6,252		
Fall (September through November)	1,227	1,978		

Table 4.2.a Mean Seasonal Mixing Heights for Fairbanks, Alaska (USAF 1995).

Estimates of baseline air emissions from aircraft operations were calculated for Eielson AFB. Aircraft operations include annual landings, take-offs, and touchand-go cycles for the assigned, deployed training, and transient aircraft at the base. Major Flying Exercises (MFEs), as well as aircraft maintenance activities, were included in the calculation. The baseline emissions estimates are presented in Table 4.2.b (USAF 1995).

Table 4.2.b Baseline Aircraft Air Pollutant Emissions Estimates for Eielson AFB, Alaska (USAF 1995).

Pollutants Emitted (Tons per year)						
CO HC NO _x PM ₁₀ SO ₂						
Eielson AFB	321.2	161.2	86.7	4.0	13.2	

Aircraft emission studies were not conducted for Fort Wainwright. Since the Yukon 1 MOA, was studied, these values are presented as an estimate for the Yukon Training Area. The Yukon 1 Military Operations Area (MOA), located in the Northern Interior Region, has the highest aircraft usage and would, therefore, have the highest level of aircraft emissions. Table 4.2.c and Table 4.2.d show the winter and summer emission concentrations (measured over the same averaging time as the NAAQS in Table 3.2.b for comparison).

In winter, air mixing is at its lowest level, with very little vertical mixing occurring. This results in the lowest dispersion of air emissions and the highest air pollutant concentrations of any season. Because vertical mixing is limited during the winter, air emissions occurring at or above 300 feet would not be expected to affect ground level air quality.

The largest number of aircraft operations occurs during the summer months of June, July, and August, when most of the MFEs take place. Mixing heights are at their highest level during the summer months, allowing for a greater dispersion of air pollutants. The estimates provided below show that air quality within this airspace is not being degraded to any appreciable degree by Air Force aircraft operations (USAF 1995). Thus, air quality within the Fort Wainwright Yukon Training Area would not be affected by Air Force aircraft operations.

Pollutant	Concentration (µg/m³)	Averaging Time	Percentage of Primary NAAQS	
Carbon Monoxide	23.3	1-Hour	0.05	
Nitrogen Oxides	0.8	Annual	0.80	
Particulates	1.0	24-Hour	0.70	
Sulfur Dioxide	1.7	24-Hour	0.50	

Table 4.2.c Baseline Aircraft Air Pollutant Emissions estimates for the Yukon 1 MOA in Winter (December, January, February) (USAF 1995).

Table 4.2.d Baseline Aircraft Air Pollutant Emissions Estimates for the Yukon 1 MOA in Summer (June, July, August) (USAF 1995).

Pollutant	Concentration	Averaging Time	Percentage of Primary NAAQS
Carbon Monoxide	13.5	1-Hour	0.03
Nitrogen Oxides	1.7	Annual	1.70
Particulates	0.6	24-Hour	0.40
Sulfur Dioxide	0.2	24-Hour	0.06

Fort Greely

The majority of the pollutants produced on Fort Greely result from forest fires, and mobile sources, such as motor vehicles. Point sources that emit over 100 tons of pollutants per year are present on the Main Post of Fort Greely. No major point sources exist on the withdrawal renewal lands (U.S. Dept. of the Army et al. 1979, U.S. Dept. of the Army 1997b).

The primary emission sources on Fort Greely are open burning from forest fires and the incineration of solid wastes. Other potential sources include small auxiliary power plants, exhaust emissions from vehicle maintenance shops and parking lots, fugitive (uncontrolled) emissions from unvegetated areas, small space heaters in isolated buildings, and potential emissions from the petroleum storage facilities. These point sources can contribute to the air quality of the Training Areas. Mobile sources of pollutant emissions include automobile and truck traffic, and aircraft operations. Vehicle exhaust and fugitive dust from offroad traffic can also be expected to occur on the Fort Greely West and East Training Areas, and could affect air quality (U.S. Dept. of the Army et al. 1979).

Aircraft emission data from Eielson AFB and the Yukon 1 MOA (Tables 4.2.b, 4.2.c, and 4.2.d) indicates air quality within the Fort Greely West and East Training Areas would not be affected by Air Force aircraft operations.

4.2.2 Ice Fog

Data do not exist showing the percentage of ice fog occurrences caused by military activities.

Current military activities can contribute to the formation of ice fog during the winter months when temperatures drop below -22°F. Ice fog, a fog composed of suspended frozen water droplets, is a unique type of atmospheric condition. It develops primarily in populated areas in extremely cold regions under appropriate climatic conditions as a direct consequence of human activities. Ice fog crystals appear as super-cooled water droplets freeze. They form when hot vapors containing water and particulate by-products or dust are emitted into a cold, water-saturated atmosphere. The particulate by-products are a result of fossil fuel combustion processes such as power plant facilities, heating plants, and motor vehicles. The seriousness of the ice fog problem has been clearly correlated with increased use of motor vehicles (Murrmann and Reed 1972).

The most obvious problem caused by ice fog is reduced visibility for vehicle and aircraft operation. Visibility in ice fog decreases to several feet in extreme cases. A far more serious problem is that ice fog, in combination with other cold regions hardships, creates a local condition where inhabitation is difficult. Also, the

airborne ice particles provide a large active surface area for interaction with other gaseous and particulate pollutants. As the ice fog precipitates, the local ground levels of pollutants intensify and act as a visual indication of the presence of other more common atmospheric contaminants. Also, the presence of ice crystals in the atmosphere may cause differences in local weather conditions due to radiative cooling. For military operations, ice fog, even in isolated situations, could provide a detectable signature thereby affecting operational efficiency (Murrmann and Reed 1972).

Existing Mitigation

Unnecessary vehicle idling is restricted on Fort Wainwright and Fort Greely. Head bolt electrical outlets (HBOs) have been installed in most parking lots on post at Fort Wainwright to reduce "cold starts", which have been linked to increases in both carbon monoxide and unburned fuel emissions. They also decrease the amount of parked vehicles idling during extreme low temperatures, thus reducing the generation of ice fog. In addition, the installation of a baghouse on the exhaust stacks of the Fort Wainwright central power plant (located on Main Post) to reduce coal particulate emissions has been planned (Griffin, pers. com. 1998).

Fort Wainwright participates in a motor vehicle emissions inspection and maintenance program with the Fairbanks North Star Borough, which is designed to reduce air pollution.

Proposed Mitigation

No additional air quality mitigation measures are recommended.

Cumulative Effects

In addition to military activities, including Army vehicle maneuvers, Air Force aircraft operations, and stationary point sources, point sources from nearby cities and private vehicles all contribute air emissions. Grading of dirt roads has an adverse effect on air quality. Climatological conditions, including vast annual temperature variations, low precipitation, low humidity, and extreme seasonal contrasts in sunlight duration, all contribute to low levels of air mixing and result in low dispersion of air pollutants. These factors combine, creating an environment conducive to episodes of poor air quality.

No Action Alternative

If the renewals are not granted, the military would no longer be able to use the withdrawal lands for training purposes. Military non-point air pollution sources associated with the withdrawal lands would no longer exist. Forest fires associated with controlled burns (as discussed in Chapter 3.15) and lightning

strikes would still create temporary episodes of poor local air quality. Existing point emission sources located off the withdrawal properties would continue to operate. A quantitative value representing the decrease in emissions production is not known as a result of the non-renewal because of the lack of representative air quality data for the Fort Wainwright Yukon Training Area and Fort Greely.

Ice fog generation would decrease in localized areas due to the elimination of military vehicular use of the withdrawal lands. A quantitative value representing the decrease in ice fog production is not known as a result of the non-renewal because of the lack of representative air quality data for the Fort Wainwright Yukon Training Area and Fort Greely.

4.3 TERRAIN

Preferred Alternative

Terrain features, including glaciers, of the Fort Wainwright Yukon Training Area and Fort Greely will be unaffected by the renewal of the withdrawal lands for 50 years.

Existing Mitigation

No mitigative measures exist regarding terrain features.

Proposed Mitigation

No mitigative measures are recommended for terrain impacts.

No Action Alternative

If the withdrawals are not renewed, public or private use of these areas for recreation, wildlife, and forestry will not impact terrain features, including glaciers. It is difficult to predict the extent and nature of changes to terrain as a result of private or commercial use of the lands for mining, agriculture, and homesteads.

4.4 GEOLOGY

Preferred Alternative

Geological conditions in the Fort Wainwright and Fort Greely areas will be unaffected by the Preferred Alternative. Continued military activities will have no inherent interaction with bedrock, surficial deposits, or geologic structures.

Existing Mitigation

No mitigative measures exist regarding geologic features.

Proposed Mitigation

No mitigative measures are recommended for impacts to geologic features.

No Action Alternative

If the withdrawal is not renewed, public or private use of these lands should have no impact on the underlying geologic conditions.

4.5 MINERAL RESOURCES

Preferred Alternative

If the lands remain closed to mineral location and leasing, there will be no impact on the mineral resource except for localized extraction of saleable materials by the Army. However, the Bureau of Land Management (BLM) and the Army may choose, at their discretion, to re-evaluate the status of the mineral closures even if the withdrawal is renewed (U.S. Dept. of the Interior and U.S. Dept. of Defense 1994a and 1994b).. Mineral exploration or development could be allowed in specified areas. Closures would probably remain in effect in the Impact Areas and other places where there is a substantial safety risk due to unexploded ordnance and other hazardous materials.

The economic impact of continued closure is difficult to estimate. Some withdrawal areas have high potential for placer gold, and some potential for lode gold and other mineralization associated with intrusive rocks (see Chapters 3.4 and 3.5 and Figures 3.5.a and 3.5.b).

There has been little detailed delineation or assessment work within the withdrawn lands, but the mineral industry has shown considerable interest in other areas with similar geologic conditions. Gold, silver, lead, zinc, copper, molybdenum, and tin are among the minerals that could be present in this geologic setting.

Improved techniques in geochemistry and geophysics are helping to locate and delineate mineral resources in ways that the "old" methods of geologic mapping could not. The evolution of mining techniques has led to the development of resources previously considered uninteresting or uneconomic, such as the Fort Knox deposit near Fairbanks.

minerals, with the exception of some geothermal possibilities in the Fort Wainwright area and moderate probability of coal in the Fort Greely area. Leasable mineral resources are unlikely to be affected either by the Preferred Alternative or the No Action Alternative.

Existing Mitigation

No mitigative measures exist regarding mineral resources.

Proposed Mitigation

No mitigative measures are recommended for impacts to mineral resources.

No Action Alternative

If the withdrawn lands are opened up to mineral activity, exploration and development, activities could potentially impact soils, surface water, groundwater, and wildlife. However, exploration and development would be subject to applicable Federal and State environmental regulations. Potential impacts would have to be addressed on a case-by-case basis by the land management agencies before activity is approved.

Socioeconomic impacts of development may include increased employment associated with exploration and development activities, and economic benefits if marketable reserves are identified.

Development of mineral resources would result in irreversible depletion; however, the withdrawal areas are currently unproven and therefore unaccounted for in the estimated global reserves.

4.6 SOILS

The environmental standards against which off-road vehicle disturbances and the extent of munitions damage are measured have not yet been adequately defined for the Fort Wainwright Yukon Training Area and Fort Greely. A general rating scheme addressing the levels of off-road vehicle disturbance to Arctic tundra was presented by Rickard and Brown (1974). This rating scheme is used as an evaluation tool when assessing the impacts of off-road maneuvering and munitions damage to the soil surface of the withdrawal lands. The following generalized degrees of impact are arranged in the order of increasing severity of surface disturbance:

Level 1: Aesthetically objectionable - single or low-frequency passes of low-pressure vehicles which produce no marked physical change in the environment, but leave greener strips or belts that persist for several years. Their effects have not yet been environmentally evaluated. Although all other forms of tundra trails are also aesthetically unsightly, they have disruptive physical characteristics which differentiate them from this category.

Level 2: Disturbance to vegetation, including crushing and shearing of woody and shrubby vegetation which occurs during winter road use. No easily measurable impact on soil properties can be observed in this category.

Level 3: Significant destruction of plant cover and breakage or compaction of the surface organic mat occurs to the extent of initiating erosion and measurable increase in thaw depth. This type of impact is characteristic of multiple passes on light snow cover or in summer. Compaction of peat results in increased transfer of heat into and out of the underlying soil.

Level 4: Disruption of the surface peat or other organic material with actual physical displacement or removal of it, generally followed by subsidence of the frozen ground as it thaws, undergoes ponding, or experiences erosion on slopes. This occurs under high frequency passage of moderate- to high-ground pressure vehicles in summer, or under conditions of improper construction and use of winter roads, with associated digging operations and establishment of fire lines.

Preferred Alternative

Concerns regarding impacts to soils by military use under the Preferred Alternative include surface disturbance and erosion due to off-road maneuvering, and soil contamination due to munitions and ordnance firing.

A complete discussion of military facilities and use is presented in Chapter 2.1.3. Currently, Fort Wainwright Yukon Training Area and Fort Greely are used by military and non-military entities. Primarily, these areas are used by the military for training purposes. The Yukon Training Area is utilized year-round, but access is largely limited to the road system due to the steepness of the terrain and thick vegetative cover.

Military Vehicle Maneuvering

Spring, summer, or fall including spring-thaw (or anytime the active layer is unfrozen)

Training Area 4 on the Fort Wainwright Yukon Training Area (Figure 2.b) was used most frequently during 1995 and 1996 (Table 2.f). Training Area 22 on Fort

Greely (Figure 2.c) was used most often during 1988 to 1995 (Table 2.g). Quantitative data is not available on the extent of damage occurring from military vehicle maneuvering on Fort Wainwright Yukon Training Area and Fort Greely. The most severe terrain damage from off-road maneuvering would be expected to occur during the summer months when the ground is not frozen. However, due to Army regulations which restrict off-road maneuvering during spring thaw (1 April to 15 May) and summer months (usually May to September in designated creek bottoms, wetlands, and alpine areas above 2,000 feet in elevation), impacts would not be expected to reach Level 4, the highest severity level. Vehicles are also instructed to remain on marked trails and designated routes until directed otherwise during tactical deployment.

The majority of military activities conducted on Fort Wainwright Yukon Training Area involve off-road maneuvering, which accounts for the majority of soil damage on the Training Areas. Damage from training maneuvers include ruts and tire tracks from military vehicles (Table 4.6.a), and evidence of excavation activities. Overlying vegetation and soil is usually disturbed by these operations. The severity of overland traffic damage and its effect on the local environment can range from compression of microtopographic irregularities (Level 1) to removal of the entire vegetation mat and near surface sediments (Level 4) if restoration practices required by Army regulations are not adhered to. Severity of damage also depends on the width of the tire or track and the weight of the vehicle.

Table 4.6.a Tire and Track Data for the Most Commonly Used Military Vehicles on Fort Wainwright Yukon Training Area and Fort Greely (Richmond *in* Blaisdell 1991 and Dept. of the Army and Navy 1992). * = rough estimate

Vehicle	Width of Track or Tire (Inches)	Width of Vehicle (Feet)	Contact Area (Square Feet)	Weight (Pounds)			
Wheeled Vehicles	Wheeled Vehicles						
HMMWV (High Mobility Multipurpose Wheeled Vehicle)	13.0 16.7	Unavailable Unavailable	0.80 Unavailable	7,519			
HEMTT (Heavy Expanded Mobility Tactical Transporter)	18.7 19.0	Unavailable Unavailable	1.84 1.60	60,350			
Truck 5.0 Ton 2.5 Ton	14.0 9.0	10. 1 * 8.8*	0.54* 0.64*	22,175 13,360			

Table 4.6.a Tire and Track Data for the Most Commonly Used Military Vehicles on Fort Wainwright Yukon Training Area and Fort Greely (Richmond *in* Blaisdell 1991 and Dept. of the Army and Navy 1992).*= rough estimate

Vehicle	Width of Track or Tire (Inches)	Width of Vehicle (Feet)	Contact Area (Square Feet)	Weight (Pounds)		
ATV (All Terrain Vehicle)	8 12	Unavailable	Unavailable	Unavailable		
Tracked Vehicles						
SUSV (Small Unit Support Vehicle)	24.0	2.0	12.70	13,781		
Bradley Fighting Vehicle (CRTC Testing only)	21.0	10.5	22.49	49,325		
Abrams Main Battle Tank (CRTC Testing only)	Unavailable	12.0	Unavailable	115,380		
Snowmachine	15.0	3.5	7.72	433		

The most common impact occurring to soils is the compression of microtopographic relief by overland movement. As the topography of the soil surface is changed by compaction and vegetation removal, the thermal properties of the surface layers may be altered in such a way to affect the stability of the permafrost beneath the surface. The permanently frozen subsurface layers are exposed to increased solar radiation and the underlying ice begins to melt. Subsidence of the surface soil and the ponding of surface water, known as thermokarst, then occurs as the underlying ice disappears (Radforth and Burwash *in* Radforth and Brawner 1977). The depth of the summer thaw can increase after impact but tends to rebound in later years (Walker et al. 1987).

Most severe damage (Level 4) may occur when off-road maneuvering is conducted during the summer months when the active layer is unfrozen. Areas with high moisture content, when exposed to vehicular traffic in summer, typically have the most rapid development of vegetation disturbance (Radforth and Burwash *in* Radforth and Brawner 1977). Drier shrub-covered hillsides support more rugged vegetation, which is more resistant to disturbance by vehicular traffic (Radforth and Burwash *in* Radforth and Burwash *in* Radforth and Brawner 1977).

Low relief areas underlain by sand-sized material of lower ice content are least affected (Walker et al. 1987). In these areas, subsidence does not always

accompany increased thaw, as the volume changes due to ice-melt are minimal. On the other hand, long-term physical modifications are greatest in terrain that is underlain by high-ice-content, fine-grained sediments and has sufficient relief to permit meltwater to run off as the permafrost thaws. Local soil disturbance may expand when the exposed, thawing sediments are located on slopes susceptible to failure. The chance of severe erosion following hillside slumping and hydraulic erosion increases with topographic relief (Walker et al. 1987).

If severe terrain damage and vegetation removal occurs on sloped areas, hydraulic erosion can create gullies and may also contribute to ice melting near the surface. The reduction in the amount of ice near the surface ultimately threatens slope stability due to the loss of the bonding effect of ice to the soil (Radforth and Burwash *in* Radforth and Brawner 1977).

Eroded sediment could be transported to adjacent wetlands threatening the natural function of these highly sensitive hydrologic systems. Soil erosion could also impact the water quality of adjacent streams by increasing suspended sediment. This could cause adverse impacts to benthic invertebrates as well as salmonoid reproduction due to reduction in the penetration of light and an increase in heat absorption (Chapman and McLeod 1987 *in* MacDonald, et al. 1991). Decreased light penetration could also reduce primary production if other factors are not limiting (MacDonald 1991).

Continual use of Training Areas in the form of bivouac operations, Drop Zones, Air Strips, and Firing Points could eventually create large areas of exposed bare soil. These areas are highly susceptible to wind erosion. Soil particles could be picked up by large gusts of wind and deposited on nearby vegetation, including wetlands and tundra. Continual erosion could result in a net loss of soil and an increase in particulate matter levels within the air.

Winter (or anytime the active layer is frozen)

Cross-country travel in vehicles with low ground pressure, such as the Small Unit Support Vehicle (SUSV), is not restricted during the winter months when the ground is frozen and the vegetative mat is protected by the snow cover. The larger tracked Bradley Fighting Vehicle and Abrams Main Battle Tank are allowed to operate only at Fort Greely and are typically used only during the winter months for Cold Regions Test Center (CRTC) studies.

The same sources of impacts are applicable during the winter months as for the summer months. However, little terrain damage results from using oversnow vehicles provided sufficient snow cover (depth and extent) exists (Gray and Male 1981). For snow to withstand wheeled traffic, studies show that it must be

compacted to an average density of at least 1,102.5 pounds per cubic foot (Gray and Male 1981). If there is insufficient snow cover or if vehicles are used too early in the fall or too late in the spring, severe damage can result (Level 3 to Level 4). Winter roads and trails should be constructed so that vehicles do not significantly compact or wear the vegetative layer, preserving its insulative capacity and preventing permafrost degradation.

The effects of snowmachines and other off-road vehicles during the winter include damage to trails, vegetation, and destruction of fish and wildlife habitat (Level 1 to Level 2). Mechanical compaction of the snow can also reduce the snow depth and destroy the air spaces while increasing the snow density and thermal conductivity. These effects inhibit the movement of small mammals beneath the snow and produce lower temperatures that subject the mammals to greater temperature stresses (Gray and Male 1981).

Fuels

Potential spill sites at Fort Wainwright and Fort Greely are those associated with the storage and transfer of fuels. Chapter 2.1.3.3 lists past fuel spills that have occurred on withdrawal lands at Fort Wainwright between 1989 and 1996 and at Fort Greely between 1986 and 1993.

Spills during tanker truck refueling operations could be caused by leaking trucks, open above ground storage tank bottom valves, improper drop tube connections, tank failure or overloading. Although all truck drivers are instructed in proper fuel transferring procedures, spills during refueling operations account for 10% of all spills larger than 100 gallons on Fort Wainwright since 1985. A similar figure was not available for Fort Greely (U.S. Army Corps of Engineers 1996a and 1996b).

The Army utilizes several vehicular tankers (HEMTTs) and 5-ton trucks with collapsible rubber containers for transporting aviation and other fuels to the field for training exercises. Historically, the collapsible containers have been responsible for a large number of fuel spills because they are easily ruptured. Since 1985, approximately 18% of all spills on Fort Wainwright larger than 100 gallons have been associated with portable tanks. A corresponding estimate was not available for Fort Greely (U.S. Army Corps of Engineers 1996a and 1996b).

There are no underground storage tanks located on Fort Wainwright Yukon Training Area, though three are located on Fort Greely West Training Area. If these tanks were to leak, the containers would be drained and replaced. Also, any contaminated soil would be removed and disposed of in accordance with U.S. Army Alaska's standard operating procedures (U.S. Army Corps of Engineers 1996a and 1996b).

Munitions

The primary impact of ammunition use by the Army is the disturbance of soil within the Impact Areas. Quantitative data representing the damage caused by munitions use within Stuart Creek and Oklahoma/Delta Creek Impact Areas are not available. In general, projectiles contain high explosive compounds that detonate upon impact with the ground, creating a crater and distributing steel fragments across the local landscape. Over time, large areas of bare ground result. This could lead to localized episodes of wind and water erosion similar to the disturbance caused by off-road maneuvering. The soil profile may contain embedded shrapnel making removal of the foreign material difficult. Evidence of long-term use of the Impact Areas include thousands of craters, debris from used targetry, pieces of shrapnel, and occasional unexploded ordnance.

It is known that the Impact Areas have been contaminated with evidence of exploded ordnance such as fragments of steel, filler material, munitions residue, and unexploded ordnance.

Brush or forest fires ignited by munitions released during training operations could occur and would result in loss of vegetative cover. Soil erosion and siltation of adjacent water bodies may result after vegetation is removed by fire.

An additional impact of ammunition use by the Army is soil contamination. The extent of soil contamination by ammunition has not yet been determined at Fort Wainwright Yukon Training Area and Fort Greely. Little information is available on the levels of accumulation of explosives residues at active firing ranges. Only frequency of use and composition of munition types are available for the withdrawal areas (Chapter 2.1.3.4 and Appendix 2.C).

The primary muniton types that have been fired into the Impact Areas are small arms and high explosives. The small arms ammunition type does not contain filler material and would not be expected to contribute to chemical contamination of the surrounding soil. Shell casings would be expected to remain within the soil profile. High explosives were the second most commonly used munition in Stuart Creek and Oklahoma/Delta Creek Impact Areas. The dominant filler materials contained in high explosives are TNT and RDX (Appendix 2.C).

Extensive contamination studies assessing the impacts of TNT and RDX on the soil profile and the surrounding local environment at Fort Wainwright Yukon Training Area and Fort Greely do not exist. However, comprehensive studies on the role of munition residues within the soil profile from locations across the country have been completed (Crockett et al. 1997, Jenkins et al. 1994, Walsh et al. 1993, Walsh and Jenkins 1992). TNT and RDX are mobile in the soil.

Thus, residues of these chemicals in the soil can be a source of groundwater pollution both on Army installations and beyond installation boundaries (Crockett et al. 1997, Jenkins et al. 1994, Walsh et al. 1993). Once explosives enter the environment, they may be transformed by microbiological and photochemical processes, creating secondary compounds (Walsh and Jenkins 1992). Information available on chemicals used in munitions expended on the withdrawal lands is presented in Appendix 2.C.

A limited site-specific study was conducted at Fort Greely to determine if munitions fired into the Impact Areas were having any adverse effect on water and sediment quality (U.S. Army Environmental Hygiene Agency 1990). The greatest environmental concern is the migration of contaminants from the Impact Areas. The streams crossing the installation are likely to be the major transport mechanisms.

Water and sediment samples were analyzed upstream and downstream of Fort Greely. Sample locations included Delta River, Jarvis Creek, Delta Creek, Little Delta River, and One Hundred Mile Creek. Chemical parameters collected at Fort Greely (Appendix 3.8.D) decreased in concentration downstream indicating a loss of minerals to the water column and no buildup from munitions. General changes in sediment chemistries were the same for Delta Creek and One Hundred Mile Creek (inside the Oklahoma/Delta Creek Impact Area) as compared to the Little Delta River (outside the Oklahoma/Delta Creek Impact Area). No explosives were detected during sampling of water or sediment and the data indicated the stream chemistries were not adversely affected by munitions (U.S. Army Environmental Hygiene Agency 1990).

A munitions study has not been completed for Fort Wainwright Yukon Training Area.

Air Force training at Stuart Creek and Oklahoma/Delta Creek Impact Areas also has an effect on the natural environment. Chapter 2.1.3.2 discusses the military use of these areas by the Air Force. The primary type of training munition expended by the Air Force is the BDU-33 (excluding 20mm and 30mm aircraft machine gun ammunition). BDU-33 expenditures accounted for over 70% of the total munitions delivered in the withdrawal lands Impact Areas since 1992. Data representing the extent of damage to the Impact Areas as a result of Air Force use have not been collected. Impacts of practice bombs could result in a Level 2 or 3 severity rating. Short-term and long-term effects to the soils would be expected to be similar to those discussed for munitions firing by the Army. Targets are constructed of plywood, steel drums, concrete, or salvaged metal vehicles. Targetry placement and maintenance has an impact on the surrounding soil. These activities require an extensive road system that is used year-round. Removal of vegetation and soil disturbance around targetry by ordnance and maintenance activities can have an effect on the local environment.

Chaff and flares are used by the Air Force on the withdrawal lands. Detailed authoritative data concerning the effects of chaff on land is lacking. However, with the wide dispersion pattern of chaff and the small amounts actually deposited per acre and lack of toxicity, no impact to land resources is anticipated from the deployment of chaff during low-altitude aircraft operations (USAF 1995). Previous Air Force environmental assessments have determined that the use of airborne chaff (under appropriate guidelines) does not produce any significant adverse environmental impact (USAF 1995).

Brush or forest fires ignited by flares released during training operations could occur and result in loss of vegetative cover. Soil erosion and siltation of adjacent water bodies may result after vegetation is removed by fire. The Air Force has established minimum altitudes for flare release that assure burnout plus three seconds of fall time before surface impact, in order to preclude the ignition of ground fires (USAF 1995).

Existing Mitigation

The following programs would continue to provide mitigation for achieving the military's mission while offering environmental protection.

Training exercises conducted on Alaska military lands are regulated by USARAK Range Regulation 350-2. This regulation provides procedures for planning, scheduling, and operating ranges and training areas, and identifies environmental requirements. All actions undertaken by the Army are required to consider their impact to the surrounding environment and to take precautions to avoid impact. These include the refilling and leveling of any foxholes, trench systems, tank traps, hull-down positions, or explosive excavations; conducting vehicular stream crossings in designated areas only; limiting cross-country vehicular travel to established roads and dry trails during spring thaw; and avoiding cross-country movement in creek bottoms, marshes, and moist tundra areas during summer months.

Damage control steps are also included within individual training plans to minimize natural resources damage. These include the protection of known sensitive areas, repair of unavoidable maneuver damage, coordination and permitting of any ground disturbing activities, and scheduling of natural resources and hazardous material inspections of training areas to ensure regulation compliance.

To guide and regulate the actions of Army personnel using and managing training lands, the Army has developed the Integrated Training Area Management (ITAM) program. The goals of ITAM are to inventory and monitor, repair, maintain, and enhance training lands at Army training installations. The Land Condition-Trend Analysis (LCTA) program serves as the inventory and monitoring portion of ITAM. This program inventories land conditions and monitors vegetation trends on military installations. The data provide installation-wide summaries of land use, disturbance, plant cover, vegetation communities, tactical concealment, birds, and small mammals. (See Appendix 2.D).

The ITAM program relies on soil surveys with an inventory of soil resources and evaluation of soil capabilities. The Natural Resources Conservation Service (NRCS) has been funded and has begun the process of completing soil surveys for Fort Wainwright Training Area and Fort Greely West and East Training Areas. These surveys will include the description, classification, and an inventory of soil properties. The establishment of the relationships between geomorphology, soils, permafrost, and vegetation unique to the withdrawal lands as a result of these surveys will also aid in monitoring and rehabilitation operations.

An additional component of ITAM is the Land Rehabilitation and Maintenance (LRAM) program. This program repairs damaged areas and uses land construction technology, such as revegetation and erosion control, to minimize future damage to training lands. These efforts are designed to maintain quality military training lands and minimize long-term costs associated with land rehabilitation.

Proposed Mitigation

A program will be implemented to identify possible muntions contamination to soils of the withdrawal lands. This program is described in Chapter 4.23.2 Proposed Mitigation, Pollution.

Cumulative Effects

Comparative data, such as historical versus current aerial photographs, were unavailable for the withdrawal area. Limited studies have precluded extensive evaluations of cumulative impacts.

The military use of the withdrawn lands as Training Areas and Impact Areas would continue to negatively impact soils. With the continuation of the Land Condition-Trend Analysis and Land Rehabilitation and Maintenance programs,

impacts to soils would be identified and monitored, and areas restored when feasible. An irretrievable loss of soils would occur in areas where munitions have contaminated the soil and rehabilitation is limited by funding and technology.

No Action Alternative

The first evaluation of the returned lands would be an assessment of the extent the lands are contaminated with explosive, toxic, or other hazardous materials. If decontamination was authorized, severe damage (Level 4) to the Impact Areas could possibly result from excavation activities needed for ordnance removal.

If these lands are opened to public land laws, and the State selections become valid, the land would be adjudicated by the Bureau of Management (BLM) for conveyance to the State. The withdrawal lands have been selected by the State of Alaska for various resource values. The selected land uses that would most directly affect soil conditions would be agricultural homesteads, settlements, heavy recreational use, forestry, and mineral development (Chapter 2.1.2). The land uses would be subject to all applicable local, State, and Federal regulations.

Farming activities requiring large scale surface disturbance could result in subsidence, if permafrost is present and if proper planning and control procedures are not followed. These changes in surface relief could damage the land for future farming operations and other purposes (National Academy of Sciences 1973). However, the areas selected for agricultural development would involve only small portions of land, which would decrease the amount of possible disturbance.

The creation of new settlements would require substantial disturbance to the soil surface. Construction activities, including building foundations, water supply systems including wells, waste disposal systems, and transportation rights-of-way, require that vegetation and soil be removed in localized areas. If proper management practices are not followed, erosion and transport of soil may result.

The northeast portion of the Fort Wainwright Yukon Training Area is considered by the State of Alaska as a high potential as an addition to the Chena River State Recreation Area. An accessible trail and road system could result in heavy recreational use. Impacts to the soil environment as a result of off-road recreational use include compaction of the surface vegetative layer and may expose the mineral soil, possibly leading to erosion. In areas underlain by permafrost, surface disturbance may lead to thawing, creating ponds and subsidence. Soil disturbance could result in areas selected for forestry practices. The removal of trees may decrease the vegetative cover, and the soil surface could be disrupted from transportation routes and timber harvesting activities. The reduction in the vegetative cover could result in permafrost thawing.

Problems associated with mineral extraction activities include severe surface disturbances such as removal of the vegetative mat and underlying mineral soil, thawing or removal of permafrost, subsidence, and eventual erosion in the form of gullying. These effects are caused by excavation and extraction of the mineral body and associated transportation routes.

4.7 PERMAFROST

Permafrost is defined as soil material with a temperature below freezing which has existed continuously for two or more years. Disturbances to the delicate thermal balance of permafrost as a result of off-road maneuvering, munitions firing, and wildfires can induce permafrost thawing, which could lead to subsidence and soil erosion. These actions could affect future maneuverability, soil conditions, water quality, aesthetics, and wildlife and aquatic habitat.

Preferred Alternative

As temperatures rise, permafrost soils are at a greater risk of disturbance. When permafrost temperatures are near 32°F, the slightest disturbance is enough to induce thawing. Once vegetation mats are torn and no longer able to provide thermal insulation, the thawing of frozen soil results. Surface runoff may cause soil erosion, and loss of ice may lead to localized volumetric reduction, resulting in subsidence of the surface. In extreme cases, fine textured soils with high ice content may also liquify, become unstable, and move downward on slopes (National Academy of Sciences 1973).

Surface disturbance in permafrost areas often has an adverse impact on the appearance of the surrounding landscape. Removal of surface vegetation, subsidence, erosion, and gully formation from unregulated off-road maneuvering and munitions firing combine to form long lasting visible scars to the landscape.

As permafrost thaws and subsidence results, the resulting erosion can damage existing roads and trails, making them impassable. Uncontrolled off-road use results in a decrease in the amount of land available for future training opportunities, increased safety hazards, decreased tactical maneuverability, increased maintenance costs, and a loss of vegetation, which can ultimately reduce training realism and undermine the training mission.
Thawing of permafrost may affect water quality by increasing suspended sediment values if there is soil movement from the thawed area to a water body. Increased suspended sediment reduces light penetration and increases heat absorption. These factors adversely impact benthic invertebrates and salmonoid reproduction (Chapman and McLeod 1987 *in* MacDonald et al. 1991). Decreased light penetration could also reduce primary production if other factors are not limiting (MacDonald et al. 1991).

An additional military-induced impact on the natural occurrence and formation of permafrost results from prescribed burning and munition wildfires. Limited data are available for the thickness of the active layer (the zone above the permafrost table that thaws in summer and freezes again in winter) after fire in forest stands in Alaska. The active layer is known to be thicker in the successional stands after fire than it is in unburned black spruce forests. The heat produced by the fire seldom causes the organic layer to burn to the permafrost boundary. However, following a fire, the changes in surface albedo (reflectivity of the vegetative cover) and the removal of vegetation and organic mat result in warmer soils and deeper thawing (National Academy of Sciences 1973).

The active layer continues to expand until the vegetation is re-established to its original condition. Data indicate that the active layer thickness increases for at least 15 years after a fire. Even after 40 years, the active layer is somewhat thicker than it is in older stands (National Academy of Sciences 1973). Subsidence of the surface soil and the ponding of surface water, known as thermokarst, occurs as the underlying ice disappears.

Existing Mitigation

Training exercises conducted on Alaska military lands are regulated by USARAK Range Regulation 350-2. This regulation provides procedures for planning, scheduling, and operating ranges and training areas, and identifies environmental requirements. All actions undertaken by the Army are required to consider their impact to the surrounding environment and to take precautions to avoid impact. These include the refilling and leveling of any foxholes, trench systems, tank traps, hull-down positions, or explosive excavations; conducting vehicular stream crossings in designated areas only; limiting cross-country vehicular travel to established roads and dry trails during spring thaw; and avoiding cross-country movement in creek bottoms, marshes, and moist tundra areas during summer months. This regulation is important to the preservation of permafrost due to the close relationship between soil damage and permafrost degradation. Damage control steps are included within individual training plans to minimize natural resources damage. These steps include the protection of known sensitive areas, repair of unavoidable maneuver damage, coordination and permitting of any ground disturbing activities, and scheduling of natural resources and hazardous material inspections of training areas to ensure regulation compliance.

To guide and regulate the actions of Army personnel using and managing training lands, the Army has developed the Integrated Training Area Management (ITAM) program. This program inventories land conditions and monitors vegetation trends on military installations. The data provide installation-wide summaries of land use, disturbance, plant cover, vegetation communities, tactical concealment, birds, and small mammals. Specifically, soil and vegetative data can be used to evaluate permafrost areas. (See Appendix 2.D).

Fort Wainwright and Fort Greely Integrated Natural Resources Management Plans are being developed with specific actions for management and use of permafrost areas.

Proposed Mitigation

A program will be implemented to identify possible muntions contamination to permafrost of the withdrawal lands. This program is described in Chapter 4.23.2 Proposed Mitigation, Pollution.

Cumulative Effects

Limited studies of permafrost located within the withdrawal lands have precluded extensive evaluations of cumulative impacts.

The use of the withdrawn lands for military activities would continue to negatively impact permafrost in areas that are continually utilized for training activities. With the continuation of the Integrated Training Area Management program, impacts to permafrost would be identified and monitored, and areas restored when feasible. An irretrievable loss of land would result in areas where permafrost degradation has been undetected or not rehabilitated due to a long recovery time associated with permafrost.

No Action Alternative

The first evaluation of the returned lands would be an assessment of the extent of contamination with explosive, toxic or other hazardous materials. If lands are contaminated, and a decontamination program is authorized, damage to the Impact Areas may result from excavation activities needed for ordnance removal. Damage would include disruption of the surface peat or other organic material with actual physical displacement or removal of it, generally followed by subsidence of the frozen ground as it thaws, and eventual ponding in areas and erosion on steeper slopes. Damage may not be severe or irreversible if proper mitigative measures are implemented to minimize degradation during excavation such as conducting operations during the winter and stockpiling the vegetative mat.

Nonmilitary land uses that would most directly affect permafrost would be agricultural homesteads and settlements (Chapter 2.1.2). Farming activities, including clearing and cultivation in areas underlain by permafrost, would require surface disturbance and could result in subsidence and changes in surface relief sufficient to make the land useless for future farming operations and other purposes (National Academy of Sciences 1973).

Surface stability is the primary concern for new construction operations in areas of permafrost. Other aspects associated with the establishment of new settlements in permafrost areas that must be considered are domestic water supply, waste disposal, and street systems. Poor site selection for streets in permafrost areas could result in increased temperatures of the surface soil. In the discontinuous permafrost areas where ice is warmer, the increased temperature may be sufficient to melt the ice. Typically, special locations or structural designs are necessary in permafrost areas (National Academy of Sciences 1973).

4.8 SURFACE WATER

Preferred Alternative

Fort Wainwright Yukon Training Area and Fort Greely are utilized by military and nonmilitary entities. Primarily, these areas are utilized by the military for training purposes. Nonmilitary use is considered secondary and involves recreational activities including off-road recreational vehicles (ORRV) use, prescribed burns, and rights-of-way.

The most severe damage to the withdrawal area tends to occur when off-road maneuvering and munitions firing is conducted during the summer months when the active layer is unfrozen. Cross-country vehicular travel is less harmful during the winter months when the ground is frozen and the vegetative mat is protected by the snowpack.

4.8.1 Streamflow

The effects on streamflow by military activities are primarily caused by off-road maneuvering within training areas and ordnance firing into Impact Areas during

the summer months. These activities, when conducted continuously in the same area for a length of time and without remediation, will eventually remove the vegetative cover exposing the mineral soil or organic material underneath. As this exposed material is traveled upon, the soil is compacted creating a smooth surface for precipitation and snowmelt runoff to travel over. Also, the loss of vegetation reduces the amount of rain and snow intercepted by the vegetative canopy and is instead delivered directly to the stream system. Eventually, water velocities are increased and infiltration into the soil profile is decreased, resulting in a greater amount of water reaching the stream system in a shorter amount of time. Overall, changes in the peak flow may have important implications for the stability of the stream channel, size and quantity of the bed material, and sediment transport rates (MacDonald et al. 1991).

No additional impacts to floodplains would occur with the withdrawal renewal. No new development or additional land acquisition is proposed in floodplain areas as part of this withdrawal renewal. Thus, any short or long term adverse impacts associated with the occupancy and modification of floodplains would not be expected. In addition, floodplain development would be avoided, in accordance with Executive Order 11988, Floodplain Management.

4.8.2 Water Quality

Sediment

Military activity conducted near or within water bodies during the summer months can lead to localized erosion and sediment delivery to the stream system. Activities include unplanned stream crossings by military vehicles, ordnance explosions along stream banks within the Impact Areas, and general maneuvers on lands adjacent to streams.

Sedimentation of rivers, streams and adjacent lakes, ponds and wetlands could be caused by military operations. Adverse impacts to benthic invertebrates as well as salmonoid reproduction due to increased sedimentation has been documented. This includes the reduction in the penetration of light and an increase in heat absorption (Chapman and McLeod 1987 *in* MacDonald et al. 1991). However, sedimentation would not be expected to negatively impact larger, naturally sediment-laden glacial streams of the withdrawal lands, such as the Delta River, Jarvis Creek, Little Delta River and Delta Creek. The amount of additional sediment to the stream system is negligible.

The direct erosion of streambanks as a result of military activities in a localized area could be matched by deposition of material on an opposite downstream bank. This could lead to the alteration of channel morphology and bank stability. Stream width could increase, creating a larger stream surface area allowing

more direct solar radiation to reach the stream surface. Bank instability in an area tends to lead to additional erosion on a continual basis. In turn, these actively eroding streambanks support little or no vegetation. This may lead to a decrease in riparian wetlands and forage for wildlife species. Also, the long-term input of organic matter into the aquatic ecosystem could be reduced (MacDonald et al. 1991).

Fuels

Local water quality could also be threatened by fuels (petroleum, oils, and lubricants) and solid waste (garbage and human waste) during military operations. If a large, undetected spill were to occur near or within a surface water body at Fort Greely, waste could migrate downstream and threaten the developments of Delta Junction and Big Delta or eventually reach the Tanana River, which flows by the City of Fairbanks. If an undetected spill were to occur at the Fort Wainwright Yukon Training Area within a tributary of the Chena River, it may cause degradation to the City of Fairbanks. Potential spill sites at Fort Wainwright and Fort Greely are those associated with the storage and transfer of fuels. Chapter 2.1.3.3 lists past fuel spills that have occurred on withdrawal lands at Fort Wainwright between 1989 and 1996 and at Fort Greely between 1986 and 1993.

If a pollutant spill were to result on withdrawal lands, proper cleanup protocol would be followed, as outlined in USARAK Regulation 200-4, Hazardous Waste, Used Oil, and Hazardous Materials Management and Spill Prevention Control and Countermeasure Plans for Fort Wainwright and Fort Greely, to insure rapid and complete decontamination. In addition, all applicable local, State, and Federal regulations would apply.

Human solid waste contamination to water bodies could create increased levels of fecal coliform, fecal streptococci, and enterococci leading to a violation of Alaska Water Quality Standards (Appendix 3.8.C).

Munitions

Impacts to the water quality of submerged lands (property below the mean high level water mark) due to military use is a significant issue with the public concerning this Legislative Environmental Impact Statement. During the scoping process, concerns were expressed over possible surface water contamination of the Delta River as a result of munitions. A series of mitigation measures have been proposed to assess the extent of water quality contamination by munitions (Chapter 4.8 Proposed Mitigation and Chapter 4.23 Proposed Mitigation).

Five types of ammunition have been fired into the Stuart Creek and Oklahoma/Delta Creek Impact Areas by the Army. These are high explosives, smokes, illumination rounds, small arms, and inert. Chapter 2.1.3.4 provides a description of the characteristics, use, and annual expenditure of each ammunition type on the withdrawal lands. Targets constructed of plywood, steel drums, concrete, or salvaged metal vehicles are also located within the Impact Areas. The extent of contamination by munitions has not yet been determined at the Fort Wainwright Yukon Training Area and Fort Greely.

The primary munition types that have been fired into the Impact Areas are small arms and high explosives. The small arms munition was used most frequently at Stuart Creek and Oklahoma/Delta Creek Impact Areas. High explosives were the second most commonly used munition at Stuart Creek and Oklahoma/Delta Creek Impact Areas (Chapter 2.1.3.4). The dominant filler materials contained in high explosives are TNT and RDX. Munition components are listed in Appendix 2.C.

Extensive contamination studies assessing the impacts of TNT and RDX on the soil profile and the surrounding local environment at Fort Wainwright Yukon Training Area and Fort Greely do not exist. However, comprehensive studies on the role of munitions residues within the soil profile from locations across the country have been completed (Crockett et al. 1997, Jenkins et al. 1994, Walsh et al. 1993, Walsh and Jenkins 1992). TNT and RDX are mobile in the soil. Thus, residues of these chemicals in the soil can be a source of pollution both on Army installations and beyond installation boundaries (Crockett et al. 1997, Jenkins et al. 1994, Walsh et al. 1994, Walsh et al. 1993). Once explosives enter the environment, they may be transformed by microbiological and photochemical processes, creating secondary compounds (Walsh and Jenkins 1992). Information available on chemicals used in munitions expended on the withdrawal lands is presented in Appendix 2.C.

A limited site-specific study was conducted at Fort Greely to determine if munitions fired into the Impact Areas were having any adverse effect on water and sediment quality (U.S. Army Environmental Hygiene Agency 1990). The greatest concern is the migration of contaminants from the areas. The streams crossing the installation are likely to be the major transport mechanisms.

Water samples were analyzed upstream and downstream of Fort Greely. Sample locations included Delta River, Jarvis Creek, Delta Creek, Little Delta River, and One Hundred Mile Creek. Several of the water quality parameters collected at Fort Greely (Appendix 3.8.D) increased in concentration downstream. However, these minerals were available in substantial quantities in the upstream

(background) sediment samples. In addition, the water samples were not filtered, and the heavy load of glacial flour suspended in the water column contributed to the increases. This was especially true for aluminum, iron, barium, and phosphorous because they are only slightly soluble in surface water with a neutral pH. The general changes in water chemistries were the same for Delta Creek and One Hundred Mile Creek (inside the Impact Area) as they were for the Little Delta River (outside the Impact Area). No explosives were detected during sampling and the data indicated the stream chemistries were not adversely affected by munitions (U.S. Army Environmental Hygiene Agency 1990).

A munitions study was not completed for Fort Wainwright Yukon Training Area.

U.S. Air Force training at Stuart Creek and Oklahoma/Delta Creek Impact Areas also has an effect on the natural environment. Chapter 2.1.3.2 discusses the military use of these areas by the U.S. Air Force. The primary type of training munition expended by the Air Force is the BDU-33 (excluding 20mm and 30mm aircraft machine gun ammunition). Effects of these practice bombs could result in disturbance of streambanks within the Impact Areas. Data representing the extent of damage to the Impact Areas as a result of Air Force use have not been collected. Short-term and long-term effects would be expected to be similar to those discussed for munitions firing by the Army.

Chaff and flares are used as a defense mechanism on withdrawal lands. Chaff is relatively insoluble in water. Chaff landing on water would either be submerged or driven across the surface by wind. Chaff in water bodies could be consumed by wildlife or fish. No change in dissolved oxygen content or temperature from the introduction of chaff into the water would be expected (Block and Schiff 1977 *in* USAF 1995, USAF 1989 *in* USAF 1995). The current form of chaff used by the Air Force is non-toxic to fish and mammals.

Flares used in training exercises would have no affect on the underlying surface water. The flares would be extinguished once they reached the body of water.

4.8.3 Ice Bridges

The effects of ice bridges on the environment are short term and localized to the areas where they are constructed. Ice bridge construction involves direct contact with the streambanks and surrounding areas of the Delta River and Jarvis Creek. The State of Alaska Department of Natural Resources, Division of Land issued a Land Use Permit for the purpose of construction and use of ice bridges and associated work areas at bridge sites. This permit requires that activities employing wheeled or tracked vehicles shall be conducted in such a manner as

to minimize surface damage, and that existing roads and trails shall be used whenever possible. All activities must minimize disturbances of natural drainage systems including channel morphology, water quality and quantity.

Effects to fish and wildlife resources must also be avoided. All hazardous waste, garbage, and other debris must be removed from the work site. Prior to termination of permit activities, the military must dismantle ice bridges so that the melting rate coincides with those of naturally occurring ice formations in the area.

An annual report summarizing ice bridge design specifics, damage associated with construction and use, and number of personnel involved in the exercise must be submitted within thirty days of the anniversary of the effective date of the authorization. If these stipulations are not adhered to, the Land Use Permit will not be renewed for the following year, terminating all ice bridge construction by the military.

In addition to ice bridge permit revocation, deviations from the Land Use Permit provisions may lead to adverse impacts to local and surrounding resources. Construction and excavation techniques could cause excessive scarring or removal of vegetation. It has been shown that compression and removal of surface vegetation causes an increase in thermal conductivity once the snow cover melts.

Also, the buildup of snow for bridge construction tends to persist longer than the surrounding snow cover during the thaw season and may have a retarding effect on plant growth in the area for the following season (Radforth and Burwash *in* Radforth and Brawner 1977).

Inadequate bridge design or improper load capacities could cause sagging of the bridge. The velocity of the stream may increase in certain areas resulting in increased erosion along the streambank (Gray and Male 1981).

4.8.4 National Wild and Scenic Rivers System

The proposed withdrawal renewal would not affect the current Wild and Scenic Rivers designation of the Delta River. If the No Action Alternative is selected, the Bureau of Land Management would not anticipate on extending the Wild and Scenic River designation of the Delta River onto the withdrawal lands (Bonnell, pers. com. 1999, Wilson, pers. com. 1999).

Existing Mitigation

Training exercises conducted on Alaska military lands are regulated by USARAK Range Regulation 350-2. This regulation provides procedures for planning,

scheduling, and operating ranges and training areas, and identifies environmental requirements. All actions undertaken by the Army are required to consider their impact to the surrounding environment and to take precautions to avoid impact. These include the refilling and leveling of any foxholes, trench systems, tank traps, hull-down positions, or explosive excavations; conducting vehicular stream crossings in designated areas only; limiting cross-country vehicular travel to established roads and dry trails during spring thaw; and avoiding cross-country movement in creek bottoms, marshes, and moist tundra areas during summer months. These precautions will decrease the incidence of soil erosion and subsequent sedimentation causing degraded water quality.

In addition to these environmental considerations, damage control steps are also included within individual training plans to minimize natural resources damage. These steps include the protection of known sensitive areas, repair of unavoidable maneuver damage, coordination and permitting of any ground disturbing activities, and scheduling of natural resources and hazardous material inspections of training areas to ensure regulation compliance.

Additionally, the military must comply with all applicable State and Federal statutes involving water resources. The Alaska State Drinking Water Standards establish maximum contaminant levels and monitoring requirements for public water systems. The standards for each regulation are discussed in Appendix 3.8.D.

Proposed Mitigation

A water quality sampling program will be established for the withdrawal lands. The study effort will include an analysis of surface water bodies, with monitoring stations located directly upstream and downstream of the installations.

Cumulative Effects

Comparative data were unavailable for the withdrawal area. Limited studies have precluded extensive evaluations of cumulative impacts.

The continued use of the withdrawal lands for military training activities will have the greatest impact on surface water quality. Off-road maneuvers and ordnance firings will cause surface disturbance that can lead to increased sediment loads to the stream system. The Integrated Training Area Management program will continue to monitor and correct any erosion and sediment delivery problems.

No Action Alternative

The first evaluation of the returned lands would be an assessment of the extent the lands are contaminated with explosive, toxic, or other hazardous materials.

If they are contaminated, the Secretary of the Interior and Secretary of the Army would determine if decontamination is practicable and economically feasible. Although it is not specifically stated, waters within the withdrawal lands should also be considered during decontamination activities.

Once these lands are sufficiently decontaminated, they would be open to public land laws, State selections would become valid, and the lands would be adjudicated by the Bureau of Land Management (BLM) for conveyance to the State of Alaska. Areas of the withdrawal lands have been selected by the State of Alaska for certain land uses. The land uses that would most directly affect surface water quality and quantity would be agricultural homesteads and settlements, and forestry (Chapter 2.1.2). The land uses would be subject to all applicable local, State, and Federal regulations.

Farming activities, once established, may pose a water quality threat to the surrounding stream system. If agricultural chemicals are applied, they could be transported to the nearest surface water source, causing contamination.

The creation of new settlements would require water supply systems including waste disposal systems. Overuse or improper design of these systems could result in surface water contamination.

Disturbance to water quality and quantity could result in areas selected for forestry practices. The removal of trees will decrease the vegetative cover, which may lead to increased peak flows. Also, increased erosion and sediment transport to the stream system could lead to degraded water quality.

The military would lose its ability to use the withdrawal lands for training purposes and there would be no need for ice bridge construction. The existing permits required for ice bridge construction would expire and not be renewed.

4.9 GROUNDWATER

In general, groundwater exists in large supply on the withdrawal lands and is the primary drinking water source. Based on limited information, the overall groundwater quality on the withdrawal lands is good. The only naturally occurring water quality parameter with measured values above the set standard is iron (Appendix 3.9), which was collected at Fort Wainwright. All of the water quality parameters measured at Fort Greely were below the concentrations recommended by the Alaska Drinking Water Standards (18 AAC 80) (Appendix 3.9). Continued use by the military would not affect the amount of groundwater

available for use. However, groundwater quality could be negatively impacted by military operations.

Preferred Alternative

4.9.1 Groundwater Occurrence

Groundwater sources of Fort Wainwright Yukon Training Area and Fort Greely would be unaffected by the Preferred Alternative.

4.9.2 Groundwater Quality Fuels

The primary potential spill sites at Fort Wainwright are those associated with the storage and transfer of fuels. Areas that are relatively flat with well-drained, very fine sand and silts overlying stratified gravel and gravelly sand with permeability rates of 5 to 10 inches per hour would limit the horizontal migration of spilled fuel as opposed to vertical migration (U.S. Army Corps of Engineers 1996a and 1996b). Areas with the highest permeability rates are located along the floodplains of the Tanana and Chena rivers, and where depth to the water table averages between 10 and 20 feet. In areas free of permafrost, contamination to the water table during a major oil discharge onto unfrozen ground is possible. In areas with permafrost and poorly-drained soils, such as creek valley bottoms, the permafrost acts as a confining layer above the aquifer. Oil spills in these areas would be confined above the permafrost areas and would migrate laterally downgradient in a flow direction similar to the Tanana and Chena rivers (U.S. Army Corps of Engineers 1996a and 1996b). Chapter 2.1.3.3 lists past fuel spills of 10 gallons or more that have occurred on withdrawal lands at Fort Wainwright between 1989 and 1996.

Similar to Fort Wainwright, the primary potential spill sites at Fort Greely are those associated with the storage and transfer of fuels. Areas that are relatively flat with well-drained, very fine sand and silts overlying stratified gravel and gravelly sand would limit the horizontal migration of spilled fuel. Depth to the water table averages between 170 and 220 feet. Oil spills in areas where permafrost exists would be confined above the permafrost areas not reaching the water table and would also migrate laterally downgradient in a northeasterly direction (U.S. Army Corps of Engineers 1996a and 1996b). Chapter 2.1.3.3 lists past fuel spills of 55 gallons or more at Fort Greely between 1986 and 1993.

A large diesel spill resulted at the Fort Greely Main Post area when a Petroleum, Oil, and Lubricants (POL) line broke in the winter of 1982. The quantity of the spill was estimated to be in excess of 50,000 gallons. It was determined that the spill was bound in the soil structure. Over time, the fuel could migrate to the groundwater table as precipitation and snowmelt (U.S. Army Corps of Engineers 1994). All applicable U.S. Army regulations regarding spills were implemented.

Spills during tanker truck refueling operations could be caused by leaking trucks, open above ground storage tank bottom values, improper drop tube connections, tank failure, and overloading. Although all truck drivers are instructed in proper fuel transferring procedures, spills during refueling operations account for 10% of all spills larger than 100 gallons on Fort Wainwright since 1985. A corresponding estimate was not available for Fort Greely (U.S. Army Corps of Engineers 1996a and 1996b).

The Army utilizes several vehicular tankers and collapsible rubber containers for transporting aviation and other fuels to the field for training exercises. Historically, the collapsible containers have been responsible for a large number of fuel spills because they are easily ruptured. Since 1985, approximately 18% of all spills on Fort Wainwright larger than 100 gallons have been associated with portable tanks. A corresponding estimate was not available for Fort Greely (U.S. Army Corps of Engineers 1996a and 1996b).

There are no underground storage tanks located on Fort Wainwright Yukon Training Area, though three are located on Fort Greely West Training Area. If these tanks were to leak, the containers would be drained and replaced and proper cleanup operations would be conducted as required by U.S. Army Alaska regulations (U.S. Army Corps of Engineers 1996a and 1996b).

An additional area of potential groundwater contamination is the area downgradient of the landfill located on the Fort Greely Main Post. Materials from the landfill could migrate to the groundwater table from the infiltration of precipitation and snowmelt. Monitoring wells installed near the landfill do not indicate any contamination. However, deposits underlying the immediate area are composed of relatively clean gravel and sands to moderately silty gravels and sands, which would allow contaminant movement (U.S. Army Corps of Engineers 1994).

Contamination events occurring off of the withdrawal lands pose a threat to the quality of the underlying groundwater as a whole. Contamination of the groundwater supply could inhibit future use by the military and public down gradient from the source.

Existing Mitigation

USARAK Regulation 200-4 outlines proper management of hazardous wastes, used oils, and other hazardous materials. It mandates specific policies for the

management of these items, including storage and labeling requirements, proper handling, training requirements, pollution prevention, and transport and disposal requirements.

Spill Prevention Control and Countermeasure Plans exist for Fort Wainwright and Fort Greely. The plans document methods implemented at each installation to prevent oil spills from reaching navigable waters and/or groundwater. They include spill prevention, discovery, and emergency notification procedures. Fort Wainwright and Fort Greely conduct "cradle to grave" management of hazardous materials. Records are maintained on anything that transpires over the "lifetime" of any hazardous material on the installation. Documentation is required for equipment inspections, tests, and repairs; personnel fuel handling and spill response training; reportable spills; corrective actions to prevent recurring spills; and investigations including soil, surface water, and/or groundwater.

Proposed Mitigation

Existing groundwater data for the withdrawal lands will be organized and evaluated for completion of a more detailed groundwater quality assessment. Any future monitoring efforts will be based on these assessments. Once a sampling scheme is developed, monitoring for munitions by-products will be included.

Cumulative Effects

Limited studies of groundwater on the withdrawal lands have precluded an extensive evaluation of cumulative impacts.

No severe negative impacts to the groundwater quantity or quality are associated with military activities. The quantity of groundwater underlying the withdrawal areas is very large and is constantly recharged from surface water sources. Localized areas of contamination may occur as a result of fuel oil spills. However, strict regulations and response procedures regarding spills are followed by the military.

No Action Alternative

The withdrawal lands have been selected by the State of Alaska for certain land uses. The land uses that would most directly affect groundwater quantity and quality would be agricultural homesteads and settlements (Chapter 2.1.2). Although not directly stated in the Evaluation Units for Final State Land Selections (1992), agricultural activities may require groundwater sources for irrigation. Also, the use of agricultural chemicals could pose a contamination threat to underlying groundwater. Residential settlements would also require water sources, most likely in the form of groundwater wells, for inhabitation.

Septic systems and other waste disposal methods would also be associated with the settlements and could create localized contamination. The land uses would be subject to all applicable local, State, and Federal regulations.

4.10 WETLANDS

Preferred Alternative

Fort Wainwright Yukon Training Area and Fort Greely are utilized by military and nonmilitary entities. Primarily, these areas are utilized by the military for training purposes. These activities may cause various detrimental impacts to wetlands and ultimately affect surrounding soils, permafrost, and water bodies. A complete discussion of military facilities and their uses is presented in Chapter 2.1.3.

The distribution of wetlands within the withdrawal areas is presented in Chapter 3.10 and Appendix 3.10. Knowledge of the areal extent of wetlands in the withdrawal areas is limited. Current data were collected in 1992 by the U.S. Fish and Wildlife Service as part of the National Wetlands Inventory (NWI). All but 5% of the Fort Wainwright Yukon Training Area was surveyed by this program. However, approximately half of Fort Greely (54%) was not surveyed. Inferring from current data, it is apparent that wetlands exist within Impact and Training Areas, mainly along floodplains and stream corridors (Figures 3.10.a and 3.10.b).

The most severe damage to wetlands tends to occur when off-road maneuvering and munitions firing is conducted during the summer months, when the active layer is unfrozen. Areas with high moisture content (wetlands), when exposed to vehicular traffic in summer, typically have the most rapid development of vegetation disturbance (Radforth and Burwash *in* Radforth and Brawner 1977). Cross-country vehicular travel is less harmful during the winter months when the ground is frozen, and the vegetative mat is protected by the snowpack. A proper thickness of snow will protect wetland vegetation, preserving its insulative capacity.

Permits are required by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act for wetland modification by mechanized equipment. Typically, the density and inundation with water of wetland areas prevent maneuvering during much of the time. However, wetlands are present within each Impact and Training Area, and even though off-road military exercises are regulated, some disturbance may occur. The military may maneuver or conduct foot traffic in wetland areas as long as the wetlands are not disturbed. If wetland areas are disturbed, they must be promptly reclaimed.

Many impacts occur to the surrounding environment as a result of wetland disturbance and loss. One effect of the removal of wetlands in an area is an increase in peak flows downstream. Although wetlands in permafrost-dominated areas contribute only slightly to flood storage, when wetland vegetation is removed and natural depressions are eliminated, water will no longer be detained in these areas. Removal of vegetation can lead to increased water velocities, leading to greater amounts of water delivered downstream. In addition, the amount of time between precipitation inputs and the greatest amount of storm discharge (lag time) will shorten.

Removal and disruption of wetlands can also affect low flows, which occur in late summer and early fall, of surrounding stream systems. Low flows may increase because the removal of vegetative cover reduces evapotranspiration and rainfall interception. Regular flows may return once the wetland is fully revegetated.

An additional effect to the local environment as a result of wetland disturbance is loss of erosion control. Wind and water velocities could increase near the ground. Soil particles would loose their stability once the vegetative roots are removed, making transport of the soil particles easier.

Wetlands provide insulation for underlying permafrost by preventing warming and eventual thawing of permafrost-rich soils. Disturbance or removal of wetland vegetation can increase local erosive forces creating thermokarst conditions.

Wetlands in floodplain areas also aid in erosion control in a limited capacity by removing suspended sediment from floodwaters. Wetland vegetation in these areas help to stabilize the riverbank, preventing streambank collapse and the widening and deepening of channels. Stream width increases result in a larger stream surface area allowing more direct solar radiation to reach the stream surface. Also, bank instability in an area leads to additional erosion on a continual basis. In turn, these actively eroding streambanks support little or no vegetation, leading to a decrease in riparian wetlands and forage for wildlife species. Also, the long-term input of organic matter into the aquatic ecosystem will be reduced (MacDonald, et al. 1991).

Wetland disturbance can lead to a loss of a natural filtering mechanism. Wetlands can filter out or transform waterborne constituents through a variety of biological and chemical processes. For example, increased suspended sediment concentrations, a direct result of erosion and sediment transport, can reduce the penetration of light, and sustained suspended sediment levels could ultimately reduce primary production if other factors are not limiting. Impacts to wetlands are minimized by various Army, Federal, and State laws and regulations. The Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act require permits before construction work using mechanized equipment occurs, in order to maintain wetland integrity. Section 10 of the Rivers and Harbors Act requires permits prior to commencing any work or structures built in navigable water of the United States. Such work includes dredging and bank stabilization. Section 404 permits are required for the discharge of dredged or fill material into a water of the United States, including wetlands.

Current knowledge regarding the status of wetlands located within the withdrawal boundaries is based upon the U.S. Army Corps of Engineers permitting system, which is required by Section 404 of the Clean Water Act. According to Section 404, wetland modification will occur only in designated areas with the acceptance of a permit application by the U.S. Army Corps of Engineers. A total of 114.86 acres, based on U.S. Army Corps of Engineers permitting records, have been disturbed by military activities since 1989 (Table 4.10.a).

These permits usually contain special provisions that require the permittee to maintain natural drainage patterns to prevent flooding or excessive drainage of nearby wetlands, stabilize construction areas to prevent erosion, prevent encroachment upon adjacent wetlands, and implement a plan to avoid future disturbance and reestablish vegetation when such disturbance cannot be avoided.

In addition, Executive Order 11990, Protection of Wetlands, requires that Federal agencies minimize any significant action that contributes to the loss or degredation of wetlands and that action be initiated to enhance their natural value. It is the Department of the Army's policy to avoid adverse impacts to existing aquatic resources and offset those adverse impacts when they are unavoidable. Additionally, the Army will "strive to achieve a goal of no net loss of values and functions to existing wetlands, and permit no overall net loss of wetlands on Army controlled lands". Furthermore, the Department of the Army will take a progressive approach towards protecting existing wetlands, rehabilitating degraded wetlands, restoring former wetlands, and creating wetlands in an effort increase the quality and quantity of the nations's wetlands resource base. To meet this requirement, identification and maintenance of a wetlands inventory is essential (DA 1995).

Since military activities conducted on the withdrawal renewal lands would be consistent with those conducted during the past 15 years, and the Army is not proposing to expand or add Impact Areas on the withdrawal lands, and various wetland damage mitigation measures are planned, an increase in future impacts to wetlands are not expected to occur if the renewal is granted.

Existing Mitigation

A wetland planning-level survey was recently completed at Fort Wainwright Yukon Training Area and a similar study is in progress at Fort Greely. A wetlands management and revegetation plan is funded and in progress for the withdrawal lands. Fort Wainwright and Fort Greely Integrated Natural Resources Management Plans are under final review by the Army and BLM with specific actions for management of wetland areas.

Training exercises conducted on Alaska military lands are regulated by USARAK Range Regulation 350-2. This regulation provides procedures for planning, requesting, and operating ranges and Training Areas with USARAK and highlights certain environmental aspects to be taken into consideration. All actions undertaken by the U.S. Army are required to consider their impact to the surrounding environment and to take certain precautions to avoid impact. Wetlands use permits are obtained through the U.S. Army Corps of Engineers permitting process. In addition to these environmental considerations, damage control steps are also included within individual training plans to minimize natural resources damage.

Proposed Mitigation

Additional wetland mitigation will be determined by the U.S. Army Corps of Engineers through the permitting process for the Clean Water Act, Section 404.

Cumulative Effects

Severe negative impacts to wetlands associated with military activities are minimal because unauthorized military activity is strictly prohibited in wetland areas. According to Section 404 of the Clean Water Act, wetland modification will occur only in designated areas with the acceptance of a permit application by the U.S. Army Corps of Engineers. A total of 114.86 acres or 0.0132% of the withdrawal lands, based on U.S. Army Corps of Engineers permitting records, have been disturbed by military activities since 1989 (see Table 4.10.a). Since future military activities are presumed to be similar to current operations and wetland restoration techniques are currently applied, cumulative impacts to wetlands over time would not be expected to be significant. Third party development interests, including rights-of-way granted by the Bureau of Land Management, would also not be expected to greatly impact the distribution of wetlands on the withdrawal lands. A more complete survey of wetland type and location will aid military operation coordinators in planning field exercises away from these sensitive areas.

No Action Alternative

The first evaluation of the former withdrawal lands would be an assessment of the extent any wetland areas are contaminated with explosive, toxic or other hazardous materials. If they are contaminated, the Secretary of the Interior and Secretary of the Army would determine if decontamination is practicable and economically feasible. If the lands were deemed unusable, they would sit idle until decontamination was authorized by the Army. Decontamination would involve the physical removal of all ordnance from the Impact Areas.

Once these lands are sufficiently decontaminated, they would be open to public land laws, State selections would become valid, and the lands would be adjudicated by the Bureau of Land Management (BLM) for conveyance to the State of Alaska. Areas of the withdrawal lands have been selected by the State of Alaska for certain land uses. The ensuing land uses would be subject to the same requirements as the military as stated in Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. Thus, any new agricultural, construction, forestry, or mining activity would need a permit prior to initiation. The land uses would be subject to all applicable local, State, and Federal regulations.

4.11 VEGETATION

No Federal or State threatened, endangered, or proposed plant species are listed as occurring within or near the withdrawal lands and no listed plant species have been found on the withdrawal lands during field surveys. Chapter 3.14 contains a discussion on rare plants found on the Fort Wainwright Yukon Training Area. Appendix 3.14 contains the informal consultation response from the U.S. Fish and Wildlife Service regarding threatened and endangered species and the withdrawal of Fort Wainwright Yukon Training Area and Fort Greely West and East Training Area.

Military activities that affect vegetation on the withdrawal lands include direct impacts from bombing and artillery firing into Impact Areas, foot maneuvers, and tracked vehicle use. Establishment of Maneuver Areas, Firing Points, Observation Points, Bivouac Sites, Firing Ranges, Assault Strips, and Drop Zones all damage and/or destroy vegetation. Although these areas are dispersed over large land areas, cumulative impacts to vegetative communities occur.

Preferred Alternative

Retention of the lands by U.S. Army Alaska would have some negative effects on vegetation on the withdrawal lands. Rehabilitation of areas under the Land Rehabilitation and Maintenance (LRAM) program would mitigate negative impacts (See Appendix 2.D).

Impacts of military activities to vegetation include breaking and crushing of plants and direct mortality. This can directly or indirectly alter plant communities, structure, and 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).

Tracked vehicles can cause direct mortality to plants and indirectly affect plant communities through soil compaction and by altering competitive relationships (Milchunas et al. 1998). Shaw and Diersing (1989 & 1990) investigated the impacts of tracked vehicles on short grass steppe vegetation that had not previously been used for this type of activity. They found that tracked vehicles decreased plant litter, vegetative ground cover, and basal cover, while bare ground increased. The reduction in cover was accompanied by changes in species composition. As the amount of cover decreased, cool-season grasses and warm-season forbs replaced perennial warm-season grasses. Decreases in succulents, shrubs, and trees resulted with the occurrence of secondary succession in disturbed areas. Large military vehicles can alter vertical and horizontal structure of plant communities (Severinghaus et al. 1981). Van Cleve (1977) considered tracked vehicles the most widespread cause of disturbance to Arctic ground surfaces.

Disturbed areas result in soils becoming more compacted (Braunack 1986, Prose 1985, Goran et al. 1983). Increased soil compaction can indirectly alter plant communities by affecting seedling establishment, plant water and nutrient uptake, root penetration, and cause invasion 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. There was less ground cover resulting in an increase in bare ground and bulk soil density, with significant soil loss in some areas. Soil compaction occurred, resulting in crown die-back, although canopy cover was not significantly different between bivouac sites and non-bivouac sites.

Fire from military activities impacts vegetation. Vegetation in these areas is kept in varying successional stages, maintaining diversity of vegetation composition. A greater number of fires occur on the withdrawal lands due to incendiary devices. The Impact Areas and some of the Buffer Zones are burned periodically.

Existing Mitigation

U.S. Army Alaska Regulation 350-2 Range Regulation, U.S. Army Regulation 200-2, Environmental Effects of Army Actions, and U.S. Army Regulation 200-3 Natural Resources-Land, Forest, and Wildlife Management, provide procedures for protecting vegetation.

Floristic inventories have been completed to collect, identify, and catalog all vascular plants on Fort Wainwright Yukon Training Area. Inventories are being conducted on Fort Greely. Vegetation mapping has been completed to identify ecosites on Fort Wainwright Yukon Training Area and is being conducted at Fort Greely as part of the Ecological Land Classification. The Ecological Land Classification will allow U.S. Army Alaska to manage lands on an ecosystem level.

To guide and regulate the actions of Army personnel using and managing training lands, the Army has developed the Integrated Training Area Management (ITAM) program. The goals of ITAM are to inventory and monitor, repair, maintain, and enhance training lands at Army training installations. The Land Condition-Trend Analysis (LCTA) program serves as the inventory and monitoring portion of ITAM. This program inventories land conditions and monitors vegetation trends on military installations. The data provide installation-wide summaries of land use, disturbance, plant cover, vegetation communities, tactical concealment, birds, and small mammals. Land Rehabilitation and Maintenance (LRAM) projects are being conducted to restore vegetation (See Appendix 2.D).

Forest Management Plans for Fort Wainwright and Fort Greely are being prepared as part of the Integrated Natural Resources Management Plans.

Proposed Mitigation

The forest resources inventory will be implemented and results used to complete and implement the Forest Ecosystem Management Plans that are part of the Integrated Natural Resources Management Plans.

Cumulative Effects

The use of the withdrawal lands for military activities would continue to cause some negative impacts on vegetation in areas such as Drop Zones, Assault Strips, and Impact Areas. With the continuation of the Integrated Training Area Management Programs (LCTA and LRAM), impacts to vegetation would be identified and monitored, and areas restored when feasible. There would be some irretrievable impacts to vegetative communities in areas that are used frequently or developed for military training. The extent of vegetation disturbance that would cause irretrievable impacts can not be quantified at this time because the research programs have only been in force a few years and little data are available.

No Action Alternative

Damage to vegetative communities from military activities would decrease. U.S. Army Alaska has the ability to restore some of the vegetative communities disturbed by military activity through the LRAM program. If the withdrawn lands are not renewed for military use, LRAM projects would be discontinued and some areas would not be rehabilitated. These lands would remain damaged and scarred.

It is difficult to assess future use of most of the withdrawal lands if they are returned to the State. The Beaver Creek area of Fort Wainwright Yukon Training Area would receive increased use when the State implements plans to create a loop trail and build a cabin near the creek. Vegetation in this area would be destroyed in construction of the trail, cabin, and from possible camping along the trail. Roads and trails could receive increased use by the public, which could damage vegetation near these areas.

Mining, forestry, agriculture, and settlements may occur if the lands are returned to the State. These activities would alter and possibly destroy vegetative communities.

4.12 WILDLIFE

The U.S. Fish and Wildlife Service has listed one Federally endangered species, the American peregrine falcon, and one Federally delisted species, the Arctic peregrine falcon, as occurring within the area of Fort Wainwright Yukon Training Area and Fort Greely. Confirmed sightings of falcons have occurred on Fort Wainwright and Fort Greely.

The U.S. Forest Service has listed the trumpeter swan and osprey as sensitive species. Trumpeter swans have been confirmed on the Fort Greely West Training Area and osprey have been found on Fort Wainwright and Fort Greely.

No State listed threatened or endangered wildlife species are documented as occurring within or near the withdrawal lands. Four passerines listed by the State of Alaska as "species of concern" have been confirmed on the withdrawal lands. The species are the olive-sided flycatcher, gray-cheeked thrush, Townsend's warbler, and blackpoll warbler. Chapter 3.14 and Appendix 3.14 contain more information on Federal and State listed species.

Impacts to wildlife species and their habitat is a significant issue with the public concerning this Legislative Environmental Impact Statement. During the scoping process, concerns were expressed over possible disturbance to bison, moose, caribou, and their habitat. U.S. Army Alaska is working with the Alaska Department of Fish and Game to minimize disturbance to these wildlife populations during sensitive times, such as calving season, and to protect sensitive habitat.

Some research has been conducted on the withdrawal lands to identify sensitive habitat and impacts to wildlife from military activities. Studies of Dall sheep, grizzly bear, bison, and caribou have been conducted, and present management reflects research findings and recommendations.

Researchers debate whether investigating the impacts to wildlife from military activities should be evaluated at the population level or on the responses of a few animals. Tazik et al. (1992) stated it is important to take the population-based view. "If the local population is stable and relatively abundant, then adverse impacts that affect only a few individual animals should be considered insignificant". Most research studies however, measure the immediate rather than long-term effects due to difficulty in gathering long-term data over many years and several generations.

In some species, immediate effects and population effects are clearly correlated. In a study of caribou calves, survival was negatively correlated to exposure to low-level overflights of military jet aircraft (Harrington and Veitch 1992).

Preferred Alternative

Military activity does negatively affect individual animals and could affect populations. The methods taken by the military to manage these problems could determine if effects are short or long-term. No studies have been conducted on the withdrawal lands to measure military activity disturbance on specific species. Management guidelines relating to minimal disturbance of animals during sensitive periods and minimum damage to sensitive habitats will decrease negative effects on individual animals and populations. These sensitive periods and sensitive habitats are identified in Chapter 3.12.

Wildlife responses to and impacts from noise caused by fixed wing aircraft and helicopters is the most researched impact from military activities. Information is also available on wildlife responses to off-road vehicles, mainly 4-wheel and snowmachine use. Noise, more than sight of machines, causes disturbance to wildlife. It can be assumed that other machines, such as tracked vehicles, used by the military, cause similar responses from wildlife.

The following review of research findings for specific wildlife species gives a better understanding of the complexities involved in estimating disturbance levels and minimizing negative impacts to wildlife from military activity, while meeting the requirements of the military mission.

Grizzly Bear and Black Bear - No studies have been conducted to analyze the specific effects of military activities on grizzly and black bears (USAF 1995). One study noted that grizzly bears panicked, stumbled, and ran when exposed to noise from aircraft (Golden et al. 1979). Bears have been observed to retreat to dens when disturbed by aircraft, and potential den sites may be abandoned during periods when dens are sought (Harding 1976, USAF 1992). Periods of sensitivity are during mating, postpartum (shortly after birth), and during feeding concentration times (USAF 1992).

Grizzly bears and black bears are distributed throughout the Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas. Fort Greely West Training Area has a grizzly bear intensive spring use area along the Delta River in the southern portion of the West Training Area due to bison calving in the area. A portion of the intensive spring use area lies within the Washington and Texas Ranges. These are Dedicated Impact Areas and as such, the bears could be negatively impacted by live firing, bombing, and noise disturbance.

On Fort Greely, grizzly bears are known to concentrate in the riparian areas along Buchanan Creek, the East Fork Little Delta River and Delta Creek to Dinosaur Ridge. The southern portion of the West Training Area is a breeding and cub rearing area (Reynolds, pers. com. 1998). The only area of intense military activity is the riparian area along Delta Creek. This area is part of the Oklahoma/Delta Creek Impact Area and is subject to intense military air-to-ground training and bears could be disrupted from feeding.

The extent to which negative impacts would affect the grizzly and black bears is unknown. Reynolds et al. (1986) reported that underground blasts caused brief periods of movement from denning grizzly bears, but the bears did not leave the dens and torpor (period of inactivity, low respiration) was not disrupted. Present information suggests negative impacts could disrupt feeding, mating, cub rearing behavior, and to a lesser extent, denning.

Moose - Little information is available on the effects of military activity on moose. Moose have shown startle responses and increased their walking speed when disturbed by civilian aircraft. Sensitive periods for moose are winter, and rutting and calving seasons. Adults could become startled and temporarily leave their young, making them vulnerable to predators.

Moose concentrate in riparian areas, and military overflights tend to follow river valleys. This may create a higher frequency of disturbance time to moose than other ungulates that do not concentrate in high flight corridors (USAF 1995). Moose prefer riparian habitat. These areas are sensitive to disturbances by offroad recreational vehicles. Degradation of habitat would have a negative impact on moose.

A high number of fires occur on the withdrawal lands from military activities. The fires reduce the amount of forested areas, creating open areas of early successional vegetation on which moose browse.

Concentration areas on Fort Greely West Training Area receive little disturbance from on-the-ground military activities. Fall, winter, and spring concentration areas in the East Training Area would be impacted by military activities. The East Training Area, Oklahoma, Lakes, and Washington Impact Areas would have the most activity, therefore causing higher disturbances to moose than other areas. Aircraft activity impacts all of Fort Greely.

Dall Sheep - Aircraft noise can disrupt sheep behavior. A study of bighorn sheep at the Grand Canyon (Stockwell et al. 1990) showed sheep were sensitive to helicopter noise during winter with a 43% reduction in foraging efficiency. During spring no significant foraging effect was identified. The authors note the seasonal difference may have been due to the fact that the sheep had migrated to lower elevations farther away from helicopter noise. A study conducted in California during April and June, of sheep movements in response to helicopters, showed that animals altered both their distribution and movements. Some animals left the study area following surveys. Some animals ran upon approach of the helicopter (Bleich et al. 1990).

Sheep are especially vulnerable to disturbance in winter, during lambing, and at watering areas and salt licks. Evidence of predators keying in on mineral licks was noted by Heimer (1995), and disturbance to sheep at these areas could cause susceptibility to predation. A study by Jorgensen (1974) found a 50%

reduction in use of a watering site when off-road recreational vehicles were near. The terrain that sheep inhabit also makes them vulnerable to accidents when disturbed. A panic response to noise could cause sheep, especially lambs, to fall off cliffs.

Negative impacts on sheep foraging, distribution, and movements would increase if the frequency of military flights over habitat areas increased. This could lead to energy loss in individual animals, resulting in susceptibility to environmental stress factors and possibly death (USAF 1995).

Dall sheep inhabit alpine areas in the southern portion of the Fort Greely West Training Area. Recommendations from a study by Spiers and Heimer (1990) identified that vehicular traffic should be excluded from elevations above 3500 feet in the mountains between Buchanan Creek and Delta Creek to preclude destruction of alpine habitat. The second recommendation was that large ground exercises spread over a large area should not occur on sheep range. Sheep that were frightened by people or equipment would not have ample escape territory. Small numbers of troops could train in sheep range if they stayed in an area $1m^2$.

Present data show that the Army conducts few activities in Dall sheep habitat and therefore has little impact on Dall sheep. Implementing recommendations by Spiers and Heimer (1990) would insure minimal effects on Dall sheep and their habitat from military ground activities.

Caribou - Aircraft noise causes caribou to become nervous, startle, panic, and run. Pregnant cows may become injured prior to and during birth (Golden et al. 1979, Calef et al. 1976). Frequency and duration of nursing decreased in a herd in the Northwest Territories, and cow-calf groups were displaced for distances up to two miles following helicopter landings (Gunn et al. 1985).

The Delta caribou herd is possibly the most studied caribou herd in relation to human disturbance. Researchers speculate that the majority of this herd has become habituated to a wide range of disturbances from military overflights, ordnance delivery, habitat alteration from fire and mining, human developments, roads and railroads, and airfields on their historic range (Davis et al. 1985).

Most of the pre-calving, calving, and post-calving area identified on Fort Greely West Training Area, is in the southern portion of the Training Area where little military activity occurs. Some of the habitat does extend into the Oklahoma/Delta Creek and Lakes Impact Areas. The Alaska Department of Fish and Game has established a minimum disturbance period from 15 May-31 May for the pre-

calving, calving, and post calving areas within the West Training Area. This requirement minimizes impacts to caribou during these critical periods.

Bison - Bison habitat includes land along the Delta River, and east of the river including the East Training Area. These areas are used extensively for military training. Bison can become nervous, get up from resting positions, and run when exposed to aircraft (Golden et al. 1979); yet another study (Frazier 1972) found that bison were insensitive or habituated to military aircraft noise.

No studies have been conducted to determine long-term effects of military activity on bison. From studies conducted on other large mammals, it can be presumed that bison would have some negative short-term and possibly longterm responses to military activity.

The Alaska Department of Fish and Game has established a minimum disturbance period (mid February - early September) for bison on Fort Greely West Training Area. The military has agreed not to conduct activities or operations in or near bison habitats during this time period when bison are present. This will minimize adverse effects on bison.

Wolf - The Alaska Department of Fish and Game is currently studying wolves in Game Management Unit 20A including Fort Greely. Information is not yet available to analyze effects of the alternatives.

Wolverine - Wolverines are known to inhabit the withdrawal lands but no information is available on population size and habitat use.

Sandhill Crane - Few studies have been conducted to identify impacts to sandhill cranes from human disturbance. One study found that nesting sandhill cranes were undisturbed by highway traffic. The birds were thought to be acclimated to the noise (Dwyer and Tanner 1992). Another study reported that nesting sandhill cranes remained on their nests 82% of the time when a helicopter flew over the nests (Larkin et al. 1976).

Migratory Birds - Studies have shown that migrating birds do not show frequent reactions to loud sounds during flight, but noises such as loud blasts could have short-term or long-term effects on their oriented behavior. Migrating birds have been shown to turn away from loud sound sources, and while some birds recorrected their course after the sound had ceased, others birds remained on the changed course (Larkin 1976 and 1978).

Studies on off-road recreational vehicle (ORRV) activity impacts to birds has shown statistically significant differences in abundance and variety of birds between low-use and high or moderate-use areas. Birds showed increased susceptibility to flushing by fleeing the area, which could result in disruption of territories, decreased ability to feed their young, or defend their nest from predators (Weinstein 1978).

Studies indicate that loud, continuous sounds could permanently damage the hearing of birds (Marler et al. 1973). Several studies suggested that high levels of ORRV noise could interfere with bird communication, especially during breeding season when males maintain territories through song and court females (Luckenbach 1975, 1978, Weinstein 1978).

Existing Mitigation

Habitat Management Plans are currently being completed as part of the Integrated Natural Resources Management Plans. The plans will identify sensitive wildlife habitats and implement management to protect these areas. The plans will comply with Federal and State regulations on management of wildlife and habitats on military lands.

A habitat improvement project is being conducted on Fort Wainwright Yukon Training Area using prescribed burns in aspen groves to improve habitat for ruffed grouse.

Surveys are being conducted to identify raptor habitats and locate nest sites on the withdrawn lands. If nests are located, necessary management requirements will be initiated to protect these areas. Surveys are also being conducted for neotropical birds, and small mammals. The surveys will include identification of threatened, endangered species. Breeding Bird Surveys are conducted on Fort Wainwright to assist State population studies. No Breeding Bird Surveys are conducted on Fort Greely.

A Bird Air Strike Hazard Program (BASH) has been implemented at Fort Wainwright and Fort Greely to minimize the risk of bird/aircraft strikes. For information on this program, see the U.S. Air Force Final Environmental Impact Statement, Alaska Military Operations Areas, Volume II (1995).

Proposed Mitigation

Information from bird surveys on the withdrawal lands will be reviewed to identify habitat areas for neotropical migrants. Breeding Bird Surveys will continue on Fort Wainwright and be implemented on Fort Greely.

Cumulative Effects

Cumulative effects to wildlife populations from noise and human disturbance are difficult to assess because of the lack of long-term research information available. It has been shown that noise from aircraft and off-road recreational vehicles, bombing, and artillery firing can negatively affect certain wildlife species and that individual animals react differently. Because certain species have been documented as having lower survival rates of young, decreased reproductive success, and avoidance of previously used habitat due to noise it can be predicted that there will be a loss of individuals of certain species. The affect this could have on general populations is unknown at this time.

Impacts to wildlife habitat are more readily assessed. Military activity is low in the southern portion of the West Training Area designated as grizzly bear, caribou, and Dall sheep habitat. If military activity continues to be low in this area, impacts to species populations levels would be low. Bison habitat is affected by military activities, but at this time, the population is at or near population levels set by the Alaska Department of Fish and Game. If bison habitat is not altered from its present condition, negative impacts from military activities will remain minimal.

No Action Alternative

With the loss of military activity on the withdrawal lands, many of the impacts to wildlife would decrease. Negative impacts to wildlife from civilian aircraft, helicopters, off-road recreational vehicles, and other recreational activities would continue. The Council on Environmental Quality has listed off-road vehicles as one of the most serious public land use problems (Berry 1980).

With the loss of military presence in the area, there could be an increase in public use. Considering the size of the withdrawn lands, it could be hypothesized that the State could not regulate public use and that increased human disturbance to wildlife from public recreational activities could occur. Disturbance to wildlife and associated habitat would occur if mining, forestry, agriculture, and settlement activities were allowed.

The Alaska Department of Fish and Game would continue to manage wildlife populations on the formerly withdrawn lands and therefore changes in wildlife harvests from hunting, trapping, and fishing would continue to be regulated by the State.

4.13 FISHERIES

No Federal or State threatened or endangered fish species are listed as occurring in waters on or near the withdrawal lands. Appendix 3.14 contains the informal consultation response from the U.S. Fish and Wildlife Service.

4.13.1 Fish Stocking

The Alaska Department of Fish and Game stocks one lake on Fort Wainwright Yukon Training Area and 15 lakes on Fort Greely West Training Area. Funding for stocking these lakes comes from two sources: the Sport Fish Account of the State Fish and Game Fund, and the Federal Aid in Sport Fisheries Restoration Program.

Preferred Alternative

U.S. Army Alaska would continue to allow fishing at the stocked lakes and other lakes and waterways on the withdrawal lands. They would continue to work with the Alaska Department of Fish and Game to evaluate other lakes and waterways for possible fish stocking. The cooperative effort by these agencies would maintain and improve fishing opportunities for the public. These efforts could increase the use of stocked lakes on military lands by the public.

Manchu Lake, on the Fort Wainwright Yukon Training Are, is stocked. The access road to this lake needs repair and upgrades for easier access. U.S. Army Alaska is planning to repair this road within the next five years. By improving the road, the military would increase public access to this lake and possibly increase public use.

The military has provided the Alaska Department of Fish and Game with helicopter transportation for stocking remote lakes on and off the post. U.S. Army Alaska would continue to support fish stocking if helicopters remain available at Fort Wainwright. The provision of helicopters to the State agency decreases the cost of stocking the lakes, allows the State to continue stocking, and releases funds for other State wildlife projects.

Heavy snows settling on lakes can cause oxygen depletion, resulting in fish dieoffs. U.S. Army Alaska has used heavy equipment to remove snow from lakes and would continue this management practice. The intervention of the military saves the State money by decreasing the number of fish needed to stock these lakes and increases the possibility for high quality fishing experiences with an increase in catchable-size fish. The Alaska Department of Fish and Game has stated that Big Lake on Fort Greely West Training Area could support an excellent fishery if the water level was raised. The agency recommended that the military evaluate costs and benefits of raising the lake level. U.S. Army Alaska would evaluate the feasibility of this project during 1998-2001. If the military decided to increase the water level of the lake, it would provide greater fishing opportunities for the public.

A few lakes on Fort Greely have undesirable fish that affect the growth and survival of game species. Alaska Department of Fish and Game and Fort Greely personnel would remove these fish through the use of rotenone. U.S. Army Alaska would build gabion dams (large rock structures that allow water, but not fish, to flow through) to protect these lakes from reintroduction of undesirable fish species during periods of high water. This would also increase fishing opportunities for the public.

The use of the withdrawal lands by the military has a positive effect on fish stocking. The use of military personnel and equipment saves the State money and allows more projects to be completed within the Delta Junction/Fairbanks area to improve public recreational fishing.

The military may have to temporarily close areas due to training exercises which could limit public access to fishing areas. This could decrease the number of fishing days available and possibly create a negative public reaction.

Existing Mitigation

At the present time, there is no existing mitigation for fish stocking on the withdrawn lands.

Proposed Mitigation

Fishing opportunities for the public will be maintained. Habitat for stocked fish will be improved.

Cumulative Effects

No negative cumulative effects would occur to fish stocking on the withdrawn lands. Lakes would continue to be stocked unless the Alaska Department of Fish and Game altered their fish stocking management plan. The public would continue to use the lakes for recreational fishing.

No Action Alternative

The lakes would continue to be stocked, but availability of military helicopters to stock lakes on the withdrawal lands and other remote areas would cease. This could decrease the number of lakes stocked and opportunities for recreational fishing within the Fort Wainwright Yukon Training Area and Fort Greely West Training Area.

Any project such as repairing the road to Manchu Lake, snow removal from lakes, raising lake water levels to increase year-round fish populations, and improving lakes for fisheries would be a State cost. Due to the lack of military equipment and personnel available for these projects, habitat for fisheries within the withdrawal lands could decrease.

The lack of military operations on Fort Wainwright Yukon Training Area and Fort Greely would eliminate the probability of a fishing area being closed. This could increase the number of fishing days available to the public.

4.13.2 Wild Fisheries

No fish population surveys have been conducted on Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas. No studies have been conducted to analyze impacts from military operations.

Preferred Alternative

Ongoing military activities within the Impact Areas damage fish habitat in rivers and streams. This could have a negative effect on fish populations.

Another possible impact to fish populations results from crossing streams with heavy equipment. This can cause bank erosion, suspended sediment increases, and changes in the shape and structure of streams resulting in habitat loss. Although U.S. Army Alaska Regulation 350-2, Range Regulation, states that during summer months (usually May through September) cross-country movement is permitted in all areas except designated creek bottoms, marshes and moist tundra areas, this does not inhibit stream crossing. Range Control maintains a list of areas designated as closed during summer months. During winter breakup (usually 1 April through 15 May) all vehicles are restricted to established roads and dry trails.

U.S. Army Alaska is allowed to create ice bridges from November to mid March. These could have adverse effects on anadromous or resident fish species and their habitat and may obstruct passage and movement of fish (ADF&G 1992b). Requirements for necessary construction permits keep this possibility low. The Alaska Department of Fish and Game listed the Delta River and Jarvis Creek as having resident fish populations that could be affected by ice bridges.

Contamination of waterways can occur from hydrocarbons from vehicle exhaust. Adams (1975) found that a lake was contaminated with hydrocarbons from snowmachine exhaust through snowmelts. Impacts to the Delta River and Jarvis Creek are unknown at this time.

Several creeks and rivers flow through the Impact Areas. Five types of ammunition are used in these areas; high explosives, smoke, illumination rounds, small arms, and inert. Information on possible contamination of the waterways from the use of these ammunition is not available. If the waterways are carrying contaminants, fish could be affected.

The Little Delta River and Delta Creek are listed as anadromous streams. However, chum and coho salmon are not reported in the Fort Greely area.

Existing Mitigation

Direct fisheries mitigation is currently not being conducted on the withdrawn lands. Current erosion control practices, water quality standards, and vegetation disturbance restrictions indirectly affect fish through protection of habitat.

Ice bridge permits list restrictions set by the Alaska Department of Fish and Game to protect fish populations. The restrictions minimize impacts to water flow, thus minimizing impacts to fish movement through the area.

Proposed Mitigation

Fish habitat surveys should be conducted.

Cumulative Effects

U.S. Army Alaska is required by Federal law to protect waterways from unnecessary negative impacts. Many of the waterways on the withdrawn lands would be protected, and minimal disturbance would occur. The location of Impact Areas around rivers and creeks would result in an irretrievable commitment of sections of certain rivers and/or creeks. It is difficult to determine the impacts of chemicals on fish populations in waterways that flow through the Impact Areas. Research would have to be conducted to see if there would be a cumulative effect on fish populations.

No Action Alternative

Impacts from military operations would cease. Changes in stream banks, stream flow, and fish populations would be based on natural phenomenon and recreational activities. The use of off-road recreational vehicles would probably increase with greater public access and could damage waterways by causing bank erosion, increased sediments, and loss of fish habitat.

4.14 THREATENED OR ENDANGERED SPECIES (State and Federal) AND SPECIES OF CONCERN (State)

No Federal or State threatened, endangered, or proposed plant species are listed as occurring within or near the withdrawal lands, and no listed plant species have been found on the withdrawal lands during field surveys. In 1995, a plant survey was conducted on the Yukon Training Area. Several populations of three plants (Water plantain, Crawford's sedge, Northern kittenstails), listed as imperiled in the State or rare by the Alaska Natural Heritage Program were located.

The U.S. Fish and Wildlife Service has listed one Federally endangered bird species (American peregrine falcon), and one Federally delisted species (Arctic peregrine falcon) as occurring within the area of Fort Wainwright and Fort Greely. Confirmed sightings of falcons at Fort Wainwright and Fort Greely have occurred. Appendix 3.14 contains the response from U.S. Fish and Wildlife Service concerning the withdrawal renewal and Federally listed species. Based on the project description and the fact that no new Impact Areas are proposed, the U.S. Fish and Wildlife Service concluded that the land withdrawal renewal is not likely to adversely impact listed species (Sousa, pers. com. 1998).

The olive-sided flycatcher, gray-cheeked thrush, Townsend's warbler, and blackpoll warbler are listed as State species of concern and have been found on the withdrawal lands.

The U.S. Forest Service lists the trumpeter swan and osprey as sensitive species. Trumpeter swans have not been found on Fort Wainwright Yukon Training Area but are known to nest on the Tanana Flats of Fort Wainwright and within Fort Greely West Training Area. Osprey have been identified on each post.

Preferred Alternative

At the present time, there are no management guidelines for protection of the plants listed as imperiled or rare by the Alaska Natural Heritage Program. Lack of protection could increase the likelihood that populations of these species on the withdrawal lands would be decreased or lost.

There are no known American peregrine falcon or osprey nest sites on the withdrawal lands, although habitat is available. These migratory species use forest habitats for nesting and foraging. Negative impacts to forest habitat could occur if U.S. Army Alaska removes forested areas to create Maneuver Areas.

Loss of large areas of hunting habitat would result in reduction of prey abundance (USFWS 1982). Fires from incendiary devices could also decrease the amount and suitability of nesting and foraging habitat, which could cause nesting failure and possibly negatively impact populations.

Trumpeter swans require wetland habitat for nesting and feeding. The military is required by Executive Order 11990-Protection of Wetlands, to take action to minimize destruction, loss, or degradation of wetlands. Loss of habitat for trumpeter swans would be minimal. Very little on-the-ground military operations occur on Fort Greely West Training Area, which minimizes possible negative effects to habitat.

U.S. Army Alaska is working with the Alaska Department of Fish and Game (ADF&G), conducting aerial surveys for trumpeter swans. This increases the capability of the State to manage this species.

Although the osprey is not a Federal or State listed species, the U.S. Forest Service has it listed as a sensitive species. U.S. Army Alaska conducted a raptor survey in 1998, attempting to identify nesting sites. Other surveys specifically designed to identify suitable habitat and locate nesting sites for birds of prey (raptors) have not been conducted in the past on the withdrawal lands.

Breeding Bird Surveys have shown that the olive-sided flycatcher, gray-cheeked thrush, Townsend's warbler, and blackpoll warbler use habitat on the withdrawn lands. No management practices have been initiated to protect their habitats and minimize disturbance during sensitive periods. Lack of habitat protection and management could have negative impacts on these species.

The swan, osprey, and four passerines are protected under the Migratory Bird Treaty Act (16 U.S.C. 703-721), (MBTA). The Act specifically addresses the "taking" of migratory birds. The definition of taking includes disturbance and habitat destruction.

Impacts from military activity would include noise disturbance. Noise disturbance from on-the-ground and aerial operations could cause temporary disturbance to foraging and nesting birds. Disturbance to American peregrine falcons would be minimal due to the U.S. Fish and Wildlife Service recommended protection measures that restrict human activity around nest sites. These include aerial and ground "off-limits" zones and minimizing activities during sensitive time periods. Protection measures also include restrictions on alteration of habitat within 15 miles of nest sites (USFWS 1982).

Without such protection measures, noise disturbance can cause negative behavior changes in raptors, waterfowl, and other birds. The Air Force (USAF 1995) summarized research findings on raptor and waterfowl responses to aircraft. Adult peregrines, startled by aircraft noise, stand in the nest, leaving the eggs or nestlings underfoot. This could result in the eggs being broken or the nestlings being kicked off the nest scrape (Ambrose 1992). If adults left the nest in response to noise disturbance, the eggs or young would be exposed to weather and predators (USAF 1995).

Low altitude military training operations can cause adult raptors to flush from the nest (White and Sherrod 1973). In one study, 53% of nesting red-tailed hawks flushed from the nest during low altitude helicopter overflights (Anderson, et al 1989), and nesting gyrfalcons flushed from aircraft overflights (Platt 1975).

Species of raptors and individual birds will react differently to noise. In several studies, raptors only had minor behavior changes or reactions of short-term duration (Lamp 1989, Ellis 1981). Productivity was not limited in any of the populations studied. However, in a study of gyrfalcon response to aircraft noise, there was a statistical significance in reoccupation of the nest sites. Gyrfalcons that were disturbed during nesting sought new nest sites, but 75% of the undisturbed nest areas were reoccupied (Platt 1975).

Different species of waterfowl react differently to aircraft noise, and during different periods such as staging, nesting, and molting. Trumpeter swans seem to be most vulnerable during the spring nesting and fall staging periods (Carson 1993). Aircraft noise can cause short-term stress in waterfowl, changes in feeding behavior, habitat dislocation, and possible lowered reproductive rates (Belanger and Bedard 1989, USAF 1995). Continued use of the withdrawal lands for aerial training could disturb waterfowl during sensitive periods.

Aircraft collisions with birds is a serious problem. The Air Force has created operational recommendations based on bird behaviors such as migratory patterns, flight corridors, and major flight times. By following these recommendations, Bird-Aircraft Strike Hazard (BASH) will be minimized.

Existing Mitigation

Surveys for threatened or endangered species are currently incorporated into other surveys.

Proposed Mitigation

If threatened or endangered species are found on the withdrawal lands, management guidelines will be written and implemented after consultation with the U.S. Fish and Wildlife Service and Alaska Department of Fish and Game.

Cumulative Effects

All of the species discussed in this chapter use habitat on the withdrawal lands. Many of the species use forest habitat. Loss of forest habitat could occur from incendiary device fires. Loss of forest habitat could lead to lower nesting success rates and possibly lower population levels.

Noise has been shown to cause certain species of raptors to leave an area, abandon the nest, and/or leave the young for periods of time, making them susceptible to predators. Noise disturbance could cause lowered nesting success in certain species.

No Action Alternative

With the lack of military presence on the withdrawal lands, disturbances such as noise from military aircraft and vehicles, loss of habitat from bombing, and large fires from incendiary devices would cease. Aerial operations would decrease with the loss of bombing ranges, thus decreasing the bird-aircraft strikes.

Returning lands to State management could increase public use of these areas and increase disturbances to sensitive species due to recreational activities. These disturbances include increased off-road recreational vehicle use and increased use of the lands for hiking and hunting.

Disturbance to sensitive wildlife species and habitat would occur if mining, forestry, agriculture, and settlement activities were allowed. Loss of habitat could lead to lower reproductive success for some species and possibly lower population levels.

The State would be responsible for all surveying and monitoring of species on the withdrawal lands. The State would lose the use of military equipment and personnel for surveys. U.S. Army Alaska would no longer provide funding for wildlife studies and resource management.

4.15 FIRE MANAGEMENT

Wildland fire management and suppression on withdrawn lands is the responsibility of the Alaska Fire Service, Bureau of Land Management. The
Alaska Fire Service maintains responsibility through "Interagency Support Agreements" with U.S. Army Alaska (see Chapter 3.15).

Of the seven known causes of fire on Fort Wainwright Yukon Training Area and Fort Greely, incendiary devices are the major cause of fire on withdrawal lands with lightning being second. Other causes of fire are field burning, vehicle exhaust, recreation, trash burning, and warming fires. For a more detailed description of the fire history see Chapter 3.15.

Preferred Alternative

Fire incidents have not resulted in the withdrawal area being designated as nonattainment for air quality. Fires may result in sporadic disturbance of traffic, including temporary road closures and restrictions on aviation. Slight health risks may also be associated with fires.

Under the Preferred Alternative, the present management agreements and support services between U.S. Army Alaska and the Alaska Fire Service would continue. Some of the services include fire hazard reduction work, fire suppression, technical advice, and support services provided by Alaska Fire Service in exchange for use of buildings and lands, maintenance of buildings, utility costs, and provision of services such as on-site housing and food for fire personnel when working on fire projects on military lands.

The Preferred Alternative continues U.S. Army Alaska as the land manager for fire management. The land manager and Alaska Fire Service determine the fire protection status boundaries for the withdrawal lands. If the withdrawal lands are renewed, protection status would be based on military mission requirements and equipment placement. This includes the status of "Critical Fire Pprotection" for areas containing Air Force equipment.

It is possible that fires started on withdrawal lands could cross protection status boundaries into areas managed by the State, which could have a different protection status. However, fire information for the withdrawal lands shows that out of 95 incendiary device fires, only one has crossed onto State lands indicating that the probability of this occurrence is low. Fires originating on State lands could also cross onto military lands. If fires begin in Impact Areas the cost of suppression could increase because on-the-ground fire suppression in these areas is prohibited.

Lands with Modified, Full, or Critical protection could be altered from their intended use. This might decrease the environmental and economical value of lands and decrease the value of withdrawal lands for military purposes.

Existing Mitigation

U.S. Army Alaska, in cooperation with the Bureau of Land Management, Alaska Fire Service, have written Fire Management Plans for Fort Wainwright and Fort Greely. The plans will assess current fire hazards and list recommendations to reduce them. Firebreaks are currently maintained in high risk areas on the withdrawn lands. A fire-break exists on the northern boundary of Stuart Creek Impact Area on Fort Wainwright Yukon Training Area. On Fort Greely, firebreaks are maintained on the southern end of the Main Post, from the Richardson Highway to Jarvis Creek.

Fire hazard indices are imposed on Fort Greely so that military training involving incendiary devices is restricted during high fire hazard periods. Stuart Creek Impact Area does not have fire index use restrictions. Fort Wainwright Fire Department and Range Control management guidelines for the Impact Area allows continued year-round use.

Proposed Mitigation

Interservice Support Agreements will be maintained for the length of the withdrawal.

Cumulative Effects

The number of fires from incendiary devices will continue to be high on the Impact Areas, and in Maneuver Areas within Fort Greely East Training Area, resulting in varied successional stage vegetation. Information is not available on species diversity in the Impact Areas. It is difficult to predict cumulative effects without a history of vegetative cover, intensity of past fires, and their effect on plant species diversity.

No Action Alternative

If the withdrawal lands remained under the Bureau of Land Management, the Alaska Fire Service (AFS) would continue to have primary responsibility for fire detection and suppression. Through the Annual Operating Agreement, between the AFS and State of Alaska, Division Of Forestry (DOF), the DOF has agreed to provide detection and initial attack suppression services upon request, and subject to available forces, for Fort Greely West and East Training Areas which lie within the Division of Forestry Protection Area. The lands could eventually be returned to the State of Alaska and primary responsibility would be with DOF.

The "Interservice Support Agreements" between U.S. Army Alaska and the Alaska Fire Service (AFS) would have to be reviewed and necessary changes made. The AFS would no longer provide wildland fire suppression and other

services. The AFS could lose the right to use buildings and retain services from U.S. Army Alaska.

Under the Alaska Fire Management Plan, the AFS would remain the first responder agency for the Fort Wainwright Yukon Training Area and the Division of Forestry would remain the first responder for Fort Greely.

The military would no longer train on the withdrawal lands, which would eliminate fires caused by military activity. The main cause of fire would, in all probability become lightning strikes, thus the Division of Forestry would have to respond to fewer fires.

4.15.1 Prescribed Burns

U.S. Army Alaska and the AFS use prescribed burns to enhance wildlife habitat, create fire breaks, and increase or create military Maneuver Areas on the withdrawal lands.

Preferred Alternative

The Army would continue to work with the AFS to maintain fire breaks and conduct prescribed burns to prevent large, damaging fires, and enhance wildlife habitat. The Army and AFS use prescribed burns for personnel training and equipment testing. This would continue to provide a service to both agencies in fire preparedness.

Existing Mitigation

Prescribed burns are used as a management tool to prevent large, damaging fires. On Fort Wainwright Yukon Training Area, there are two high priority areas where prescribed burns are used: the area south of the Stuart Creek Impact Area firebreak, and the Small Arms Ranges. Fort Greely contains two areas: the area between the firebreaks south of the Main Post and the Small Arms Ranges.

U.S. Army Alaska and the Alaska Fire Service develop Prescribed Burn Plans for each prescribed burn. The burns are conducted to reduce fire hazard and improve wildlife habitat.

Proposed Mitigation

No additional mitigation is needed for prescribed burns.

Cumulative Effects

Changes in vegetation composition could occur in areas where prescribed fire is frequently used to reduce fire hazard. This could cause wildlife species to leave these areas and be replaced by species adapted to early successional stage vegetation communities.

No Action Alternative

Under the No Action Alternative there would be fewer prescribed burns. Lands that are kept in early to mid-successional vegetation stages could return to late successional stages. U.S. Army Alaska and AFS training opportunities would be reduced.

4.16 PUBLIC ACCESS

Public access on the withdrawal lands is a significant issue with residents of Fairbanks, Delta Junction, and the surrounding communities. No public opinion surveys have been conducted to analyze public sentiment on use restrictions, difficulty in access, major uses, and area closures. Scoping for this Legislative Environmental Impact Statement showed that persons attending the meetings were concerned with recreational use and airspace access.

Preferred Alternative

U.S. Army Alaska would continue to use the withdrawal lands to fulfill its military mission. The Lakes Impact Area, Buffer Zones, Maneuver Areas, and Training Areas would be temporarily closed when necessary for military activities. The High Hazard Impact Areas, and the Texas and Washington Ranges would remain off-limits to the public. U.S. Army Alaska would continue to notify the public of closures through weekly bulletins, newspaper announcements, and upon entry onto the withdrawal lands.

On Fort Greely West Training Area, the lands between Meadows Road and the Impact Area would have restricted use. The Trans-Alaska pipeline system corridor on Fort Wainwright Yukon Training Area and Fort Greely West Training Area would remain closed to off-road recreational vehicles. All Federal, State, and military regulations for off-road vehicle use on the withdrawal lands would continue to be enforced.

Restricted access policies would not change for the Air Force Technical Applications Center.

All policies and procedures for civilian airspace access would continue. Civilian pilots should call the Special Use Airspace Information Service, a 24-hour service (1-800-758-8723 or 907-372-6913) provided by Eielson Air Force Base

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Range Control to civilian pilots flying in and around Military Operations Areas and Restricted Areas in interior Alaska. The purpose of the service is to reduce the unaware interaction between civilian and military aircraft in the areas of concentrated joint use (civil/military) by exchanging real-time information about location and planned activities (USAF 1995).

U.S. Army Alaska and the Air Force cannot allow increased public use of airspace and flight corridors over the withdrawal lands based on military training schedules. The restrictions are emplaced for safety purposes and to ensure completion of military exercises.

Under the current Preferred Alternative, no changes in use restrictions for Military Operations Areas (MOAs) would occur without appropriate National Environmental Policy Act (NEPA) documentation. The U.S. Air Force Final Environmental Impact Statement (EIS) for Alaska Military Operations Areas (USAF 1995), describes Air Force flight operations over the withdrawn lands and discusses conflicts with, and impacts to, civilian air use. The withdrawal lands lie beneath only 1,284 square miles of the 60,780 square miles of airspace analyzed in the MOA EIS.

An increased use of Restricted Areas over the withdrawal lands by the military could decrease the availability of the airspace to civilian pilots (USAF 1995). The increased military use of Restricted Areas could minimally decrease public recreational opportunities and possibly limit economic growth for aerial tours and guide services using the withdrawn lands.

U.S. Army Alaska would continue to provide the public with access to unrestricted areas. General access procedures would not change, the public would be required to check in with the military police before entering and upon leaving the withdrawal lands. The public would have to comply with all applicable Federal, State, and Army regulations.

Public access and use of the withdrawal lands is based on military training needs and could decrease if military operations increase.

Existing Mitigation

Military regulations for public access on the withdrawal lands are enforced to provide public safety, protect vegetative communities, wildlife, and sensitive habitat.

The Air Force provides a service to the civil aviation community to increase safety in the Military Operations Areas and Restricted Areas above Fort

Wainwright and Fort Greely. The Special Use Airspace Information Service (SUAIS) (1-800-758-8723 or 907-372-6913) is a 24-hour service to assist civilian pilots planning flights through or around Military Operations Areas and Restricted Areas in interior Alaska. The SUAIS provides information on which MOAs are active, Army artillery firing, and known helicopter operations (USAF 1995).

Proposed Mitigation

U.S. Army Alaska will develop a public information packet and media strategy to inform the public of restricted access areas and areas open for public use. The information packet would contain a map identifying restricted and open areas, roads, authorized activities, restricted airspace, and information on airspace accessibility. U.S. Army Alaska will study the feasibility of establishing an internet website and telephone hotline to provide access information.

Cumulative Effects

Effects of the military's use of the withdrawal lands and restrictions to access are discussed under the Preferred Alternative. Without data to identify the amount of use the withdrawal lands receive, including airspace use, it is difficult to address cumulative effects. Recreation is one of the major reason the public wants access to the withdrawal lands. Cumulative effects in the Preferred Alternative on recreation are discussed in Chapter 4.17.

No Action Alternative

Increased public use would occur with the removal of access restrictions. From information gathered at scoping meetings, there would be an increase in public use for recreational activities such as hunting and snowmachining.

Civilian airspace access would increase with the loss of Training Areas to the Air Force and U.S. Army Alaska. The loss of Restricted Areas would allow easier, faster travel for civilians between communities, and to and from destinations within the withdrawn land boundaries. The increase in access could provide greater opportunity for aerial tours and guide services, and persons wanting flight access into the remote areas on the withdrawal lands.

4.17 RECREATION

Preferred Alternative

U.S. Army Alaska would continue to maintain areas on Fort Wainwright Yukon Training Area and Fort Greely for public recreational activities. Areas would be subject to temporary closures based on military activity and wildlife habitat management objectives. Hunting, trapping, and fishing opportunities would continue, and the public would be required to obtain the necessary State licenses and hunting, trapping, and fishing (HTP) permit from U.S. Army Alaska. The public would be required to follow all applicable State and Federal regulations governing use of military lands for public recreation.

Trails on the withdrawal areas would remain open to recreational use. Off-road recreational vehicle (ORRV) use would be regulated by State, Federal, and military guidelines. Areas could be closed to ORRV use by U.S. Army Alaska resource officers for land rehabilitation and to prevent negative impacts to areas and/or wildlife.

Civilian pilots, guide services, and aerial tours would be allowed continued use of airspace. Restrictions could be emplaced based on safety and use for military activities.

The Beaver Creek-South Fork Area within the Fort Wainwright Yukon Training Area was designated as part of the Chena River State Recreation Area by the State legislature. However, the State action does not transfer title of the land nor is it supported by the military. This area would be retained by U.S. Army Alaska. This area is part of the Buffer Zone as well as tactical airspace (See Figure 2.f) for the Stuart Creek Impact Area and would be subject to closures based on military training. The public would continue to be allowed to recreate there during designated times, but it could not be developed as part of the Chena River State Recreation Area.

U.S. Army Alaska would continue to work with Federal and State agencies to develop a watchable wildlife program and contribute to ecotourism through special projects.

Existing Mitigation

Federal, State, and military regulations govern recreational use of withdrawn lands; such regulations recognize environmental needs.

Proposed Mitigation

Recreational use of stocked lakes on the withdrawal lands will be monitored to determine its impact to the vegetation and shoreline surrounding the lakes.

Cumulative Effects

If the military increases restrictions on public access, it could reduce recreational opportunities and impact guide services.

The public would not be subjected to area closures and use restrictions emplaced by the military. Response during scoping meetings for this Legislative Environmental Impact Statement showed that use of trails on Fort Greely by snowmachiners would increase under the No Action Alternative.

Recreationists currently use the Winter (Valdez) Trail (see Figure 3.16.b) for snowmachining and dog sledding. The trail runs from the Blair Lakes Training Area on the Fort Wainwright to Fort Greely West Training Area, entering in the northwest corner. The trail provides access to Koole Lake. Winter Trail extends through the Oklahoma/Delta Creek Impact Area into the northern portion of the West Training Area and crosses onto State land. Efforts are currently underway to connect Alaska to the Trans-Canada Trail. The Winter Trail is one of the systems proposed for inclusion. If the State of Alaska obtains the withdrawn lands it would increase the opportunity for this trail to connect with the Canada Trail system (Heidorn, pers. com. 1997).

If the Alaska Department of Natural Resources acquires the Beaver Creek-South Fork Area, it will be developed for recreational purposes.

The Alaska Department of Fish and Game would continue to manage wildlife on the formerly withdrawal lands. Fewer wildlife surveys would be conducted without assistance from the military.

4.18 CULTURAL RESOURCES

Neither alternative would affect known Native Alaskan sacred sites, funerary sites, or artifacts of Native Alaskan cultural patrimony on lands proposed for withdrawal.

Preferred Alternative

The Preferred Alternative, to renew the withdrawal for 50 years, would require the Army to implement the Integrated Cultural Resources Management Plan (ICRMP) (Alaska State Historic Preservation Office 1998a,b) on withdrawal lands of Fort Wainwright and Fort Greely. This would have long-term, positive effects on archeological sites. The U.S. Army Alaska cultural resources management program would provide for inventory, evaluation, and protection of archeological sites in accordance with sections 106 and 110 of the National Historic Preservation Act of 1966, as amended (NHPA); U.S. Army Regulation 200-4, Cultural Resources Management; the Archaeological Resources Protection Act of 1979; and other pertinent Federal laws and regulations. The Alaska State Historic Preservation Office has been contacted regarding potential impacts of the Proposed Action on cultural resources and possible compliance requirements per Section 106 of the National Historic Preservation Act. The Preferred Alternative would continue the existing management practices on the withdrawal lands, therefore the State concluded that this action is not an undertaking for Section 106 purposes. The State's response letter is located in Appendix 3.18.B.

Existing Mitigation

The U.S. Army Alaska (USARAK) cultural resources management program provides for the inventory, evaluation, and protection of archeological sites on USARAK lands.

Proposed Mitigation

No additional mitigative measures are recommended for cultural resources.

No Action Alternative

Effects on cultural resources would depend on whether lands remained the property of Bureau of Land Management (BLM) or were conveyed to the State of Alaska. Management by BLM would not adversely affect cultural resources. BLM is currently a partner in the cultural resources management on Fort Wainwright and Fort Greely and maintains a full-time cultural resources staff. As a Federal agency, BLM would continue to manage former withdrawal lands in accordance with sections 106 and 110 of the National Historical Preservation Act and other laws and regulations pertaining to cultural resources management by Federal agencies. However, the Army would not be required to implement the Integrated Cultural Resources Management Plan. Management responsibilities would transfer to BLM.

Management by the State of Alaska, Department of Natural Resources could indirectly result in negative effects to archeological sites. As property of the State, archeological sites on former withdrawal lands would be protected under the Alaska Historic Preservation Act of 1971. Section 41.35.070 of the Act generally stipulates review by the Department of Natural Resources, of all Statesupported undertakings impacting archeological sites (Alaska State Historic Preservation Office 1998a). Because there are no implementing regulations, this clause is often ineffective (Sackett, pers. com. 1998). Therefore, former withdrawal lands would be more susceptible to development and recreational uses that could adversely impact archeological sites under State management.

Final

4.19 SOCIOECONOMICS

Preferred Alternative

The land withdrawal renewal enhances national defense preparedness. International events dictate changes in military missions. These changes cause fluctuations in employment, income, schools, and other socioeconomic measures. The positive economic effects of the military in interior Alaska would continue with renewal of the withdrawals for 50 years. No adverse impacts are expected if the withdrawals are renewed. Socioeconomic data would be expected to fluctuate at current levels while the land is withdrawn.

The most likely consequence of renewal is continued restrictions on access to military lands. This is a serious social and economic consequence for recreational users of military lands. Recreational use is greater than that reflected in permits issued by the military. It is difficult to estimate non-permitted use of these lands. Popular activities include snowmachining, boating, dog sledding, flying, and off-road recreational vehicle use.

Existing Mitigation

No mitigative measures exist regarding socioeconomics.

Proposed Mitigation

No mitigative measures are recommended for impacts to socioeconomics.

No Action Alternative

Under the No Action Alternative, nonrenewal of the land withdrawal would occur. The withdrawal areas constitute two of the three major military training areas in interior Alaska. The Tanana Flats Training Area would be the only area available for Army and Air Force use. Extremely limited aspects of Army and Air Force missions in Alaska could continue if the withdrawal renewal lands are not available for military use. Non-renewal could substantially alter the ability to meet mission requirements in Alaska. Essentially, nonrenewal could precipitate closure of the installations and realignment of personnel and force structure.

The loss of the Yukon Training Area and Fort Greely would have a major impact on the ability of the Army to conduct land maneuvers. The Yukon Training Area and Fort Greely East Training Area are capable of supporting year-round maneuvering while the Tanana Flats is only capable of supporting maneuvers during the winter months. Loss of these training areas could lead to relocation of Fort Wainwright soldiers and would result in a significant loss of revenue for the Fairbanks area. The loss of the Stuart Creek and Oklahoma/Delta Creek Impact Areas would have a major impact on routine and Major Flying Exercises conducted by the Air Force in interior Alaska. The loss of the Impact Areas would cause a major military forces restructuring by the Department of Defense. Air Force personnel would not be sent to Alaska to train and could not be sent to other bases because these facilities and ranges are at operating capacity. Obtaining available land and establishing new tactical bombing ranges comparable to Stuart Creek and Oklahoma/Delta Creek Impact Areas would not be feasible due to the cost.

The current realignment of Fort Greely's Main Post area serves as an example for the consequences of nonrenewal of these lands. Military and civilian positions accounted for half the direct employment in the Delta area before Fort Greely was selected for realignment.

There are approximately 50 to 60 Department of Defense jobs planned for Fort Greely after Base Realignment and Closure, 1995. These positions are contingent upon withdrawal renewal. Thus, these positions would be eliminated without renewal and other area jobs would be lost in the trade and service sectors as a consequence.

Decontamination expenditures are funded by Congress. It is estimated that the total cost to decontaminate the Impact Areas on the withdrawal properties is approximately \$248.9 million (See Chapter 2.1.3.5). Additional studies are needed to accurately evaluate the quantity and type of contaminants. Funding to decontaminate the withdrawal lands would have to be appropriated by Congress.

Currently, the Fairbanks North Star Borough (FNSB) government receives Payment in Lieu of Taxes (PILT) from the Federal government of approximately \$300,000 for all military lands within the Borough. There are approximately one million acres of military land in the Borough; this amounts to roughly 30 cents per acre.

Employment and Multiplier Effects

Since approximately one quarter of the employment, and nearly 30% of the payroll of the FNSB relies on the military, a closure or major downsizing would clearly have significant effects on the local economy. Together, the Army and Air Force missions account for nearly 50% of the local economy once multiplier effects are introduced.

A survey of Fort Wainwright personnel was taken in 1998 to assist in determining the effects of the nonrenewal (Appendix 3.19.C). It was determined

that 69% of local personnel expenditures are off-post rather than on-post (Table 4.19.a). The effect of nonrenewal on the FNSB economy would be substantial. In total, personnel spend approximately \$61 million off-post in the FNSB economy. The primary effects would be in wholesale and retail trade, service sector, and finance insurance and real estate.

	On-Post Expenditures	Off-Post Expenditures		
	TFE _{nd}	TFE _{dm}	TFE _{nd}	TFE _{dm}
Average	\$5,278.60	\$872.00	\$7,027.67	6,215.28
Minimum	\$0.00	\$0.00	\$0.00	\$0.00
Maximum	\$26,620.00	\$16,355.00	\$41,640.00	\$54,808.00
Standard Deviation	\$4,784.00	\$2,428.39	\$9,501.20	\$10,869.64

 Table 4.19.a
 Expenditures by Personnel and Their Families in 1997.

Note: Off-Post refers to goods and services purchased by the respondent (and his or her family) in the North Star Borough.

TFE=Total Family Expenditures

_{nd}=non-durable goods

dm=durable goods; miscellaneous goods and services

Nonrenewal of Fort Wainwright Yukon Training Area and Fort Greely could result in a maximum loss of around ten thousand uniformed personnel and their dependents; approximately 12% of the local population. Civilian employees and their dependents represent a maximum population loss of another 6%-8%. Taken together with multiplier effects, the maximum population loss would be around one-third of the current population.

Schools

In the 1997-98 school year, there were 4,377 students that were dependents of military personnel in the FNSB School District; 2,593 attended on-post, while 1,784 attended schools off-post (Stayrook, pers. com. 1998). This is approximately 27% of the Fairbanks school district total. The number of students that are dependents of civilian employees on-post is not tallied by the school district. Given that there are over 2,200 civilian positions on Fort Wainwright and Eielson Air Force Base, well over one-third of the school district population is directly associated with the military activity in interior Alaska.

The effect on schools would thus be relatively greater, and could approach half the school population when multiplier effects are included. This has an atypical economic effect on communities in Alaska. Because State oil revenues, not local tax revenues, pay for most of the educational costs in Alaska, public school education is considered a "primary" or "economic base" industry (Fried and Windisch-Cole 1998). For the FNSB, the local contribution is only about 26% of the local school budget, which totals approximately \$115 million. The loss in school attendance would reduce both State and Federal funding, currently around \$80 million.

Tourism

The survey of base personnel indicates the immediate effect of a nonrenewal would be a substantial loss of tourism. Approximately 40% of base personnel surveyed had visitors in 1997. Total visitor days accounted for by base personnel may be as high as 40,000. Nonrenewal would cause a substantial decrease in this source of tourism.

There are specific gains to the tourism and recreation industries in the event of nonrenewal. Dog sledding, snowmachining, airboating, flightseeing, and other recreational activities are on the increase. They would only be expected to increase if the withdrawal lands are not renewed for military use.

The highest values are associated with the lands closest to Fairbanks, which do not require vehicle trailering to access. For 30 years, airboat traffic from Fairbanks has travelled up the Delta River as far as Tangle Lakes (Redfern, pers. com. 1998) The Little Delta River and Delta Creek are used by jet boaters and airboaters. They are accessed from the Salcha River.

The Fort Greely area is becoming a more important snowmachining area, accessed from the pipeline river-crossing on the Tanana River and from the Harding Lake area (Heidorn, pers. com. 1998). Hunting, fishing, trapping, and other personal use opportunities for local residents would likely increase.

Mineral Resources

Portions of the Tanana River drainage are part of the Mid-Tanana Basin of the Tanana-Kuskokwim Lowlands, which has long been thought to hold deposits of oil or gas (USGS 1975). The Mid-Tanana Basin underlies portions of the Fort Greely West and East Training Areas (Alaska Dept. Of Natural Resources website 1998)). There has been no development for oil or gas in interior Alaska historically. Interior Alaska is still remote and the exploration and development costs are relatively high. The costs have decreased significantly as the economic base has increased and infrastructure has been developed.

Some exploratory work has been done in the Copper River Basin adjacent to Lake Louise. The State has indicated two companies are interested in development. A proposed lease sale is being formulated over the next 18 months by the State Division of Oil and Gas (Fairbanks Daily News-Miner June 24, 1998).

Exploratory work for oil and gas has not been done on the military lands. But the potential for natural oil and gas exists. It is sheer speculation to estimate the value of hydrocarbons on these lands. The presence of natural gas seeps provides good potential for commercial natural gas production in the Mid-Tanana Basin, where structure affords potential accumulation (Burglin, pers. com. 1998).

Placer mining has occurred in the past on the withdrawal lands and would be expected to occur if the lands were relinquished. The historical placer mines were not large, and a few small operations could probably be supported in the Beaver Creek drainage on the Fort Wainwright Yukon Training Area as well as the southern portion of the Fort Greely West Training Area. With the recent developments in hard rock technology, some hard rock development adjacent to former placer activity would be expected.

Agriculture

The economics of agriculture would be improved marginally if the nonrenewal resulted in less expensive private land. However, it is highly doubtful that agriculture will become a viable industry in Alaska.

The State is presently harvesting only 6%-10% of the allowable harvest in interior Alaska (Mackey, pers. com. 1998). It is doubtful that under State management a substantial timber industry would develop on the withdrawal lands. Neither area appears to have large acreages of high timber value. Privatization of the land would have to occur with only the potential for a modest timber industry. A sustained yield of over 1.5 million board feet a day is possible on lands south of the Tanana across from Birch Lake (Claudis, pers. com. 1998.)

Guiding Industry

No change from existing conditions is expected under the Preferred Alternative.

4.20 SUBSISTENCE

The proposed action does not change access for subsistence use from what has occurred during almost 50 years of military use. Approximately 9% of the withdrawn lands are permanently closed to subsistence use due to Impact Area hazards.

Fort Wainwright Yukon Training Area

Neither alternative would affect subsistence practices on proposed withdrawal areas of Fort Wainwright since subsistence taking of fish and wildlife is minimal, if it occurs, on the Fort Wainwright Yukon Training Area. Increased access opportunities that could result from the No Action Alternative would not significantly increase subsistence use of these lands (see Appendix 3.20).

Preferred Alternative

Fort Greely West and East Training Areas

The Preferred Alternative may affect subsistence use of portions of the proposed withdrawal lands of Fort Greely, but this effect would not be significant (see Appendix 3.20). Some lands are less accessible than would be the case under the No Action Alternative. Military activities may affect some game species' behavior to make them more or less available to subsistence users.

Residents of Delta Junction, Healy Lake, Big Delta, Dry Creek, and Dot Lake would continue to have access to Fort Greely for hunting, trapping, and fishing. As is currently the case, seasons for non-Federal subsistence would be determined by the Alaska Department of Fish and Game (ADF&G), and access to withdrawal areas would be regulated by the Army to minimize significant disruption to the military mission or undue exposure to human safety hazards created by military operations. Currently, there is no established subsistence-user preference under State of Alaska regulations in the take of fish and wildlife on Fort Greely.

In 1986, the Bureau of Land Management (BLM) determined the renewal of military use of the lands did not significantly impact subsistence use of these lands (see Appendix 3.20). Based on the number of access permits issued for the withdrawal lands, the public comments received during scoping and review of the Draft LEIS, and the determinations made by the BLM in 1986, there is no significant impact to subsistence use under the Preferred Alternative.

Existing Mitigation

The Sikes Act requires military lands be made available for nonmilitary uses. Access to the withdrawn lands is permitted by the Army when it does not impact military training nor is a hazard to public safety.

Proposed Mitigation

No additional mitigative measures are recommended for impacts to subsistence.

No Action Alternative

A decision not to withdraw proposed lands may result in indirect, positive effects on subsistence uses since access for hunting, trapping, and fishing would improve in the absence of military mission constraints. Reversion of former withdrawal lands to Bureau of Land Management or transfer of the property to the State of Alaska would continue responsible management of game species. However, without the withdrawal renewal, the Integrated Natural Resources Management Plans would not be implemented. This could lead to decreased funding and less management of fish and wildlife on former withdrawal lands. Because seasons are determined by Alaska Department of Fish and Game on the basis of population health, it is unlikely that areas currently closed to the taking of wildlife would open. Likewise, it is unlikely that bag limits established for open areas would change.

Transfer of former withdrawal lands to the State of Alaska would improve access for hunting, trapping, and fishing to some degree. Many lands are already open to hunting, fishing, and trapping when military operations or safety hazards do not conflict. The effects of some additional subsistence opportunities are likely not to be significant, based on current subsistence use of withdrawn lands and "No Significant" determinations for the previous withdrawal renewals (see Appendix 3.20). Only approximately 75,000 acres (9%) are permanently closed due to Impact Area hazards. Fishing, in particular, would not be significantly impacted since almost all quality fishing lakes are open virtually year-round.

4.20.1 Section 810(a): Finding for the Preferred Alternative

Section 810(a) of Alaska National Interest Lands Conservation Act (ANILCA) requires an evaluation of the effects of this withdrawal action on subsistence use. Chapters 3.20 and 4.20 of this LEIS serve as the evaluation under ANILCA. If the proposed action would significantly restrict subsistence uses, then the Federal government is required to provide notice and hearing.

The Preferred Alternative would result in no significant adverse effects on the customary or traditional subsistence uses of withdrawal lands on Fort Wainwright and Fort Greely based on the number of access permits issued, the public comments received for this LEIS, and the non-significant impact determinations made by the Bureau of Land Management in 1986 for the prior withdrawal renewal (see Appendix 3.20).

Preferred Alternative

Under the Preferred Alternative, there would be no disproportionately high and adverse human health or environmental effects on minority and low-income populations. Effects of the military's continued use of the withdrawal lands would impact the entire population of the Fort Wainwright and Fort Greely areas. Minority and low-income populations would be affected to the same extent as the general population.

The withdrawal renewals would not disproportionately affect children through environmental health or safety risks. Renewal of the withdrawn lands for military use would affect children to the same extent as the general population.

Existing Mitigation

No mitigative measures exist regarding environmental justice.

Proposed Mitigation

No mitigation is needed for environmental justice impacts.

No Action Alternative

Under the No Action Alternative, there would be no disproportionately high and adverse environmental effects to human health on minority and low-income populations. Nonrenewal of the withdrawn lands would affect minority and lowincome populations to the same extent as the general population.

Relinquishing the withdrawal renewal lands from military use would not disproportionately affect children through environmental health or safety risks. Nonrenewal of the withdrawn lands would affect children to the same extent as the general population.

4.22 NOISE

Preferred Alternative

Noise impacts from the military would continue under the Preferred Alternative as has occurred on the withdrawal lands over the past 50 years. Subsonic aircraft flights are the dominant military noise source (subsonic flights occur at speeds below the speed of sound level and do not produce sonic booms). Except for the Target Areas, all of Fort Wainwright Yukon Training Area and Fort Greely fit within Zone I noise level for A-weighted sound (Table 3.22.b). In the vicinity of the Impact Areas, sound levels reach the Zone II level with greater probability for annoyance. Since all Impact Areas are off-limits to personnel due to unexploded ordnance, noise levels from Impact Areas would not affect people or land use.

The most common military-generated noise is by Air Force jet aircraft utilizing the Stuart Creek Impact Area and the Oklahoma/Delta Creek Impact Area. The Air Force jets conduct air-to-ground training at subsonic speeds. For routine, daily training operations, the maximum A-weighted day-night level (ADNL) is 60 to 63 dBA (USAF 1995). This sound level occurs adjacent to the target areas. Two to three miles from the target area the sound levels decrease to 55 dBA.

Noise complaints received by the Air Force for jet aircraft in the vicinity of the Yukon Training Area and Fort Greely average 24 complaints per year (Gifford 1998). The noise is usually from low flying aircraft entering or exiting an Impact Area.

During major training exercises, the ADNL increase from 62 to 65 dBA and drops to 55 dBA outside of the immediate target area. Thus, the majority of the Fort Wainwright Yukon Training Area and Fort Greely has a sound level of 55 dBA.

Impulse noise or C-weighted sound levels in the military environment are typically caused by artillery fire, sonic booms, and explosions. Noise zone levels were computed using military impulse noise activities for 1997 (U.S. Army Center for Health Promotion and Preventive Medicine 1998). Zone II and III noise limits do not leave the military boundaries for impulse noise. Figure 4.22.a shows the limits for Zone II and Zone III noise levels with noise contours. The noise zones II and III center in the Impact Areas and the Firing Points.

C-weighted and small arms sound levels have not been calculated for Fort Wainwright and Fort Greely. Few noise complaints have been received for artillery, explosions, or small arms firing. Most noise complaints have been from helicopter overflights while traveling from the Fort Wainwright Airfield to the Fort Wainwright Yukon Training Area or Fort Greely. As Army use shifts from the relatively loud UH-1 "Huey" helicopter to the quieter UH-60 Blackhawk helicopter, noise complaints are expected to decrease (Zeman, pers. com. 1998).

Most noise complaints received by the Army in the Fort Wainwright Yukon Training Area and Fort Greely areas have been from the overflight of helicopters near the Salcha River, which is south of the Fort Wainwright Yukon Training Area. The low human population density allows for helicopter pilots to normally select routes away from human habitation (Douglas, pers. com. 1998, Hand, pers. com. 1998). Figure 4.22.b shows the military training routes that helicopters use to access the Training Areas.

Helicopter noise along military training routes would contribute to existing highway and rural noise. Currently, routine helicopter training flights average two round trip flights each week.



Figure 4.22.b Military Helicopter Flight Paths (Zeman 1998).

Existing Mitigation

Limited hours of firing demolitions, field artillery, and mortars is 6 a.m. to 10 p.m. The public is notified of exceptions to firing hours by the Public Affairs Office through publication of a Notice of Firing.

Aircraft are required to maintain a minimum flight altitude of at least 1,500 feet above ground level (AGL) over the Chena River Recreation Area from 1 May through 30 September.

The Air Force Final Environmental Impact Statement - Alaska Military Operations Areas (MOAs), Record of Decision (1997), lists the measures designed to

mitigate the noise-derived adverse impacts identified in the analysis for the EIS. Please refer to the Record of Decision for specific mitigation.

Air Force mitigation relevant to the withdrawal lands are changes in the Fox, Birch and Clear Creek MOA. The Fox MOA boundary was modified to avoid noise impacts to the Delta River and Gulkana National Wild and Scenic Rivers, Tangle Lakes area and Richardson Highway. Noise impacts were further reduced by raising the minimum altitude to 5000 feet above ground level.

Noise impacts were significantly reduced around the Salcha and Harding Lakes area by modifying the Birch MOA boundaries and eliminating the Clear Creek MOA.

The Air Force provides a 24-hour feedback line at 1-800-538-6647 to collect comments or complaints regarding noise.

Proposed Mitigation

A review of noise impacts to key species such as caribou and bison will be conducted and a management plan written that lists protection requirements.

No Action Alternative

Noise impacts from military operations would cease.

4.23 EXISTING AND PROPOSED MITIGATION

4.23.1 Existing Mitigation

The following programs have been implemented by U.S. Army Alaska (USARAK) at Fort Wainwright and Fort Greely. The Army will continue these programs for the duration of the withdrawal renewal to provide mitigation for achieving the military's mission while offering environmental protection.

Several programs and regulations exist which provide mitigative measures for soils, permafrost, surface water, and wetlands. The following summaries define existing mitigation for these resources.

Training exercises conducted on Alaska military lands are regulated by USARAK Range Regulation (AR) 350-2. This regulation outlines procedures for planning, scheduling, and operating ranges and training areas, and identifies environmental requirements. All actions undertaken by the Army are required to consider their impact to the surrounding environment and to take precautions to minimize impact. These include the refilling and leveling of any foxholes, trench systems, tank traps, hull-down positions, or explosive excavations; conducting vehicular stream crossings in designated areas only; limiting cross-country vehicular travel to established roads and dry trails during spring thaw; and avoiding cross-country movement in creek bottoms, marshes, and moist tundra areas during summer months.

Damage control steps are also included within individual training plans to minimize natural resources damage. These include the protection of known sensitive areas, repair of unavoidable maneuver damage, coordination and permitting of any ground disturbing activities, and scheduling of natural resources and hazardous material inspections of training areas to ensure regulation compliance.

To guide and regulate the actions of Army personnel using and managing training lands, the Army has developed the Integrated Training Area Management (ITAM) program. The goals of ITAM are to inventory and monitor, repair, maintain, and enhance training lands at Army training installations. The Land Condition-Trend Analysis (LCTA) program serves as the inventory and monitoring portion of ITAM. This program inventories land conditions and monitors vegetation trends on military installations. The data provide installation-wide summaries of land use, disturbance, plant cover, vegetation communities, tactical concealment, birds, and small mammals. (See Appendix 2.D).

An additional component of ITAM is the Land Rehabilitation and Maintenance (LRAM) program. This program repairs damaged areas and uses land construction technology, such as revegetation and erosion control, to minimize future damage to training lands. These efforts are designed to maintain quality military training lands and minimize long-term costs associated with land rehabilitation. (See Appendix 2.D).

Land Use. Land management for the withdrawal renewal lands will continue under the ITAM program and the Integrated Natural Resources Management Plans, which will be reviewed and updated every five years.

Air Quality. Unnecessary vehicle idling is restricted on Fort Wainwright and Fort Greely. Head bolt electrical outlets (HBOs) have been installed in most parking lots on post at Fort Wainwright to reduce "cold starts", which have been linked to increases in both carbon monoxide and unburned fuel emissions. They also decrease the amount of parked vehicles idling during extreme low temperatures, thus reducing the generation of ice fog. In addition, the installation of a baghouse on the exhaust stacks of the Fort Wainwright central power plant (located

on Main Post) to reduce coal particulate emissions has been planned (Griffin, pers. com. 1998).

Fort Wainwright participates in a motor vehicle emissions inspection and maintenance program with the Fairbanks North Star Borough, which is designed to reduce air pollution.

Terrain. No mitigative measures exist regarding terrain features.

Geology. No mitigative measures exist regarding geologic features.

Mineral Resources. No mitigative measures exist for mineral resources.

Soils. The ITAM program relies on soil surveys with an inventory of soil resources and evaluation of soil capabilities. The Natural Resources Conservation Service (NRCS) has been funded and has begun the process of completing soil surveys for Fort Wainwright Training Area and Fort Greely West and East Training Areas. These surveys will include the description, classification, and an inventory of soil properties. The establishment of the relationships between geomorphology, soils, permafrost, and vegetation unique to the withdrawal lands as a result of these surveys will also aid in monitoring and rehabilitation operations.

Permafrost. Procedures outlined in AR350-2 preventing surface disturbance, aid in the preservation of permafrost because of the close relationship between soil damage and permafrost degradation. Soil and vegetative data, once complete, will be used to evaluate permafrost areas.

Fort Wainwright and Fort Greely Integrated Natural Resources Management Plans are being developed with specific actions for management and use of permafrost areas.

Surface Water. Procedures outlined in AR350-2 decrease the incidence of soil erosion and subsequent sedimentation, thereby reducing the risk of degraded water quality.

The military must comply with all applicable State and Federal statutes involving water resources. The Alaska State Drinking Water Standards establish maximum contaminant levels and monitoring requirements for public water systems. The standards for each regulation are discussed in Appendix 3.8.D.

Groundwater. USARAK Regulation 200-4 outlines proper management of hazardous wastes, used oils, and other hazardous materials. It mandates specific policies for the management of these items, including storage and labeling requirements, proper handling, training requirements, pollution prevention, and transport and disposal requirements.

Spill Prevention Control and Countermeasure Plans exist for Fort Wainwright and Fort Greely. The plans document methods to prevent oil spills from reaching navigable waters and/or groundwater. They include spill prevention, discovery, and emergency notification procedures. Fort Wainwright and Fort Greely conduct "cradle to grave" management of hazardous materials. Records are maintained on anything that transpires over the "lifetime" of any hazardous material on the installation. Documentation is required for equipment inspections, tests, and repairs; personnel fuel handling and spill response training; reportable spills; corrective actions to prevent recurring spills; and investigations including soil, surface water, and/or groundwater.

Wetlands. A wetland planning-level survey was recently completed at Fort Wainwright Yukon Training Area, and a similar study is in progress at Fort Greely. A wetlands management and revegetation plan is funded and in progress for the withdrawal lands. Fort Wainwright and Fort Greely Integrated Natural Resources Management Plans are under final review by the Army and BLM with specific actions for management of wetland areas.

Wetlands use permits are obtained through the U.S. Army Corps of Engineers permitting process.

Vegetation. Vegetation mapping has been completed to identify ecosites on Fort Wainwright Yukon Training Area and is being conducted at Fort Greely as part of the Ecological Land Classification. The Ecological Land Classification will allow USARAK to manage lands on an ecosystem level.

Forest Management Plans for Fort Wainwright and Fort Greely are being prepared as part of the Integrated Natural Resources Management Plans.

Land Rehabilitation and Maintenance (LRAM) projects are part of the annual planning cycle. Rehabilitation projects are implemented to restore vegetation using USARAK staff, troop projects, and cooperative efforts with the soil and water conservation districts.

Wildlife. Habitat Management Plans are being completed as part of the Integrated Natural Resources Management Plans. The plans will identify

A habitat improvement project for ruffed grouse is being conducted on Fort Wainwright Yukon Training Area using prescribed burns in aspen groves.

Upon completion, the Integrated Natural Resources Management Plans will replace the Cooperative Agreement for Management of Fish and Wildlife Resources on Army lands in Alaska.

Surveys are being conducted to identify raptor habitats and locate nest sites on the withdrawal lands. If nests are located, necessary management requirements will be initiated to protect these areas. Surveys are also being conducted for neotropical birds, and small mammals. The surveys will include identification of threatened or endangered species. Breeding Bird Surveys are conducted on Fort Wainwright to assist State population studies.

A Bird Air Strike Hazard Program (BASH) has been implemented at Fort Wainwright and Fort Greely to minimize the risk of bird/aircraft strikes. For information on this program, see the U.S. Air Force Final Environmental Impact Statement, Alaska Military Operations Areas, Volume II (1995).

Fisheries. No mitigative measures exist for fish stocking.

Wild Fisheries. Current erosion control practices, water quality standards, and vegetation disturbance restrictions indirectly affect fish through protection of habitat.

Ice bridge construction permits list restrictions set by the Alaska Department of Fish and Game to protect fish populations. The restrictions minimize impacts to water flow, thus minimizing impacts to fish movement through the area.

Threatened or Endangered Species (State and Federal). Surveys for threatened or endangered species are incorporated into other surveys.

Fire Management. USARAK, in cooperation with the Bureau of Land Management Alaska Fire Service, have written Fire Management Plans for Fort Wainwright and Fort Greely. The plans assess current fire hazards and list recommendations to reduce them. Firebreaks are maintained in high risk areas on the withdrawal lands. A firebreak exists on the northern boundary of Stuart Creek Impact Area on Fort Wainwright Yukon Training Area. On Fort Greely,

firebreaks are maintained on the southern end of the Main Post, from the Richardson Highway to Jarvis Creek.

Fire hazard indices are imposed on Fort Greely so that military training involving incendiary devices is restricted during high fire hazard periods. Stuart Creek Impact Area does not have fire index use restrictions. Fort Wainwright Fire Department and Range Control management guidelines for the Stuart Creek Impact Area allows continuous year-round use.

Prescribed Burns. Prescribed burns are used as a management tool to reduce the incidence of large, damaging fires and improve wildlife habitat. On Fort Wainwright Yukon Training Area, prescribed burns are conducted on the area south of the Stuart Creek Impact Area firebreak, and on the Small Arms Ranges. On Fort Greely prescribed burns are conducted on the area between the firebreaks south of the Main Post and on the Small Arms Ranges. USARAK and the Alaska Fire Service develop Prescribed Burn Plans for each prescribed burn.

Public Access. Range bulletins provide information on area closures to the public. Military regulations are enforced to protect public safety, vegetative communities, wildlife, and sensitive habitat.

The Air Force provides a service to the civil aviation community to increase safety in the Military Operations Areas and Restricted Areas above Fort Wainwright and Fort Greely. The Special Use Airspace Information Service (SUAIS) (1-800-758-8723 or 907-372-6913) is a 24-hour service to assist civilian pilots planning flights through or around Military Operations Areas and Restricted Areas in interior Alaska. The SUAIS provides information on which MOAs are active, Army artillery firing, and known helicopter operations (USAF 1995).

Recreation. Federal, State, and military regulations govern recreational use of military lands; such regulations recognize environmental needs.

Recreational activities are monitored through the Integrated Natural Resources Management, Plans.

Cultural Resources. The USARAK cultural resources management program provides for the inventory, evaluation, and protection of archeological sites on USARAK lands.

Socioeconomics. No mitigative measures exist regarding socioeconomics.

Subsistence. Access to the withdrawal lands is permitted by the Army for subsistence purposes when it does not conflict with military training nor is a hazard to public safety.

Environmental Justice. No mitigative measures exist regarding environmental justice.

Noise. Firing demolitions, field artillery, and mortars are limited to the hours of 6 a.m. to 10 p.m. The public is notified of exceptions to firing hours by the Public Affairs Office through publication of a Notice of Firing.

Aircraft are required to maintain a minimum flight altitude of at least 1,500 feet above ground level (AGL) over the Chena River Recreation Area from 1 May through September 30.

The U.S. Air Force Final Environmental Impact Statement - Alaska Military Operations Areas, Record of Decision (1997), lists the measures designed to mitigate the noise-derived adverse impacts identified in the analysis relevant to the withdrawal lands.

The U.S. Air Force provides a 24-hour public comment line at 1-800-538-6647 to collect comments or complaints regarding noise.

4.23.2 Proposed Mitigation

The following programs are proposed to be implemented by the Army at Fort Wainwright Yukon Training Area and Fort Greely with the renewal of the withdrawal lands for military use. These programs will provide additional mitigation for achieving the military's mission while offering more extensive environmental protection for the duration of the withdrawal renewal.

Pollution. The Army will implement a program to identify possible munitions contamination of withdrawal lands. This program will initiate the collection of baseline data to determine the location, extent, and potential migration of munitions contamination in soils, surface water, and groundwater. Based on these preliminary results, a long-term monitoring program will be developed to assess cumulative impacts to the withdrawal lands from on-going military activities. These results will identify areas in need of restoration, activities which pose the greatest environmental threat, and the potential mitigation measures to be implemented. Extensive and expedient investigations will be conducted in those areas considered exposure pathways, such as streams. A risk assessment will be completed to determine the relative danger of munitions contamination to the environment and surrounding human population.

Decontamination. A data collection system will be created to incorporate munitions expenditure reports, number of duds in an area, chemical components of munitions, and biohazards of each chemical. This information will be used in conjunction with the proposed pollution assessment program to identify impacts to the environment and human population. These measures will be implemented in addition to the Army's Range Facilities Management Support System (RFMSS).

In the event a range becomes inactive, the Department of Defense Range Rule will apply. The Range Rule addresses decontamination and remediation actions that must be implemented at deactivated ranges.

Land Use. No additional land use mitigation measures are recommended.

Air Quality. No additional air quality mitigation measures are recommended.

Terrain. No mitigative measures are recommended for terrain impacts.

Geology. No mitigative measures are recommended for impacts to geologic features.

Mineral Resources. No mitigative measures are recommended for impacts to mineral resources.

Soils. A program will be implemented to identify possible muntions contamination to soils of the withdrawal lands. This program is described in Chapter 4.23.2 Proposed Mitigation, Pollution.

Permafrost. A program will be implemented to identify possible muntions contamination to permafrost of the withdrawal lands. This program is described in Chapter 4.23.2 Proposed Mitigation, Pollution.

Surface Water. A water quality sampling program will be established for the withdrawal lands. The study effort will include an analysis of surface water bodies, with monitoring stations located directly upstream and downstream of the installations.

Groundwater. Existing groundwater data for the withdrawal lands will be organized and evaluated for completion of a more detailed groundwater quality assessment. Any future monitoring efforts will be based on these assessments. Once a sampling scheme is developed, monitoring for munitions by-products will be included.

Wetlands. Additional wetland mitigation will be determined by the U.S. Army Corps of Engineers through the permitting process for the Clean Water Act, Section 404.

Vegetation. A forest resources inventory will be conducted and results used to complete and implement the Forest Ecosystem Management Plans, which are part of the Integrated Natural Resources Management Plans.

Wildlife. Information from bird surveys on the withdrawal lands will be reviewed to identify habitat areas for neotropical migrants. Breeding Bird Surveys will continue on Fort Wainwright and be implemented on Fort Greely.

Fisheries. Fishing opportunities for the public will be maintained. Habitat for stocked fish will be improved.

Wild Fisheries. Fish habitat surveys will be conducted.

Threatened or Endangered Species (State and Federal). If threatened or endangered species are found on the withdrawal lands, management guidelines will be written and implemented after consultation with the U.S. Fish and Wildlife Service and Alaska Department of Fish and Game.

Fire Management. Interservice Support Agreements will be maintained for the length of the withdrawal.

Prescribed Burns. No additional mitigation is needed for prescribed burns.

Public Access. U.S. Army Alaska will develop a public information packet and media strategy to assist the public in accessing the withdrawal lands. The information packet will contain a map identifying restricted and open areas, roads, authorized activities, restricted airspace, and information on airspace accessibility. The Army will also study the feasibility of establishing an internet website and telephone hotline to provide access information.

Recreation. Recreational use of stocked lakes on the withdrawal lands will be monitored to determine its impact to the vegetation and shoreline surrounding the lakes.

Cultural Resources. No additional mitigative measures are recommended for cultural resources.

Socioeconomics. No mitigative measures are recommended for impacts to socioeconomics.

Subsistence. No additional mitigative measures are recommended for impacts to subsistence.

Environmental Justice. No mitigation is needed for environmental justice impacts.

Noise. Determine noise impacts to key species, such as caribou and bison, and include protection requirements within a management plan.

STATISTICS OF THE OWNER WATER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER	A REAL PROPERTY OF A REAL PROPER						
Permit Number and Waterbody	Duration	Location	Project Description and Acreage	Special Provisio			
Fort Wainwright	Fort Wainwright Yukon Training Area						
4-910800, Moose Creek 10	2/6/92 - 1/31/95	Activity will occur on Fort Wainwright about 2.5 miles north of Moose Creek, and 4 miles southeast of Chena River, specifically section 12, T. 2 S., R. 3 E., Fairbanks Meridian, USGS Quad Fairbanks D-1.	Discharge of 7,500 cubic yards of gravel fill material into 1.8 acres of wetlands to construct an access road 3,900 feet long and 20 feet wide. The purpose of the discharge is to upgrade an existing dry weather/winter access trail, which connects the Husky Drop Zone to Transmitter Site Road.	Natural drainage patterns shall be maintained by c or excessive drainage of adjacent wetlands. All disturbed and fill areas shall be stabilized to pre Adjacent wetlands outside of the project area will r			
970660	1997	Activity will occur at Fort Wainwright.	Discharge of material into 0.03 acres of waters of the United States for the construction of a rifle range.	Unknown			
4-970888, Stuart Creek 2	1/8/98-12/31/00	Activity will occur within the Yukon Training Area-Stuart Bombing Range between Stuart Creek and the south fork of the Chena River.	Discharge of approximately 120,100 cubic yards of gravel, rock, and soil into 24.3 acres of waters of the United States (wetlands), to improve and upgrade access to roads and target arrays; and the maintenance by mechanized landclearing (cultivation) of 36.2 acres on the existing mock airfield, within waters of the United States (wetlands). Work would consist of primary target roads (15,75 acres), secondary target roads (3.6 acres), target pads (3.67 acres), temporary equipment turnarounds (1.17 acres), temporary stockpile of fill material site (0.1 acres), and the maintenance of mock airfield by cultivation with a blade, disc harrow, or excavator to a depth of 6 inches (36.2 acres).	Natural drainage patterns shall be maintained by c or excessive drainage of adjacent wetlands. All disturbed and fill areas shall be stabilized to pre Adjacent wetlands outside of the project area will r			
Fort Greely Wes	t and East Trai	ning Areas					
890397	1989	Activity will occur at Fort Greely on less than one acre.	Cleanup of oil spill.	Unknown			
D-920132, Bolio Lake	5/28/92 - ?	Activity will occur at Bolio Lake in sections 7, 8, 17, 18, and 19, T. 12 S., R. 10 E., Fairbanks Meridian at Fort Greely.	Conduct a road construction project to Bolio Lake including discharges of dredged and/or fill material into headwaters and isolated waters. The discharge will not cause the loss of greater than one acre of waters of the United States, including wetlands.	Natural drainage patterns shall be maintained by c or excessive drainage of adjacent wetlands. All disturbed and fill areas shall be stabilized to pre Adjacent wetlands outside of the project area will r			
9-930448, Jarvis Creek	6/23/93 - ?	Activity will occur at 12-mile Crossing, Jarvis Creek at Fort Greely.	Reconstruction of a ford crossing by placing fill in waters of the United States.	The proposed work will qualify for a wetlands perm clean fill material from a nearby gravel bar will be i across Jarvis Creek at the 12-mile Crossing location the Clean Water Act.			
D-950283, Delta River	6/1/95-indefinite	Activity will occur along the eastern bank of the Delta River on the Fort Greely Military Installation within the Mississippi Impact Area near Observation Post 7A located in section 13, T. 12 S., R. 9 E., Fairbanks Meridian.	Discharge of 1333 cubic yards of fill material into 1.5 acres of waters of the United States (wetlands) to construct an earth berm to be used for equipment and personnel protection from possible black blast and explosion during missile launching.	After additional information was obtained from an of the USACE, they determined that the proposed pro- regulatory jurisdiction. As a result, the berms cons flood plain were left in place for future missile testin alteration of the method, scope, or location of the a authorization.			
4-950011, Jarvis Creek 3	7/5/95 - 5/31/98	Site 1: Activity will occur in Jarvis Creek off the east end of runway 24 of Allen Army Airfield and east of Ammunition Storage Point, in sections 1 and 12. Site 2: Activity will occur in an unnamed slough on the east side of the Delta River along Beales Range Road in section 10. Both sites are located in T. 11 S., R. 10 E., Fairbanks Meridian, Fort Greely, USGS Quad Mt. Hayes D-4.	Dredging of 1,500 cubic yards of gravel material from waters of the United States, including wetlands, for three consecutive years. At Site 1, approximately 1,000 cubic yards of gravel will be obtained from below the ordinary high water mark of Jarvis Creek. At Site 2, approximately 500 cubic feet will be obtained from below the ordinary high water mark of the unnamed slough adjacent to the Beales Range Road. The gravel and fill will be used for general road maintenance work through out the Fort Greely facility.	Gravel shall be removed only from unvegetated an gravel bar to the existing water level. Any bank slopes disturbed by equipment shall be s erosion. Stockpiling of usable materials shall not occur belo mark of streams.			
4-960879, Delta River	10/28/96 - 10/31/97	Activity will occur along the Delta River approximately 9 miles south of Delta Junction.	Discharge of 3,760 cubic yards of gravel material below the ordinary high water mark of the Delta River into approximately 3.2 acres of waters of the United States to construct three diversion berms, excavate a diversion channel, and repair three existing roadway crossings. River flows are preventing access to the firing ranges, and excessive erosion could impact electrical power poles, causing interruption of electrical service to other military installations within or operated by Fort Greely.	The permittee must submit a plan addressing a pro to the flooding and erosion problems on later than			
D-970402	6/1/97 - ?	Activity will occur within wetlands on Fort Greely Military Installation along Meadows Road from the Texas Range Maintenance Facility south to OP-10A.	Construct an 18,000 foot long utility line to support military operations, of which 9,400 feet would cross waters of the United States (wetlands). The trench would be 8 inches wide by 36 inches deep. Material would be temporarily sidecast. The trench would be backfilled, and any excess material would be hauled to uplands. Approximately 0.3 acres would be temporarily impacted.	A plan must be implemented to avoid or minimize over vegetation and to reestablish such vegetation wher avoided.			
D-970461, Delta Creek	6/18/97 - ?	Activity will occur within wetlands adjacent to Delta Creek on Fort Greely Military Installation located in section 15, T. 11 S., R. 5 E., Fairbanks Meridian.	Discharge of 92 cubic yards of fill material into 0.06 acres of waters of the United States (wetlands) to construct CALFAX Range which is necessary for soldier training in a simulated defended position.	Fill material will be clean sand and fine gravel. Str mat will not be authorized during construction or or Insulation and geotextile material will be placed be to protect permafrost. Supplies will be airlifted to the site.			
M-920063, Delta Creek 1	12/24/97- 12/31/00	Activity will occur within the Oklahoma Impact Area of the Fort Greely Military Installation, approximately 19 miles WSW of Delta Junction, AK located in sections 16, 21, and 28, T. 11 S., R. 7 E., Fairbanks Meridian.	Discharge of an undetermined amount of fill material into 25.5 acres of waters of the United States (wetlands), resulting from the mechanized land clearing by cultivation (with a blade or disc harrow to a depth of 6 inches) to construct and maintain a target array consisting of a mock runway, taxiway, and compound area for military pilot training purposes.	Seasonal aerial and/or ground surveys of migratory aiffield must be performed. Access to and from the mock airfield site for maintu- removal is restricted to primary routes. Off-trail activities will only be allowed at the site to			
4-9 70913, Tanana River 168	1/21/98 - 1/31/99	Activity will occur adjacent to or near a 110-mile corridor starting in the Tanana Flats Training Area (approximately 1 mile directly south of Fairbanks, Alaska, known as the Bonnefield Trails) via a land bridge corridor to Fort Greely combat training areas (Oklahoma Range, CALFEX Range, and to Donnelly Dome DZ).	Conduct mechanized land clearing of approximately 21 acres of waters of the United States (wetlands) and discharge approximately 17,000 cubic yards of fill material in wetlands. These discharges will be incidental to two winter military training exercises, Arctic Strike and Northern Edge, in construction of winter trails, tactical operation centers, and campsites by heavy equipment (bulldozers).	Natural drainage patterns shall be maintained by c or excessive drainage of adjacent wetlands. All disturbed and fill areas shall be stabilized to pre Adjacent wetlands outside of the project area will n			

	Table 4.10.a
to prevent erosion. a will not be encroached upon.	
d by culverts to prevent flooding to prevent erosion. a will not be encroached upon.	
d by culverts to prevent flooding to prevent erosion. a will not be encroached upon.	Wetland Permits Issued by U.S. Army Corps of
e permit exemption because ill be used and a road existed location prior to the passage of	Engineers, Alaska District on
n an on-site field inspection by ed project area was not under s constructed in the Delta River s testing. However, any f the activity may require	Withdrawal Lands
ed and exposed portions of the II be stabilized to prevent r below the ordinary high water	
a proposed long-term solution than 7/1/97.	
mize disturbance to wetland a when disturbance cannot be	
el. Stripping of the vegetated n or operation. ed below all site disturbances	
pratory bird usage of the mock maintenance and ordinance ite to retrieve ordinance.	
t by culverts to prevent flooding to prevent erosion. will not be encroached upon.	Source: U.S. Army Corps of Engineers, Alaska District

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	Figure 4.22.a
	Noise Zones
	Fort Wainwright and Fort Greely
	Legend
	Noise Zone II
	Noise Zone III
	Dedicated Impact Area
	High Hazard Impact Area
	🖾 Impact Area Buffer Zone
	∼ Road
	PL99-606 Withdrawal Boundary
atta i	Other Military Withdrawal Boundaries
st	
	SCALE 1 : 575,000 2 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 Kilometers 2 0 2 4 6 8 10 12 14 16 18 Miles
	Sources: U.S. Army Center for Health Promotion and Preventive Medicine Environmental Noise Program. Aberdeen Proving Grounds, MD.

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CHAPTER 6 BIBLIOGRAPHY

BIBLIOGRAPHY

- Adams, E.S. 1975. Effects of Lead and Hydrocarbons from Snowmobile Exhaust on Brook Trout (Salvelinus fontinalis). Trans. Am. Fisheries Soc. 104(2): 363-373 in Berry, Kristin H. 1980. A Review of the Effects of Off-Road Vehicles on Birds and Other Vertebrates. California Desert Plan Program, U.S. Bureau of Land Management, Riverside, CA.
- AIRSWeb. 1998. Source Report. Website http://www.epa.gov/airsweb.
- Alaska Air Command Collection. 1940. Memo to General Arnold dated December 19. Series 111, Box 3, File 12.
- Alaska Department of Community and Regional Affairs. 1990 Census.
- Alaska Department of Fish and Game (ADF&G). *Alaska Hunting Regulations.* No. 38. Effective Dates July 1, 1997 - June 30, 1998.
- Alaska Department of Fish and Game (ADF&G). 1997. Statewide Stocking Plan for Recreational Fisheries 1998 (Draft).
- Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Bureau of Land Management, and U.S.D.A. Forest Service. 1994. *Alaska's Threatened and Endangered Species*.
- Alaska Department of Fish and Game (ADF&G). 1993. Delta Bison Management Plan, July 1, 1993 - June 30, 1998.
- Alaska Department of Fish and Game, Alaska Division of Parks and Outdoor Recreation, Alaska Division of Tourism, Alaska Department of Transportation and Public Facilities, Alaska Marine Highway System, USDA Forest Service (Region 10), Bureau of Land Management, U.S. Fish and Wildlife Service (Region 7), National Park Service, National Marine Fisheries Service, USDA Soil Conservation Service, 6th Infantry U.S. Army, 11th Air Force, National Audubon Society, Alaska-Hawaii Region, National Wildlife Federation, Alaska Natural Resource Center, The Nature Conservancy, Alaska Field Office, Alaska Conservation Foundation, Alaska Visitors Association, Alaska Tourism Marketing Council, Alaska Society of Convention and Visitor Bureaus, and Alaska Wilderness Recreation and Tourism Association. 1992a. *Memorandum of*

Understanding Regarding Watchable Wildlife and Ecotourism in Alaska.

- Alaska Department of Fish and Game (ADF&G). 1992b. Response letter (DACA85-9-93-8) for Fish Habitat Permit FG92-III-0235, Ice Bridge Construction, Maintenance, and Use, Tanana River, Salcheket Slough, McDonald Creek, Clear Creek, Dry Creek on Fort Wainwright, and the Delta River and Jarvis Creek on Fort Greely, Tanana River (Stream No. 334-40-11000-2490) LAS 13859.
- Alaska Department of Labor. 1987-1997. Statistical Quarterly.
- Alaska Department of Natural Resources (ADNR). 1992. Draft Evaluation Units for Final State Land Selections.
- Alaska Department of Natural Resources (ADNR). 1991. Tanana Basin Area Plan for State Lands.
- Alaska Department of Natural Resources (ADNR), Division of Forest, Land, and Water Management. 1980. *Geohydrology of the Delta-Clearwater Area Alaska US Geological Survey Water-Resources Investigations 80-92.*
- Alaska Department of Natural Resources (ADNR), Division of Geological and Geophysical Surveys. 1996. *Alaska's Mining Industry*.
- Alaska Department of Natural Resources (ADNR), Division of Parks and Outdoor Recreation. 1994. *Chena River State Recreation Area Master Plan*.

Alaska Department of Natural Resources (ADNR). 1998. Website http://www.dnr.state.ak.us

Alaska Division of Forestry. 1994-1997. Annual Reports.

- Alaska Division of Geological and Geophysical Surveys. 1996. Alaska Mineral Industry.
- Alaska Earthquake Information Center. 1998. Searchable Earthquake Database, January 1, 1997 - June 30, 1998 (searched between 63°-65° N Latitude and 144°-147° W Longitude), Website http://www.giseis.alaska.edu/seis/html_docs/ db2catalog.html.
- Alaska Earthquake Information Center, GI-UAF, and U.S. Geological Survey. 1997. Interior Alaska Seismicity 1988 to 1995. Website

http://www.giseis.alaska.edu/seis/html_docs/historic _interior_ seis.html.

- Alaska Heritage Resource Survey Records, on file at the Office of History and Archaeology, Department of Natural Resources. 1998. Anchorage, AK.
- Alaska Legislative Research Agency. 1994. Hardwood Timber Resources in Interior Alaska. Legislative Report 94.223.
- Alaska Natural Heritage Program (ANHP), State of Alaska (ADF&G) Endangered and Species of Concern List. 1998. Website http://www.uaa.alaska.edunri/ aknhp_web/biodiversity/zoological/spp_of_concern/species%20list/state. html.
- Alaska Natural Heritage Program, U.S. Forest Service (USFS) Sensitive Species List. 1998. Website http://www.uaa.alaska.edu/enri/aknhp_web/ biodiversity/ zoological/spp_of_concern/species%20list/fssen.html.
- Alaska State Historic Preservation Office. 1998a. Alaska Historic Preservation Act: Alaska Statutes and Alaska Administrative Code. Office of History and Archaeology, Department of Natural Resources. Anchorage, AK.
- Alaska State Historic Preservation Office. 1998b. Fort Wainwright Cultural Resources Management Plan (Draft). Office of History and Archaeology, Department of Natural Resources. Anchorage, AK.
- Alaska State Historic Preservation Office. 1998. Personal Communication with Rachel Joan Dale (archaeologist) and Darrell L. Lewis. Office of History and Archaeology, Department of Natural Resources, Anchorage, AK.
- Alaska Visitors Association. 1997. Tourism Wise: What Alaskans Should Know About Alaska's Visitor Industry.
- Alaskan Command, U.S. Air Force (USAF). 1991. Environmental Assessment for Arctic Warrior 91.
- Ambrose, Skip. 1995. Personal Communication. Endangered Species Specialist, Northern Alaska Ecological Services, USFWS <u>in</u> United States Department of the Air Force, 11th Air Force. Final Environmental Impact Statement, Alaska Military Operations Areas Volumes I-IV. Elmendorf AFB, AK.

- Ambrose, Skip. 1998. Personal Communication. Endangered Species Biologist, U.S. Fish and Wildlife Service, Fairbanks, AK.
- Anchorage Daily News. 1972. SM-1A is Done: Reactor Closed at Fort Greely. July 29.
- Anderson, D.E., O.J. Rongstad, and W.R. Mytton. 1989. *Response of Nesting Red-Tailed Hawks to Helicopter Overflights.* The Condor.
- Anderson, Douglas D. 1984. Prehistory of North America, Vol. 5 of The Handbook of North American Indians: Arctic. Smithsonian Institute.
- Anderson, G.S. 1970. Hydrologic Reconnaissance of the Tanana Basin, Central Alaska.
- Andrews, Elizabeth. 1975. Salcha: An Athapaskan Band of the Tanana River and Its Culture. Master's Thesis, University of Alaska, Fairbanks.
- Arnold, Major General H.H. 1940. Our Frontier in Alaska. National Geographic.

Arobio, Ed, Personal Communication, Alaska State Department of Agriculture.

- Bacon, G.H., J.A. Ketz, and C.M. Mobley. 1986. Produced by the Alaska Heritage Research Group, Inc. for the U.S. Army Corps of Engineers, Alaska District, Anchorage, Alaska. *Historical Preservation Plans for U.S. Army Lands in Alaska*.
- Bacon, Glenn and Charles E. Holmes. 1979. Prepared for the U.S. Army Corps of Engineers, Alaska District. *Archaeological Survey and Inventory of Cultural Resources at Fort Greely.*
- Bailey, Robert G. 1995. *Description of the Ecoregions of the United States*. Second Edition. Miscellaneous Publication No.1391, USDA Forest Service, WA.
- Bates, Major. 1998. Personal Communication. Commander, 283rd Medical Detachment, Fort Wainwright, AK.
- Bedford, Barbara L and Jesse Ford. 1987. *Hydrology of Alaskan Wetlands, USA: A Review.* Arctic and Alpine Research, Vol.19, No. 3.

Final

- Belanger, L. and J. Bedard. 1989. *Response of Staging Greater Snow Geese to Human Disturbance*. Journal of Wildlife Management. Vol. 53.
- Bellrose, Frank C. 1980. *Ducks, Geese and Swans of North America.* Stackpole Books, Third Edition. Harrisburg, PA.
- Benson, Carl S. 1965. *Ice Fog: Low Temperature Air Pollution*. University of Alaska Geophysical Institute.
- Berry, Kristin H. 1980. A Review of the Effects of Off-Road Vehicles on Birds and Other Vertebrates. California Desert Plan Program, U.S. Bureau of Land Management, Riverside, CA.
- Blaisdell, George L. 1991. First International Conference on Winter Vehicle Mobility. Santa Barbara, CA.
- Bleich, Vernon C., R. Terry Bowyer, Andrew M. Pauli, Robert L. Vernoy, and Richard W. Anthes. 1990. *Responses of Mountain Sheep to Helicopter Surveys*. California Department of Fish and Game. Vol. 76, No. 4.
- Bonnell, Betsy. 1999. Personal Communication. Northern Field Office, Bureau of Land Management, Fairbanks, AK.
- Boucher, John, and Kristen Tromble. 1996. Federal Agencies Prominent Despite Downsizing. Alaska Economic Trends.
- Brandon, Deane R., ALSIB. 1975. *The Northwest Ferrying Route Through Alaska*, 1942-45. American Aviation Historical Society Journal.
- Braunack, M.V. 1986. The Residual Effects of Tracked Vehicles on Soil Surface Properties. Journal of Terramechanics 23:37-50.
- Bruce, Pam. 1998. Personal Communication. Wildlife Biologist, Fort Wainwright, AK.
- Bundtzen, Thomas K. 1998. Personal Communication. Pacific Rim Geological Consultants, Fairbanks, AK.
- Bureau of Land Management (BLM), Alaska Interagency Fire Management Council. 1998. Alaska Wildland Fire Management Plan.

Alaska Army Lands Withdrawal Renewal

- Bureau of Land Management (BLM). 1999. The Delta National Wild and Scenic River. Website. http://www.ak.blm.gov/gdo/delta1.html.
- Bureau of Land Management (BLM) and U.S. Army Alaska (USARAK). 1995. Memorandum of Understanding Concerning the Management of Certain Public Lands Withdrawn for Military Use.
- Bureau of Land Management (BLM), Alaska Fire Service. 1984. Alaska Interagency Fire Management Plan - Upper Yukon/Tanana Planning Area.
- Bureau of Land Management (BLM). 1980. Soils, Water and Air. Fort Wainwright Maneuver Area.
- Burglin, Cliff. 1998. Personal Communication. Land Consultant. Fairbanks, AK.
- Burns, L.E., R.J. Newberry, and D.N. Solie. 1991. Quartz Normative Plutonic Rocks of Interior Alaska and Their Favorability for Association with Gold. Alaska Division of Geological and Geophysical Surveys, Report of Investigations 91-3.
- Burrows, R.C., W.W. Emmett, and B. Parks. 1981. Sediment Transport in The Tanana River Near Fairbanks, Alaska 1977-1979. U.S. Geological Survey Water Resources Investigations 81-20.
- Bush, James D, Jr. 1984. *Narrative Report of Alaska Construction 1941-1944*. U.S. Army Engineer District, AK.
- Butorac, Marcia. 1998. Personal Communication, Outdoor Recreation Planner, Bureau of Land Management, Glennallen Field Office, Glennallen, AK.
- Calef, G. W., E.A. DeBock, and G.M. Lortie. 1976. The Reaction of Barren Ground Caribou to Aircraft. Arctic. 29:201-212.
- Cannone, Robert. 1998. Personal Communication, Inspection Services, Office of Air Quality Maintenance, Alaska Department of Environmental Conservation, Air and Water Quality Division, Fairbanks, AK.

Carson, Al. 1993. Personal Communication (letter) with Susan Means. Habitat Biologist, Habitat and Restoration Division, ADF&G. <u>in</u> United States Department of the Air Force, 11th Air Force. Final Environmental Impact Statement, Alaska Military Operations Areas Volumes I-IV. Elmendorf AFB, AK.

Cashen, William R. 1971. A Brief History of Fairbanks.

Castner, Joseph C. 1984. Lieutenant Castner's Alaskan Exploration 1898, A Journey of Hardship and Suffering. Cook Inlet Historical Society.

City of Fairbanks. 1998. Annual Budget.

City of North Pole. 1997. General Fund Operating Budget.

- Clark, Donald W. 1981. Prehistory of the Western Subarctic, Vol. 6 of The Handbook of North American Indians: Subarctic. Smithsonian Institute.
- Clark, Ellen. 1998. Personal Communication. LCTA Coordinator, Fort Greely. Delta Junction, AK.

Claudis, Steve. 1998. Personal Communication. Alaska Division of Forestry.

- Cloe, John and Michael F. Monaghan. 1984. *Top Cover: The Air Force in Alaska 1920-1983*. Anchorage Chapter, Air Force Association and Pictorial Publishing Company.
- Cobb, E. 1972. *Metallic Mineral Resources Map of the Mt. Hayes Quadrangle, Alaska*. US Geological Survey Map MF 414.
- Cohen, Stan. 1979. The Trail of '42. Pictorial Histories Publishing Co. Missoula, MT.
- Cold Regions Test Center (CRTC). 1997. Winter Testing For America's Army and Winter Testing. Briefing Materials.
- Cowardin, Lewis M. 1979. *Classification of Wetlands and Deepwater Habitats* of the United States. United States Fish and Wildlife Service, FES/OBS-70/31.

- Crockett, A.B., H.D. Craig, T.F. Jenkins, and W.E. Sisk. 1997. *Field Sampling and Selecting On-Site Analytical Methods for Explosives in Soil*. Federal Facilities Forum Issue, Las Vegas, NV.
- Curtin, G.C., D.L. Tripp, and W.J. Nokleberg. 1990. Summary and Interpretation of Geochemical Maps for Stream Sediment and Heavy Mineral Concentrate Samples, Mt. Hayes Quadrangle, Eastern Alaska Range, Alaska. US Geological Survey Map MF-1996 B.
- Dale, Bruce. 1997 and 1998. Personal Communication, Wildlife Biologist, Alaska Department of Fish and Game, Fairbanks, AK.
- Davis, J.L., P. Valkenburg, and R.D. Boertje. 1985. *Disturbance of the Delta Caribou Herd* in *Proceedings of the First North American Caribou Workshop*. Ottawa, Ontario. Canadian Wildlife Service Publication.
- Defense Mapping Agency, Hydrographic/Topographic Center. 1978. Terrain Analysis (Including The Yukon Command Training Site and The Fairbanks Permafrost Station). Fort Wainwright, AK.
- Delta/Greely School District. 1998. Personal Communication. Delta Junction, AK.
- Denfield, D. Colt. 1994. The Cold War in Alaska: A Management Plan for Cultural Resources. Prepared by the United States Army Corps of Engineers, Alaska District.
- Department of the Air Force, 11th Air Force. 1998. Letter dated May 28, 1998.
- Department of the Army. 1994. Army Ammunition Data Sheets Small Caliber Ammunition. FSC 1305, TM 43-0001-27.
- Department of the Army. 1994. Army Ammunition Data Sheets for Demolition Materials. TM 43-0001-38.
- Department of the Army. 1994. Army Ammunition Data Sheets for Grenades. TM 43-0001029.
- Department of the Army. 1994. Army Ammunition Data Sheets for Land Mines. FSC 1345, TM 43-0001036.

- Department of the Army and Navy. 1992. Standard Characteristics (Dimensions, Weight, and Cub) for Transportability of Military Vehicles and Other Outsize/Overweight Equipment (in TOE Item Number Sequence), TB 55-46.
- Department of the Army, Headquarters. 1974. United States Army, Alaska. Letter dated January 21, 1974. Regarding Retention of Fort Greely Air Drop Zone.
- Department of the Army (DA), Headquarters. 1991. Training Land.
- Department of the Army (DA), Headquarters. 1995. Army Regulation 200-3, Natural Resources-Land, Forest and Wildlife Management.
- Department of the Army (DA), Headquarters. 1988. Army Regulation 200-2, Environmental Effects of Army Actions.
- Department of the Army (DA), Headquarters. 1990. Army Regulations 200-1, Environmental Protection and Enhancement.
- Department of the Army (DA), Headquarters, United States Army Alaska. 1995. U.S. Army Alaska Regulation 200-4. *Environmental Quality Hazardous Waste, Used Oil and Hazardous Materials Management.*
- Department of Defense (DoD). 1996. Directive 4715.3. Environmental Conservation Program.
- Department of Defense (DoD), Explosives Safety Board, Naval Explosive Ordnance Disposal Technology Division, U.S. Army Environmental Center, Bureau of Land Management, PRC Environmental Management, Inc. 1996. Unexploded Ordnance (UXO): An Overview.
- Department of the Interior, Bureau of Land Management, Alaska Fire Service and U.S. Army Alaska (USARAK). 1995. *Support Agreement Number* 140138-95089-905.
- Department of the Interior, Bureau of Land Management, Alaska Fire Service, and State of Alaska (1422-L953-A98-0002), Department of Natural Resources, Division of Forestry. 1998a. *Reciprocal Fire Protection Agreement (*AK-DF-S-98FC-0005).

- Department of the Interior, Bureau of Land Management, Alaska Fire Service, and State of Alaska, Department of Natural Resources, Division of Forestry. 1998b. Annual Operating Agreement (AK-DF-S-95FC-0005) to Cooperative Fire Protection Agreement.
- Dingman, Samide, Saboe, Lynch and Slaughter. 1971. U.S. Army Cold Regions Research and Engineering Lab. *Hydrologic Reconnaissance of The Delta River and Its Drainage Basin, Alaska*. Research Report 262.
- Dixon, James E. 1980. Archeological Survey and Inventory of Cultural Resources, Fort Wainwright, Alaska.
- Dixon, Mim. 1978. What Happened to Fairbanks? The Effects of the Trans-Alaska Oil Pipeline on the Community of Fairbanks, Alaska. Social Impact Assessment Series No.1, Westview Press.
- Donaldson, Cathy. 1998. Personal Communication. Endangered Species Specialist, U.S. Fish and Wildlife Service, Northern Alaska Ecological Services, Fairbanks, AK.
- Douglas, Linda. 1998. Personal Communication. Public Affairs Office, United States Army Alaska, Fort Greely, AK.
- Doxiadis-System Development Corporation. 1970. Economic Potential of Alaskan Military Surplus Property, Volume I and ii, Recommendations for the Development of Whittier. Submitted to Division of State Planning and Research, Office of the Governor.
- Doxy, Mike. 1998. Personal Communication. Fisheries Biologist, Alaska Department of Fish and Game, Fairbanks, AK.
- Drake, Steve. 1998. Personal Communication. Geographic Information System Specialist, Fort Richardson, AK.
- DuBois, Steve. 1997. Personal Communication. Alaska Department of Fish and Game. Fairbanks, AK.
- Dusel-Bacon, Cynthia. 1998. Personal Communication. U.S. Geological Survey, 345 Middlefield Road, Menlo Park, CA.
- Dusel-Bacon, C., J.R. Bressler, H. Takaoka, J.K. Mortensen, D.H. Oliver, J.S. Leventhal, R.J. Newberry, and T.K. Bundtze. 1998a. *Stratiform Zinc-*

Lead Mineralization in Nasina Assemblage Rocks of the Yukon-Tanana Upland in East-Central Alaska. U.S. Geological Survey Open File Report 98-340. Website http://caldera.wr.usgs.gov/syngenms/OF98-340.html.

- Dusel-Bacon, C., J.R. Bressler, H. Takaoka, J.K. Mortensen, D.H. Oliver, J.S. Leventhal, R.J. Newberry, and T.K. Bundtzen. 1998b. Stratiform Zinc-Lead Mineralization in Nasina Assemblage Rocks of the Yukon-Tanana Upland in East-Central Alaska. Pathways '98, Extended Abstracts Volume, British Columbia & Yukon Chamber of Mines.
- Dusel-Bacon, C., J.R. Bressler, H. Takaoka, J.K. Mortensen, D.H. Oliver, J.S. Leventhal, R.J. Newberry, and T.K. Bundtzen. 1998c. *Metamorphic Hosted Mineralization in the Yukon-Tanana Upland, Alaska*. Extended Abstracts of the 16th Biennial Conference on Alaskan Mining, March 2-7, 1998, Fairbanks. Alaska Miners Association.
- Dusel-Bacon, C., J.R. Bressler, H. Takaoka, J.K. Mortensen, D.H. Oliver, J.S. Leventhal, R.J. Newberry, and T.K. Bundtzen. 1997. *Stratiform Massive Sulfides in the Yukon-Tanana Upland of Alaska: Are They There?* Abstracts for the Alaska Miners Association 1997 Meeting, Anchorage, AK.
- Dwyer, N.C. and G.W. Tanner. 1992. *Nesting Success in Florida Sandhill Cranes*. Wilson Bulletin, 104:22-31.
- Earth Info Inc. 1993. USGS Quality of Water. CD Rom.
- Ellis, D.H. 1981. Responses of Raptorial Birds to Low-Level Military Jets and Sonic Booms. Institute for Raptor Studies, U.S. Fish and Wildlife Service in United States Department of the Air Force, 11th Air Force. 1995. Final Environmental Impact Statement, Alaska Military Operations Areas Volumes I-IV. Elmendorf AFB, AK.
- ENSR Consulting and Engineering for United States Department of the Air Force. 1992. Environmental Assessment of the Expansion and Upgrade of Military Training Routes, Alaska. Elmendorf AFB, AK.

Fairbanks Daily News-Miner. 1937. 960 Acres to be Utilized by Military. April 3.

Fairbanks North Star Borough. FY 1997-1998. Approved Budget.

- Fairbanks North Star Borough. 1992. *Title 15 Floodplain Management Regulations*. Department of Community Planning.
- Fairbanks North Star Borough Community Research Center. 1998. A Socio-Economic Review.
- Fairbanks North Star Borough Community Research Center. 1996. A Socio-Economic Review.
- Fairbanks North Star Borough School District. 1997. Student Ethnic Distribution by School. October.
- Farquhar, John T. 1995. Northern Sentry, Polar Scout: Alaska's Role in Air Force Reconnaissance Efforts, 1946-1948, in Alaska at War 1941-1945. The Alaska at War Committee.
- Federal Emergency Management Agency. 1982a. Flood Insurance Rate Map, Fairbanks North Star Borough, Alaska.
- Federal Emergency Management Agency. 1982b. Flood Insurance Study City of Delta Junction, Alaska. Southeast, Fairbanks Division.
- Forbes, R.B. and F.R. Weber. 1975. *Progressive Metamorphism of Schists Recovered From a Deep Drill Hole Near Fairbanks, Alaska.* U.S. Geological Survey Journal of Research, Vol.3, No.6.
- Foreman, Gary. 1998. Personal Communication. Northern Field Office, Bureau of Land Management, Fairbanks, AK.
- Foster, H.L. 1992. *Geologic Map of the Eastern Yukon-Tanana Region, Alaska*. U.S. Geological Survey Open File Report 92-313.
- Foster, H.L., N.R.D. Albert, A. Griscom, T.D. Hessin, W.D. Menzie, D.L. Turner, and F.H. Wilson. 1979. Background Information to Accompany Folio of Geologic and Mineral Resource Maps of the Big Delta Quadrangle, Alaska. The Alaskan Mineral Resource Assessment Program. US Geological Survey Circular 783.
- Foster, H.L., T.E.C. Keith, and W.D. Menzie. 1994. Geology of the Yukon-Tanana Area of East-Central Alaska, in Plafker, G. and Berg, H.C., eds., The Geology of Alaska. Boulder, Colorado. Geological Society of America, The Geology of America, Vol. G-1.

- Foster, H.L., T.E.C. Keith, and W.D. Menzie. 1987. *Geology of East Central Alaska*. U.S. Geological Survey Open File Report 87-188.
- Franklin, Glenn. 1998. Personal Communication. Alaska State Department of Agriculture.
- Frazier, A.R. 1972. Noise Survey: F-105 Overflights, Wichita Mountains Wildlife Refuge and Vicinity, Fort Still, OK. National Technical Information Service. Springfield, VA in United States Department of the Air Force, 11th Air Force. 1995. Final Environmental Impact Statement, Alaska Military Operations Areas Volumes I-IV. Elmendorf AFB, AK.
- Fretwell, J.D., J.S. Williams, and P.J. Redman. 1996. National Water Summary on Wetland Resources. U.S. Geological Survey Water Supply Paper 2425.
- Fried, Neal. 1996. *Defense: Still One of Alaska's Biggest Exports*. Alaska Economic Trends.
- Fried, N. and G. Huff. 1987. *The Military and Alaska's Economy*. Alaska Economic Trends.
- Fried, Neal. 1998. Personal Communication. State of Alaska, Alaska Department of Labor.
- Fried, Neal and Brigitta Windisch-Cole. 1995. *The Delta Region*. Alaska Economic Trends.
- Fried, Neal and Brigitta Windisch-Cole. 1998. Public School Education A Big Industry. Alaska Economic Trends.
- Gates, Paul. 1999. Personal Communication. Regional Environmental Officer, Bureau of Land Management, Anchorage, AK.
- Geier, Hans. 1998. Personal Communication, Master of Science, Resource Economics, Delta Area Potato Farmer.
- Glashan, Stafford J. 1998. Personal Communication. Environmental Engineer, Shannon & Wilson, Inc. Geotechnical and Environmental Consultants, Anchorage, Alaska.
- Globe Meat Technology, Ltd., Confederation of Danish Industries, and Great Northern Engineering. 1994. *Preliminary Draft Feasibility Study For The*

Alaska Pork Project. Submitted to Alaska Industrial Development Authority and Export Authority Contract No. 93-012. Volume 1.

- Golat, Mike. 1993. Economic Impact of the Trapping Industry. Technical Report School of Management, University of Alaska-Fairbanks.
- Golden, J., R.P. Ouellette, S. Saari, and P.N. Cheremisinoff. 1979. Environmental Impact Data Book. Ann Arbor, Ann Arbor Science in United States Department of the Air Force, 11th Air Force. 1995. Final Environmental Impact Statement, Alaska Military Operations Areas Volumes I-IV. Elmendorf AFB, AK.
- Good, Nathaniel. 1998 and 1999. Personal Communication. Region 9: Eastern Interior Alaska Subsistence Advisory Council, and the Delta Fish and Game Advisory Committee, Delta Junction, AK.
- Goran, W.D., L.L. Radke, and W.D. Severinghaus. 1983. An Overview of the Ecological Effects of Tracked Vehicles on Major U.S. Army Installations. USA-CERL Tech. Rep. N-142. U.S. Army Corps of Engineers, Champaign, IL.
- Gray, D.M., and D.H. Male. 1981. *Handbook of Snow Principles, Processes, Management & Use.* Division of Hydrology, University of Saskatchewan, Saskatoon, Canada.
- Griffin, H. Lee. 1998. Personal Communication. Environmental Protection Specialist, Fort Wainwright, AK.
- Gronquist, Ruth. 1997. Personal Communication. Wildlife Biologist, Northern Field Office, Bureau of Land Management, Fairbanks, AK.
- Guay, Gerry. 1998. Personal Communication, Ambient Monitoring, Office of Air Quality Improvement, Alaska Department of Environmental Conservation, Air and Water Quality Division, Anchorage, AK.
- Gunn, A., F.L. Miller, R. Glaholt, and K. Jingfors. 1985. Behavioral Responses of Barren Ground Caribou Cows and Calves to Helicopters on the Beverly Herd Calving Grounds, Northwest Territories in Proceedings of the First North American Caribou Workshop, Y.T. Whitehorse, A.M. Martell, and D.E. Russel (eds.). Ottawa: Canadian Wildlife Service Publication.

- Hammond, Bob. 1998. Personal Communication. U.S. Geological Survey, Alaska Volcano Observatory, Geophysical Institute, University of Alaska, Fairbanks, AK.
- Hammond, Tim. 1998. Personal Communication. Geographic Information System Specialist, Alaska Fire Service, Bureau of Land Management, Fairbanks, AK.
- Hand, Bradly. 1998. Personal Communication, Specialist, Public Affairs Office, Fort Greely, AK.
- Hansen, Shannon R. 1998. Personal Communication. Biologist, U.S. Army Corps of Engineers Alaska District, Regulatory Branch.
- Hansen, V.L., and C. Dusel-Bacon. 1998. Structural and Kinematic Evolution of the Yukon-Tanana Upland Tectonites, East-Central Alaska, A Record of Late Paleozoic to Mesozoic Crustal Assembly. Geological Society of America Bulletin, Vol. 110 No. 2.
- Harding, L.E. 1976. Den Site Characteristics of Arctic Coastal Grizzly Bears (Ursus Arctos L.) on Richards Island, Northwest Territories, Canada. Canadian Journal Zoology 54:1357-1363.
- Harrington, F.H., and A.M. Veitch. 1992. *Calving Success of Woodland Caribou Exposed to Low Level Jet Fighter Overflights*. Arctic, 45:213-218.
- Harrison, Hal H. 1979. A Field Guide to Western Bird's Nests. Houghton Mifflin Company.
- Hart Crowser, Inc. 1987. Environmental Assessment North Warning System (Alaska). Prepared for Department of the Air Force, Air Force Systems Command, Electronic Systems Division.
- Heidorn, Scott. 1997 and 1998. Personal Communication. Winter Access Coordinator, University of Alaska Fairbanks, Fairbanks, AK.
- Heimer, Wayne. 1995. Personal Communication, in United States Department of the Air Force, 11th Air Force. Final Environmental Impact Statement, Alaska Military Operations Areas Volumes I-IV. Elmendorf AFB, AK.

- Holmes, C.E. 1979. *Report of Archeological Reconnaissance: Withdrawal Areas, Fort Greely, Alaska.* U.S. Army Corps, of Engineers, Alaska District, Anchorage, AK.
- Hull, Ryan. 1998. Personal Communication. Alaska Department of Natural Resources, Division of Mining and Water Management, Fairbanks, AK.
- Jandt, Dave. 1998. Personal Communication. Fire Management Officer, Military Lands, Alaska Fire Service, Bureau of Land Management, Fort Wainwright, AK.
- Jenkins, Thomas F., Philip G. Thorne, and Marianne E. Walsh. 1994. *Field Screening Method for TNT and RDX in Groundwater*. Special Report 94-14.
- Jones, D.S. and C.F. Bagley. 1997. *Tracked Military Vehicle Impacts on Three Vegetative Communities at Yakima Training Center, Washington.* CEMML TPS 97-4. Colorado State University, Fort Collins, CO.
- Jones, D. 1993. *Bivouac Impacts Assessment and Rehabilitation Management*. Land Rehabilitation and Management Symposium, Fort Sill, OK.
- Jones, George. 1968. The Economic Impact of Fort Wainwright and Eielson Air Force Base on Fairbanks, Alaska. MBA Thesis, University of Alaska-Fairbanks.
- Jorgenson, M. Torre, Joanna E. Roth, Martha K. Raynolds, Michael D. Smith, Will Lentz, and Allison L. Zusi-Cobb. 1996. An Ecological Land Classification for Fort Wainwright, Alaska. Draft Report. Prepared by ABR, Inc. Prepared for U.S. Army Cold Regions Research Engineering Laboratory. Hanover, NH. Fairbanks, AK.
- Jorgensen, P. 1974. *Vehicle Use at a Desert Bighorn Watering Area.* 18th Ann. Bighorn Council. Trans. P. 18-24.
- Kane, D.L. 1973 *Groundwater Recharge in Cold Regions*, The Northern Engineer, Vol.13, No.3.
- Keill, Don. 1998. Personal Communication. Northern Field Office, Bureau of Land Management, Fairbanks, AK.

- Kerns, J.D. 1991. *The Early History of Ladd Field 1938-1943*. Natural Resources Office. Fort Wainwright, AK.
- Lamp, R.E. 1989. Monitoring the Effects of Military Air Operations at the Naval Air Station Fallon on the Biota of Nevada. Nevada Department of Wildlife.
- Larkin, R.P. 1978. Radar Observations of Behavior of Migrating Birds in Response to Sounds Broadcast from the Ground in Animal Migration, Navigation, and Homing. K. Schmidt-Koenig and W.T. Keeton eds. New York: Springer-Verlag.
- Larkin, R.P. 1976. The Theory and Practice of Scaring Birds Away From Airports and Aircraft. Paper Presented at the Bird Hazards to Aircraft Training Seminar and Workshop, East Point, GA.
- Lauer, B.C. 1944. Official History: Ladd Field Fairbanks, Alaska, Fall 1938 -31 January 1944. Manuscript on file at the Command Historian's Office, Alaskan Command, Elmendorf Air Force Base.
- Layman, Craig. 1994. The Economic Value of the Recreational King Salmon Fisheries of the Gulkana and Klutina Rivers, Alaska. Masters Thesis, University of Alaska-Fairbanks.
- Luckenbach, R.A. 1978. An Analysis of Off-Road Vehicle Use on Desert Avifaunas. Forty-Third North American Wildlife and Natural Resources Conference, Wildlife Management Institute, Washington, D.C.
- Luckenbach, R.A. 1975. *What the ORVs Are Doing to the Desert.* Fremontia 2(4):3-11.
- MacDonald, Lee, Alan Smart, and Robert Wissmar. 1991. Monitoring Guidelines to Evaluate Effects of Forestry Activities on Streams in the Pacific Northwest and Alaska. Prepared for Region 10, U.S. Environmental Protection Agency. Seattle, WA.

Mackey, Paul. 1998. Personal Communication. Alaska Division of Forestry.

Marler, P., M. Konishi, A. Lutjen, and M.S. Waser. 1973. *Effects of Continuous Noise on Avian Hearing and Vocal Development*. Proceedings from National Academy of Sciences. 70(5):1393-1396.

- Survey Bulletin 712.
- McCoy, D., R.J. Newberry, P. Layer, J.J. Dimarchi, A. Bakke, J.S. Masterman, and D.L. Minehane. 1997. *Plutonic-Related Gold Deposits of Interior Alaska in Mineral Deposits of Alaska: Economic Geology Monograph 9.* Goldfarb and L.D. Miller, eds.
- McCoy, G.A. 1974. Pre Construction Assessment of Biological Quality of The Chena and Little Chena Rivers in the Vicinity of the Chena Lakes Flood Control Project Near Fairbanks, Alaska. U.S. Geological Survey Water Resources Investigations 29-74.
- McKennan, Robert. 1981. Subartic, Vol. 6 in Handbook of North American Indians. Smithsonian Institution.
- McNab, W. Henry and Peter Avers. 1994. *Ecological Subregions of The United States: Section Descriptions.* WO-WSA-5. USDA Forest Service, Washington, D.C.
- Menzie, W.D. and W.L. Foster. 1978. *Metalliferous and Selected Nonmetalliferous Mineral Resource Potential in the Big Delta Quadrangle, Alaska.* U.S. Geological Survey Open File Report 78-529 D.
- Merritt, R.D. and C.C. Hawley. 1981. Map of Alaska's Coal Resources. Alaska Division of Geological and Geophysical Surveys Special Report 37.
- Midnight Sun. 1951. Big Construction Season Begins at Ladd. May 4.
- Milchunas, D., K.A. Schulz, and R.B. Shaw. 1998. *Plant Community Structure in Relation to Long-Term Disturbance by Mechanized Military Maneuvers in a Semiarid Region.* Colorado State University, Fort Collins, CO.
- Miller, Dave. 1998. Personal Communication. U.S. Department of Agriculture Statistical Service, Palmer, AK.
- Mitchell, Brigadier General, William L. 1982. *The Opening of Alaska*. Cook Inlet Historical Society.
- Mobley, Charles M. 1984. A Report to the Alaska Historical Commission for the Campus Site Restudy Project.

- Moya, Olga L. and Andrew L. Fono. 1997. *Federal Environmental Law*. West Publishing Co. St. Paul, MN.
- Mulligan, J.J. 1974. *Mineral Resources of the Trans Alaska Pipeline Corridor*. U.S. Bureau of Mines Circular 8626.
- Murrmann, R.P. and Sherwood Reed. 1972. *Military Facilities and Environmental Stresses in Cold Regions*. Special Report 173. U.S. Army Corps of Engineers, CRREL, Hanover, NH.
- Naske, Claus M., and Ludwig J. Rowinski. 1981. *Fairbanks: A Pictorial History.* Donning Company Publishers.
- National Academy of Sciences. 1973. Second International Conference on Permafrost. Entries from Curtis V. McVee, Bureau of Land Management, Anchorage, Alaska and Leslie A. Viereck, Institute of Northern Forestry, Fairbanks, AK.
- National Park Service. Questions and Answers on the National Wild and Scenic Rivers System. 1999. Website. http://www.nps.gov/rivers.
- Nakata Planning Group. 1987. *Master Plan Report*. Prepared for U.S. Army Corps of Engineers, Alaska District. Anchorage, AK.
- Nelson, G.L. 1995. Overview of Environmental and Hydrogeologic Conditions Near Big Delta, Alaska. U.S. Geological Survey Open File Report 95-180.
- Newberry, R. J., T.K. Bundtzen, K.H. Clautice, R.A. Combellick, T. Douglas, G.M. Laird, S.A. Liss, D.S. Pinney, R.R. Reifenstuhl, and D.N. Solie. 1996. *Preliminary Geologic Map of the Fairbanks Mining District, Alaska.* Alaska Division of Geological and Geophysical Surveys, Public Data File 96-16.
- Newberry, R.J., T.C. Crafford, S.R. Newkirk, L.E. Young, S.W. Nelson, and N.A. Duke. 1997. Volcanogenic Massive Sulfide Deposits of Alaska in Goldfarb, R.J. and Miller, L.D., eds., Mineral Deposits of Alaska: Economic Geology, Monograph 9.
- Newberry, R.J., and D. McCoy. 1997. *Geology of Buld-Mineable, Plutonic-Hosted and Plutonic-Related Gold Deposits of the North Pacific: Alaska Miners Association Short Course Notes.*

- Nokleberg, W.J., I.M. Lange, D.A. Singer, G.C. Curtin, D.L. Tripp, D.L. Campbell, and W. Yeend. 1990. *Metalliferous Mineral Resources Assessment Maps of the Mt. Hayes Quadrangle, Eastern Alaska Range, Alaska*. US Geological Survey Map MF1996A.
- Novotny, Vladimir and Harvey Olem. 1994. Water Quality Prevention, Identification, and Management of Diffuse Pollution. Van Nostrand Reinhold. New York, NY.
- Office of Public Affairs, Fort Richardson. 1998. History of Fort Greely, Historical Photos, ca 1950-1985. Record Group 77, Box 9, File 206-03, Historical Photo Files. Fort Greely, National Archives, Alaska Region.
- O'Leary, R.M., E.F. Cooley, G.W. Day, T.D. Hessin, C.M. McDougal, S.K. McDanal and A.L. Clark. 1978. *Stereographic and Chemical Analyses* of Geochemical Samples from the Big Delta Quadrangle, Alaska. U.S. Geological Survey Open-File Report 78-751.
- Olishifski, J.B. and E.R. Harford. 1975. Industrial Noise and Gearing Conservation. National Safety Council. Chicago, IL.
- ONeal, Howard. 1998. Personal Communication. Chief, Range Control, Fort Wainwright, AK.
- Page, R.A., N. Biswas, J.C. Lahr and H. Pulpan. 1991. Seismicity of Continental Alaska in Neotectonics of North America. D.B. Siemmons, E.R. Engdahl, M.D. Zoback and D.D. Blackwell, eds. Geological Society of America, Decade Map Volume 1.
- Page, R.A., G.S. Plafker, and H. Pulpan. 1995. *Earthquakes and Block Rotation in East-Central Alaska*. Geological Society of America Abstracts with Progams, Vol. 27, No. 5.
- Parker, Fronty. 1998. Personal Communication. Sport Fish Division Delta Junction Area Biologist, Alaska Department of Fish and Game, Delta Junction, AK.
- Peters, Pam. 1999. Personal Communication. Fairbanks Memorial Hospital, Tumor Registrar. Fairbanks, AK.

Petroleum Information Corporation. 1997. Alaska Report.

- Pewe, T.L., and R.D. Reger. 1983. *Guidebook to Permafrost and Quaternary Along the Richardson and Glenn Highways Between Fairbanks and Anchorage, Alaska.* Fourth International Conference on Permafrost.
- Plager, Anna. 1997. Personal Communication. Park Superintendent, Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation, Fairbanks, AK.
- Platt, J.B. 1975. A Study of Diurnal Raptors that Nest on the Yukon North Slope with Special Emphasis on the Behavior of Gyrfalcons During Experimental Overflights by Aircraft. Arctic Gas Biological Report Series 30 (2):40.
- Powell, R.F. and M.R. Forrest. 1988. *Noise in the Military Environment*. Brassey's Defense Publishers, Ltd. London.
- Prose, D.V. 1985. Persisting Effects of Armored Military Maneuvers on Some Soils in the Mojave Desert. Environ. Geol. Water Sci. 7:163-190.
- Public Affairs Office, U.S. Army Alaska, Fort Richardson, Alaska. 1995. *The United States Army Alaska*.
- Quandt, Donald. 1974. Fort Wainwright's Contribution to the Fairbanks Economy. MBA Thesis, University of Alaska-Fairbanks.
- Racine, Charles, Robert Lichvar, Barbara Murray, Gerald Tande, Robert Lipkin, and Michael Duffy. 1997. A Floristic Inventory and Spatial Database for Fort Wainwright, Interior Alaska. U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory. Special Report 97-23. Hanover, NH.
- Racine, Charles H., James C. Walters. 1994. *Groundwater-Discharge Fens in the Tanana Lowlands*, Interior Alaska, U.S.A., Arctic and Alpine Research, Vol. 26, No. 4.
- Racine, Charles H. and James C. Walters. 1991. *Groundwater-Discharge Wetlands in the Tanna Flats*, Interior Alaska, CRREL Report 91-14.
- Racine, Chuck. 1998. Personal Communication. U.S. Army Corps of Engineers, CRREL, Hanover, NH..

- Reckord, Holly. 1983. That's the Way We Live, Subsistence in the Wrangell-St. Elias National Park and Preserve. Prepared for the Anthropology and Historic Preservation Cooperative Park Studies Unit, University of Alaska.
- Redfern, Roger. 1998. Personal Communication. Interior Alaska Airboater's Association.
- Reidsma, Steve. 1998. Personal Communication. Natural Resource Specialist, Fort Wainwright, AK.
- Reynolds, Harry. 1998. Personal Communication. Wildlife Biologist, Alaska Department of Fish and Game. Fairbanks, AK.
- Reynolds, G. 1986. Phase I Inventory of Cultural Resources and Overview in Historical Preservation Plan, U.S. Army Installations and Satellites in Alaska. Prepared by the U.S. Army Corps of Engineers for the 172nd Infantry Brigade.
- Reynolds, P.E., H.V. Reynolds III, and E.H. Follmann. 1986. *Responses of Grizzly Bears to Seismic Surveys in Northern Alaska*. International Conference on Bear Research and Management, 6:169-175.
- Richmond, Paul W. 1991. *Notes for Cold Weather Military Operations*. Cold Regions Research and Engineering Laboratory.
- Rickard, Warren, Jr. and Jerry Brown. 1974. Effects of Vehicles on Arctic Tundra. Environmental Conservation. Vol. 1, Spring.
- Rieger, S., D.B. Schoephorster, and C.E. Furbush. 1979. *Exploratory Soil Survey of Alaska.* Soil Conservation Service, United States Department of Agriculture.
- Robe, Cecil F. 1970. The Penetration of an Alaskan Frontier: The Tanana Valley and Fairbanks. Yale University.
- Roche, Jeanne. 1999. Personal Communication. Alaska Department of Health and Social Services. Division of Public Health, Section of Epidemiology. Anchorage, AK.

- Sackett, Russell H. 1998. Personal Communication. Architectural Historian, Alaska State Historic Preservation Office, Office of History and
- Severinghaus, W.D., W.D. Goran, G.D. Schnell, and F.L. Johnson. 1981. Effects of Tactical Vehicle Activity on the Mammal, Birds, and Vegetation at Fort Hood, TX. USA-CERL Tech. Rep. N-113/ADA109646, Champaign, IL.

Archaeology, Department of Natural Resources, Anchorage, AK.

- Sharp, Creig. 1998. Personal Communication. Range Facility Manager, Fort Greely, AK.
- Shaw, R. B. and V. E. Diersing. 1990. *Tracked Vehicle Impacts on Vegetation at the Pinon Canyon Maneuver Site, Colorado.* J. Environ. Qual. 19:234 243.
- Shaw, R. B. and V. E. Diersing. 1989. *Evaluation of the Effects of Military Training on Vegetation in Southeastern Colorado.* Headwaters Hydrology, American Water Resources Association.
- Sherrod, George. 1998. Personal Communication. U.S. Fish and Wildlife Service, Office of Subsistence Management, Fairbanks, AK.
- Sims, Doug. 1998. Personal Communication. Planner III, Fairbanks North Star Borough Department of Community Planning, Fairbanks, AK.
- Slajer, Linda. 1998. Personal Communication. Fairbanks North Star Borough School District.
- Smit, Hans. 1998. Dry Creek Volcanogenic Massive Sulphide Project, Alaska Miners Association Convention Abstracts.
- Smith, M., J. R. Bressler, and H. Takaoka. 1998. Geology and Gold Mineralization on the Pogo Claims, Goodpaster River District, Alaska in Extended Abstracts of the 16th Biennial Conference on Alaskan Mining, Fairbanks, Alaska. March 2-7.
- Smith, P.S. 1942. Occurrence of Molybdenum Minerals in Alaska. U.S. Geological Survey Bulletin 926-C.
- Solie, D.N., L.E. Burns, and R.J. Newberry. 1990. Gold Favorability in the Big Delta Quadrangle, Alaska, as Predicted by Discriminant Analysis for Non-

Final

porphyry Granitic Rocks. Alaska Division Of Geological and Geophysical Surveys Public Data File 90-16.

- Sousa, Patrick. 1998. Personal Communication. Field Supervisor, U.S. Fish and Wildlife Service, Northern Alaska Ecological Services, Fairbanks, AK.
- Spiers, James K. and Wayne E. Heimer. 1990. Dall Sheep Movements Near Fort Greely, Alaska. Preliminary Findings.
- State of Alaska, Alaska Department of Community and Regional Affairs. 1998. *Community Profiles*. Website http://www.comregaf.state.ak.us/ CF_Block.html.
- State of Alaska, Dept. of Natural Resources. 1991. Tanana Basin Area Plan for State Lands. Anchorage, AK.
- State of Alaska, Division of Community and Regional Affairs. 1998. Website www.comregaf.state.ak.us/cf-Block.html.
- Stayrook, Nick. 1998. Personal Communication. Fairbanks North Star Borough School District.
- Stockwell, Craig A., Gary C. Bateman, and Joel Berger. 1990. Conflicts in National Parks: A Case Study of the Helicopters and Bighorn Sheep Time Budgets at the Grand Canyon.
- Strauch, Becky. 1998. Personal Communication. Geographic Information System Specialist, Alaska Department of Fish and Game, Anchorage, AK.
- Summers, Harry. 1980. Small Mammals Survey on Fort Greely, Alaska.
- Swainbank, R.C. and K.H. Clautice. 1998. *Alaska's Mineral Industry 1997: A Summary*. Alaska Division of Geological and Geophysical Surveys Information Circular 43.
- Swen, Ted. 1998. Personal Communication. U. S. Fish and Wildlife Service, Fairbanks, AK.
- Swinzoe, George K. 1993. *On Winter Warfare.* Cold Regions Research and Engineering Laboratory.

- Tande, Gerald. 1998. Personal Communication. Botonist, Alaska Natural Heritage Program, Anchorage, AK.
- Tanner, G.W. and N.C. Dwyer. 1992. *Nesting Success In Florda Sandhill Cranes.* Wilson Bulletin, 104:22-31.
- Tazik, D.J., J.D. Cornelius, D.M. Herber, T.J. Hayde, and B.R. Jones. 1992. Biological Assessment of the Effects of Military Associated Activities on Endangered Species at Fort Hood, Texas. U.S. Army Construction Engineering Research Laboratories Special Report EN-93/01/ADA263489.
- TeVrucht, Mollie, Phd. 1998. Personal Communication. Senior Chemist, U.S. Army Corps of Engineers, Alaska District, Anchorage, AK.
- Thurman, A. and R.K. Miller. 1990. *Fundamental of Noise Control Engineering*. Second Edition. The Fairmount Press. Liburn, GA.
- Thurow, D.J., S.D. Warren, and D.H. Carlson. 1995. *Tracked Vehicle Effects* on the Hydrological Characteristics of Central Texas Rangeland. Transactions of the ASAE 36(6):1645-1650.
- Udvardy, Miklos. 1988. The Audubon Society Field Guide to North American Birds, Western Region. Chanticleer Press, Inc. New York.
- United States Army Center for Health Promotion and Preventive Medicine. 1998. Environmental Noise Program. Aberdeen Proving Grounds, MD.
- United States Army Corps of Engineers. 1994. *Geotechnical Report for Ground Water Monitoring Network*. Fort Greely, AK.
- United States Army Corps of Engineers, Alaska District. 1997. Environmental Assessment, BRAC 95 Realignment of Personnel and Military Functions to Fort Wainwright, Alaska.
- United States Army Corps of Engineers, Alaska District. 1986. Inventory of Cultural Resources and Overview, Phase I in Historical Preservation Plan for U.S. Army Lands in Alaska.
- United States Army Corps of Engineers, Alaska District. 1980. *Historic Preservation Plan, U.S. Army Installations and Satellites in Alaska*.

Alaska Army Lands Withdrawal Renewal

- United States Army Corps of Engineers, Alaska District. 1988. Nike Hercules in Alaska.
- United States Army Corps of Engineers: Alaska District. 1996a. Spill Prevention Control and Countermeasure Plans, Fort Greely, AK.
- United States Army Corps of Engineers, Alaska District. 1996b. Spill Prevention Control and Countermeasure Plans, Fort Wainwright, AK.
- United States Army Environmental Hygiene Agency. 1990. Effect of Munitions on Water Quality, Fort Greely, Alaska. Receiving Water Biological Study No. 32-24-0057-91.
- United States Department of the Air Force (USAF). 1998. Air Force Instructions 13-212, Volume 1. 11th Air Force Supplement 1. Elmendorf Air Force Base, AK.
- United States Department of the Air Force (USAF), 11th Air Force. 1993a. Environmental Assessment of Major Flying Exercises in Alaska. Elmendorf Air Force Base.
- United States Department of the Air Force (USAF), 11th Air Force. 1993b. Elmendorf Air Force Base. Yukon Measurement and Debriefing System Environmental Assessment Final.
- United States Department of the Air Force (USAF), 11th Air Force. 1992. Environmental Assessment of the Upgrade of Target Arrays Fort Wainwright and Fort Greely, Alaska.
- United States Department of the Air Force (USAF), 11th Air Force. 1995. Final Environmental Impact Statement, Alaska Military Operations Areas Volumes I-IV. Elmendorf AFB, AK.
- United States Department of the Army Alaska (USARAK), and U.S. Department of the Interior, Bureau of Land Management, Alaska Fire Service. 1995. Support Agreement Number WC1SH3-95089-502.
- United States Department of the Army Alaska (USARAK), U.S. Fish and Wildlife Service, Alaska Department of Fish and Game. 1986. *Cooperative Agreement for Management of Fish and Wildlife Resources on Army Lands in Alaska*.

- United States Department of the Army Alaska (USARAK), U.S. Fish and Wildlife Service, Alaska Department of Fish and Game. 1979. *Cooperative Agreement for Management of Fish and Wildlife Resources on Army Lands in Alaska.*
- United States Department of the Army, Fort Wainwright Alaska. 1998. Hunting, Trapping, and Fishing Regulations Supplement.
- United States Department of the Army, Alaska. 1994. *Enforcement of Hunting, Trapping, and Fishing on Army Lands in Alaska.* Regulation 190-13, Fort Richardson, AK.
- United States Department of the Army, Center for Health Promotion and Preventive Medicine. 1997a. *Title V Permit Application.* Fort Wainwright, AK.
- United States Department of the Army, Center for Health Promotion and Preventive Medicine. 1997b. *Title V Permit Application*. Fort Greely, AK.
- United States Department of the Army. 1983. Policies and Procedures For Firing Ammunition for Training, Target Practices, and Combat. Regulation 385-63.
- United States Department of the Army. 1995. AR 350-2, Alaska Range Regulation. Alaska.
- United States Department of the Army, 172nd Infantry Brigade (Alaska) Environmental Office, with the Assistance of the U.S. Army Corps of Engineers, Alaska District and Metrek Division of the Mitre Corporation. 1979. Draft Environmental Impact Statement Concerning Installation Utilization for 172nd Infantry Brigade Alaska at Fort Wainwright.
- United States Department of the Army Headquarters, Forces Command. 1979. Draft Environmental Impact Statement Land Withdrawal, 172nd Infantry Brigade (Alaska) Fort Wainwright, Alaska.
- United States Department of the Army Headquarters, Forces Command. 1980. Final Environmental Impact Statement Land Withdrawal, 172nd Infantry Brigade (Alaska) Fort Greely, Alaska.

- United States Department of the Interior. 1993. R.S. 2477: The History of Management of R.S. 2477 Rights-of-Way Claims on Federal and Other Lands, Draft Report to Congress.
- United States Department of the Interior and United States Department of Defense. 1994a. Fort Greely Proposed Resource Management Plan Final Environmental Impact Statement.
- United States Department of the Interior and United States Department of Defense. 1994b. Fort Wainwright Yukon Maneuver Area Proposed Resource Management Plan Final Environmental Impact Statement.
- United States Department of the Interior, Bureau of Land Management. 1995. Fortymile Caribou Herd Management Plan.
- United States Department of the Interior. 1996. Archeological Investigations of Five Remote Tracts of Land Within Denali National Park and Preserve.
- United States Department of Revenue. 1998. Website.
- United States Department of Transportation, Federal Aviation Administrative Order 7400.8, Subchapter E - Airspace, Part 73 - Special Use Airspace. 1995.
- United States Fish and Wildlife Service (USFWS) and Alaska Peregrine Falcon Recovery Team. 1982. *Recovery Plan for the Peregrine Falcon - Alaska Population.*
- United States Geological Survey. 1998. *Alaska NWIS-W Data Retrieval*. Website http://www.h20-nwisw.er.usage.gov/hwis-w/AK/.
- United States Geological Survey, National Earthquake Information Center. 1998. Earthquake data base: historical and preliminary data (searched between 63°-65° N Latitude and 144°-147° W Longitude). Website http://www.neic.cr.usgs.gov/neis/epic/epic_rect.html.
- United States Geological Survey. 1988. Water Resources Data for Alaska-Water Year 1986: U.S. Geological Survey Water-Data Report AK-86-1, 330 p.
- Van Cleve, K. 1977. Recovery of Disturbed Tundra and Tiaga Surfaces in Alaska in Recovery and Restoration of Damaged Ecosystems. J. Cairns, Jr., K.L. Dickson and E.E. Herricks eds. Proceedings of the International

Symposium on the Recovery of Damaged Ecosystems, Virginia Polytecnic Institute and State University, Blacksburg, Virginia.

- Viavant, Tim. 1998. Personal Communication. Sport Fish Division Fairbanks Area Biologist, Fairbanks, AK.
- Viereck, L.A., C.T. Dyrness, A.R. Batten, and K.J. Wenzlick. 1992. The Alaska Vegetation Classification. General Technical Report PNW-GTR-286. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.
- Von Rueden, Gerald R. and Pam Bruce. 1997. 1997 Hunter Harvest Report for Fort Wainwright and Eielson Air Force Base, Alaska.
- Wahrhaftig, C. 1965. *Physiographic Divisions of Alaska.* U.S. Geological Survey Professional Paper 482.
- Walker, D.A., D. Cete, J. Brown, and C. Racine. 1987. Disturbance and Recovery of Arctic Alaskan Tundra Terrain, A Review of Recent Investigations. CRREL Report 87-11, Hanover, NH.
- Walsh, Marianne E., Charles M. Collins, Ronald N. Bailey, and Clarence L. Grant. 1997. Special Report 97-30. *Composite Sampling of Sediments Contaminated with White Phosphorus.* CRREL, Hanover, NH.
- Walsh, Marianne E., and Thomas F. Jenkins. 1992. *Identification of TNT Transformation Products in Soil*. Special Report 92-16, Hanover, NH..
- Walsh, Marianne E., Thomas F. Jenkins, P. Stephen Schnitker, James W. Ewell, and Martin H. Stutz. 1993. Evaluation of SW846 Method 8330 for Characterization of Sites Contaminated with Residues of High Explosives. CRREL Report 93-5.
- Weber, Florence R. 1998. Personal Communication. U.S. Geological Survey, Alaska Section (Retired), Fairbanks, AK.
- Weber, F.R., H. Foster, T.E.C. Keith, and C. Dusel-Bacon. 1978. *Preliminary Geologic Map of the Big Delta Quadrangle, Alaska.* U.S. Geological Survey Open File Report 78-529 A.

- Weinstein, M. 1978. Impact of Off-Road Vehicles on the Avifauna of Afton Canyon, California. U.S. Bureau of Land Management, California Desert Program, Riverside, California. Report on Contract CA-060-CT7-2734.
- Western Regional Climate Center. 1998. Big Delta FAA/AMOS AP, Alaska (500770), Website http://www.wree.sage.dri.edu/cgi-bin/climain.pl?akbigd.
- Western Regional Climate Center. 1998. Eielson Field, Alaska (502707), Website http://www.wree.sage.dri.edu/cgi-bin/climain.pl?akeiel.
- White, C.M. and S.K. Sherrod. 1973. Advantages and Disadvantages of the Use of Rotor-Winged Aircraft Surveys. Raptor Research 7 (3-4):97-104.
- White, Ken. 1994. World in Peril: The Origin, Mission & Scientific Findings of the 46th/72nd Reconnaissance Squadron.
- Wilcox, D.E. 1980. *Geohydrology of the Delta-Clearwater Area, Alaska.* U.S. Geological Survey Water Resources Investigations 80-92.
- Williams, John R. 1970. *Ground Water in the Permafrost Regions of Alaska*. Geological Survey Professional Paper 696.
- Wilson, Kurt. 1999. Personal Communication. Bureau of Land Management, Anchorage, Alaska.
- Wilson, F.H., J.H. Dover, D.C. Bradley, F.R. Weber, T.K. Bundtzen, and P.J. Haeussler. 1998. *Geologic Map of Central (Interior) Alaska*. U.S. Geological Survey Open File Report 98-133.
- Yu, Xiaohong. 1991. Valuing the Impact of Alaska's Guiding Industry on the State's Economy. Masters Thesis, Department of Economics, University of Alaska-Fairbanks.
- Zeman, Matthew. 1998. Personal Communication. S-3, 4th Battalion, 123rd Theater Aviation, Fort Wainwright, AK.

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CHAPTER 9 COMMENTS AND RESPONSES

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COMMENTS AND RESPONSES

This chapter contains the Army's responses to comments received on the Draft Legislative Environmental Impact Statement (LEIS) for the Alaska Army lands withdrawal renewal. A summary of the public comment process, including the approach to analyze the comments is presented in Chapter 9.1. Comment letters and verbatim transcripts from the public hearings are reproduced in Chapter 9.2. The Army's responses to the comments are also located in Chapter 9.2. Publications cited in the responses can be found in the Bibliography in Chapter 6. Each comment letter or transcript was assigned an alphabetic code. Comments were coded in the order of acquisition. Within each comment letter or transcript, individual points presented were assigned a topic code. Topic codes used in the comment/response process are defined in Table 9.a. Each topic code was subsequently assigned a unique numeric code. For example, comment/response ACC-A001 refers to the first comment (001) dealing with the topic of access (ACC) presented in comment letter or transcript A. An index of individual comments and responses grouped by topic code and the commentor's last name is located in Chapter 9.3. This process resulted in 439 coded comments, which formed the basis for the responses in Chapter 9.2.

Individual responses were prepared for all input received during the public comment period. Like comments may have received identical responses.

9.1 SUMMARY OF PUBLIC COMMENT PROCESS

The Notice of Availability (NOA) of the Draft LEIS was published in the Federal Register on November 6, 1998. Announcements of the availability of the Draft LEIS and plans for public hearings/open houses were subsequently published in the *Fairbanks News-Miner*, *Delta Wind*, and *Anchorage Daily News* newspapers. The Army distributed 500 copies of the Draft LEIS, including those sent to community libraries throughout the project area.

The public comment period began November 6, 1998, with publication of the NOA, and closed February 7, 1999, for a total of 90 days. Verbal comments were recorded at public hearings held in Fairbanks, Delta Junction, and Anchorage. Some 37 written and 10 oral comments were provided by Federal, State, and local governmental agencies; special interest organizations; businesses; and individuals.

Of the written and oral comments received during the 90-day comment period, two were from Federal agencies, five from State agencies, one from local governments and agencies, eight from special interest organizations, one from local businesses, and 30 from individuals. A majority of the written comments came from Fairbanks and Delta Junction residents. Eleven comments postmarked after February 7, 1999, were reviewed and included in this analysis.

Public hearings were held in three communities in Alaska (with the number of attendees who registered shown in parentheses): Anchorage (4), Delta Junction/Fort Greely (14), and Fairbanks/Fort Wainwright (46). It is likely that some individuals chose not to register, so attendance may have been slightly higher than is indicated.

All comment letters and hearing transcripts were analyzed for their content and the different perspectives they offered. Where comments presented new, substantive information or ideas that warranted changes, the text of the LEIS was revised accordingly. Reference to the revised sections is made in the responses to specific comments. Some comments did not require a response or change to the LEIS. These expressions of opinion or preference were noted.

9.2 COMMENTS ON THE DRAFT LEIS AND ARMY RESPONSES

This chapter contains comments received during the Draft LEIS comment period and the Army's responses to them. Publications cited in the responses can be found in the Bibliography in Chapter 6. Comments were coded and are presented in the order of acquisition. Topic codes used in the comment/response process are defined in Table 9.a.

Code	Торіс	Code	Торіс
ACC	Public Access	ОТН	Other Comments
AIR	Air Quality	POL	Pollution
ALT	Alternatives	REC	Recreation
CULT	Cultural Resources	SOC	Socioeconomics
FIRE	Fire Management	SOIL	Soils

Table 9.a Definition of Topic Codes Used in the Comment/Response

 Process

Noise

NOISE

Code	Торіс	Code	Торіс
FISH	Fisheries	SUB	Subsistence
FOR	Forestry	TES	Threatened or Endangered Species
GEOL	Geology	USE	Military Use
GLAC	Glaciers	VEG	Vegetation
LAND	Land Use	WATER	Water Resources
MIN	Mineral Resources	WET	Wetlands
МІТ	Mitigation	WIID	Wildlife
		VVII	

Table 9.a Definition of Topic Codes Used in the Comment/Response

 Process

Α

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PUBLIC COMMENTS REGARDING THE DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT ALASKA ARMY LANDS WITHDRAWAL RENEWAL U.S. ARMY ALASKA DEPARTMENT OF THE ARMY

> Proceedings Held at The Diamond Willow Club Ft. Greely, Alaska

HEARING PROCEEDINGS HELD ON Tuesday, January 5, 1999

Volume 1 of 1 Pages 1 to 11, inclusive

Reported by: Carol A. McCue, RMR Heartland Court Reporters

> HEARTLAND COURT REPORTERS 907-452-6727 2 P R O C E E D I N G S

(The following is the statement of Ms. Jennifer East-Cole, taken at 3:44 p.m. on January 5, 1999, in Delta Junction, Ft. Greely, Alaska.) MS. EAST-COLE: I think I have several points, several comments I want to make. The first one is that I
ALT-A001
think a 50-year long — 50-year contract is too long.
There are too many things that can go on in that period of time, and it's just too inflexible of a length. I have a concern — my second problem is I have

a concern about the long-range plan for this area. Is

RESPONSES TO COMMENT A

ALT-A001: Noted. The Army's selection of a 50-year renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A credible operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources to protect resource values and implement natural resource management measures.

A

there a possibility that they will increase the magnitude and frequency of bombing? And if there is, this is a serious concern.

I was told by some of your representatives that **USE-A001** this bombing range will stay status quo, but that's only as it relates to the size of the area. And again, my concern is will the frequency of bombing increase and the types of bombs, can that change?

My third concern is I really don't see this helping the economy of the Delta/Ft. Greely area. They **SOC-A001** are shutting down the base, so most of these people are going to be coming up from Fairbanks. It's going to help Fairbanks' economy, but I really don't see it doing anything for Delta.

My fourth concern is I feel like all Delta stands to gain by this is that it would increase the pollution, noise pollution, water pollution, soil pollution. People drink the water, and it can damage the people. The people hunt the animals that range out on that bombing range. If the animals eat — eat food and the people eat the animals, what's that going to do to the people's health?

Also, too, the pollution can — there's a serious destruction of wildlife and fish habitat. In particular, my concern is there's a 30-mile stretch along the Tanana River that is just to the north of the bombing range, and this is critical salmon habitat, as noted by Fish and Game. How would this affect that salmon habitat?

My fifth concern is that if they continue to use this area as a bombing range, there will just be more duds out there and more damage done to the area, which just means that more money would have to be put into it to clean it up. It's already going to cost — it's almost cost prohibitive now to clean up this area.

If the contract is extended another 50 years, I do not see this area ever being cleaned up. And so much **POL-A003** of what my concerns about the fish and the wildlife and

USE-A001: The Military Lands Withdrawal Act, which authorized the withdrawals at Fort Wainwright and Fort Greely in 1986, reserved the withdrawal lands for military maneuvering, training, equipment development and testing, and training for artillery firing, aerial gunnery, infantry tactics, and other defense-related purposes. The Act did not restrict the amount of military activity permitted. Presently, the Army and Air Force do not have plans to increase the magnitude or frequency of bombing on the withdrawal renewal lands. Proposed military activities on the withdrawal lands for the renewal period will be consistent with those conducted during the past 15 years.

SOC-A001: The Base Realignment and Closure is not within the scope of this LEIS. NEPA documents, including Environmental Assessments are being prepared to analyze the impacts of the realignment on Fort Wainwright and Fort Greely. The Environmental Assessment for Realignment of Personnel and Military Functions to Fort Wainwright was published in June 1997. It is anticipated the Environmental Assessment for Realignment of Personnel and Military Functions from Fort Greely will be published in October 1999.

POL-A001: No expansion or addition of Impact Areas would occur under the Preferred Alternative. With continued military use of the withdrawal lands, impacts to water, soil, and wildlife would occur. Existing and proposed mitigation should decrease adverse impacts.

Our investigation to identify contaminants and their environmental fate revealed a lack of data for interior Alaska. Agencies responsible for monitoring contaminants have not conducted studies specific to the withdrawal areas. Information available on chemicals used in munitions expended on the withdrawal lands has been incorporated into Appendix 2.C. The baseline data presented in the table is not an analysis of contamination on the withdrawal lands, but rather a general description of the environmental fate of each chemical.

POL-A001 Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources. Please refer to Chapter 4.23 for specific guidelines for the monitoring and remediation program.

FISH-A001: Please refer to proposed mitigation in Chapter 4.23 concerning pollution. At the present time no State or Federal agency has expressed concern about military actions affecting the critical salmon habitat. Through the proposed mitigation, the Army will determine if contaminantion from military activity occurs.

POL-A002 and **A003**: Routine decontamination operations are conducted each year on the Stuart Creek and Oklahoma/ Delta Creek Impact Areas by the Air Force. Each year, all unexploded ordnance and inert residue are cleared to a radius of 1,000 feet from each of the Air Force's tactical targets. The access ways into the tactical targets and 100 feet on either side of the access ways are also cleared each year. The Air Force's routine decontamination operations are conducted on the Army's Impact Areas they utilize for training. An ordnance clearance history by the Air Force is in Appendix 2.C.

The Army does not currently conduct routine decontamination operations on the Stuart Creek and Oklahoma/Delta Creek Impact Areas. However, all unexploded ordnance accumulated during Army training in the Lakes Impact Area is accounted for when training is completed. This allows public access into these Impact Areas. The Washington Impact Area is cleared of ordnance periodically to allow for Cold Regions Testing Center (CRTC) testing. The Mississippi Impact Area is cleared is a High Hazard Impact Area with unexploded ordnance. The Washington and Texas Ranges are shooting ranges utilized by the Army for firing artillery. These Ranges are regularly cleared of artillery residue by the Army.

Proposed mitigation is outlined in Chapter 4.23.

POL-A002

Guidelines for detection and clearance of ordnance state that "environmental impacts from unexploded ordnance clearance could range from minimal to significant depending upon the amount of vegetation that must be removed, depth and areal extent of remediation, and excavation method used. All of these factors must be considered and balanced against potential risk and the degree of risk reduction that could be achieved" (Department of Defense Explosives Safety Board et al. 1996).

Cost and lack of unexploded ordnance characterization and excavation technologies are two major impediments to efficient and effective clearance of unexploded ordnance. As technologies improve, the effectiveness of remediation should increase and the time, cost, and environmental impacts for remediation should decrease.

pollution to the people is going to become more of a cumulative effect over time.

And that's it. And thank you for allowing me to comment. And I — if you could please respond, I would love to hear from you.

Sincerely, Jennie East-Cole. (Statement concluded at 3:50 p.m., January 5, 1998.) (The following is the statement given by Mr. Jack Morris at 6:05 p.m., January 5, 1999.)

MR. JACK MORRIS: Okay. My name is Jack Morris from Delta Junction. And I have three or four issues that I would like to have recorded, and questions.

The first one we would deal with is public access to the buffer areas of the 2202 impact area. It's been my concern that as impact area uses increase, that recreation and public access to the buffer areas will be limited to the point that eventually we have none.

And it — I think we need formal language written. There is a range policy 350-2 that talks about the language of September 1 through the 25th of having range cleanup. I would like to see that formal language increased to have range cleanup and allow hunting, moose hunting in the buffer zone of 2202, specifically in the Delta Creek and Little Delta areas.

At the present, it says that there will be a range cleanup during September 1 through 25, but it does not specifically state that the buffer zone will be allowed public access, specifically hunting during that time. I would like to see that issue changed.

It's been brought to my attention that the corridor accessing the west fork of the Little Delta by use of the Little Delta River is always going to remain open. It is a VFR federal flight path, and it's a — we can fly through there any time there's VFR, and that there is no plan in the future to ever close that corridor to access behind the 2202 impact area.

The second item that I would like to talk on is

ACC-A001

ACC-A002

ACC-A001: The Army may increase the use of the Impact Areas which would increase closure of the Buffer Zones. Presently, the Army and Air Force do not have plans to increase the magnitude or frequency of bombing on the withdrawal renewal lands. Proposed military activities on the withdrawal lands for the renewal period will be consistent with those conducted during the past 15 years.

ACC-A002: The Army cannot ensure the Buffer Zone will remain open for hunting during the month of September, Historically, September has been utilized for range maintenance. The military utilizes this period for annual Impact Area decontamination and target maintenance. To date, it has not resulted in the training lands being closed to the public. The Army acknowledges that the month of September is critical for hunting on the withdrawal lands and tries to accommodate the needs of the public.

ACC-A003

ACC-A003: The military has no intention of increasing the size of the Restricted Areas. Civilian pilots can fly through or around them but should contact the Special Use Airspace Information Service (1-800-758-8723 or 907-372-6913) to receive an update on military activity.

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in 1990, the Army environmental hygiene group did a water — tried to set up a water baseline on munitions contaminations of 100 Mile Creek and Delta Creek. What they did is they took water samples out of 100 Mile Creek, Delta Creek, and compared them to water samples out of the Little Delta River. The water on the 100 Mile Creek, for munitions to enter into this flowing water, it would have to come by seepage through the tundra. So there's a lot of filtering. In other words, there are no active munitions in that river. Delta Creek, on the other hand, has active munitions in the creek channel.

Now, in 1990, when this survey was taken, the amount of active munitions in the Delta Creek was not a near percentage of what there is now. I would like to see a new baseline, a new water sample taken. I know that during spring overflow, the overflow is backing into the Delta Creek targets, the craters are filling full of water. And then when breakup comes, these waters are washed out of these craters, down the Delta Creek, and into the Tanana River.

I would like to see right after breakup, say, in June, new water samples taken, specifically of the Delta Creek, up by where the targets are. Not down at the mouth, but up by where the targets are, so that we can have an additional baseline comparison to see what's happening. Using the Little Delta as the water to compare it to, I think that will work fine because it's in the buffer zone and there are no munitions. That's the — that's two.

The third item that I wanted to address was roads and trails. Last winter, the winter of '97, '98, the 2202 lookout tower above the 100 Mile Creek, off of the Delta impact area, had a road built four or five miles to the north that dropped down on Delta Creek, then a road was built up Delta Creek across from the Sullivan Roadhouse, then the road went to the north and picked up the old Cat Trail, and proceeded in a northwesterly direction to Smithersville, where there was an

WATER-A001

SOIL-A001

WATER-A001: A water quality sampling program will be established for the withdrawal lands. The study effort will include an analysis of surface water bodies, with monitoring stations located directly upstream and downstream of the installations.

SOIL-A001: In 1997, the Army built "Simpsonville", a mock town or CALFEX range, on the west side of Fort Greely's Oklahoma/Delta Creek Impact Area to conduct air and ground assaults on targets. The Army used existing trails and roads (which were originally constructed by the Air Force) to access the area. The trails have been reclaimed by replacing the vegetative mat, but as a result, increased the saturation of soil in the area during the summer. These sections of trail will most likely be used indefinitely by the Air Force during the winter. The Army conducted these operations by permit under the authority of Section 404 of the Clean Water Act. Under the Section 404 permit, reclamation of damaged land is required.

"Simpsonville" was used for the first time during the winter of 1997-1998. In the process, a new trail was created, which directly accesses Delta Creek, and pallets may have been used. The Army will use "Simpsonville" again this winter, and their activities will be monitored by a member of the U.S. Army Alaska's Natural Resources Division. The Army will be responsible for any impacts to the environment and necessary reclamation including the installation of water bars on the trail leading to Delta Creek to minimize future soil erosion.

A second CALFEX range is proposed to be built closer to Main Post. The new site will be closer and easier to access, thus eliminating much of the traffic to "Simpsonville". A wetlands permit was obtained for the construction and use of "Simpsonville" and states that if the range is abandoned, then all debris must be removed and the land reclaimed.

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encampment.

I talked to Steve Reidsma about this, and he's agreed that there is problems with that road. I noticed that this summer we had a tremendous amount of erosion, especially where the road entered the Delta Creek. The — on the tundra, parallel in Delta Creek on the way to Smithersville, they left pallets buried in the lowlands where they were getting stuck when they pulled out of there late in the summer.

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I would like to see these issues addressed. Steve says they are aware of it and that they are going to take and close that Smithersville, and that they are going to go in there and try to stop the erosion. But I would like it to be noted that we are aware of it and that there is a problem and it needs to be done there.

I think that's it.

(Off record, then back on record.)

MR. JACK MORRIS: Oh, let me add one more thing.

ACC-A004

I want to compliment the range control at Eielson for the communications network that they have set up for the local pilots, so that we can communicate on the same frequency, and so that we can work together for access into these areas. I think it's a wonderful system.

I really enjoyed coming to this meeting tonight because I got to make contact with people that if we when we have problems in the future, I've got someone I can contact. And the thing that I was surprised about is that these people are aware of some of these problems that I'm talking about. They are aware of them and are working to change these. That is a very positive thing. Okay.

(Statement concluded at 6:13 p.m., January 5, 1999.) (The following is the statement by Mr. Whit Hicks at 6:20 p.m., January 5, 1999.) MR. WHIT HICKS: Just after reviewing the volumes that you've put out and then the posters up in the room, it kind of all stops at the socioeconomic **ACC-A004:** The military appreciates your acknowledgement of the Special Use Airspace Information Service. Input from the public on this and other military communication methods is encouraged.

stand, at least as far as this region goes. It seems that the withdrawal is trying to be separated from realignment, which is not — it's an impossible thing to do, in reality. If you take — take out any economic benefit, at least to the Delta/Greely community, then every other impact is negative.

Some of the specifics I see from that, reduced public use, restricted minimal entry, a high level of environmental impact from explosives and from the road construction that's happened on around the — in the impact areas. I don't think that there's accurate or enough information on the impact and wildlife, another reason. And the other impacts are perhaps more minor, but they — they are still negative if there's no return to the community.

A couple of issues, aside from the economics, having a 50-year withdrawal, I realize it's been studied and analyzed from every direction, maybe except from mine. That's a pretty absurd thing to do, given the dynamics of world economy and this country's economy and our local economy, and other things that we haven't even considered yet, a 50-year blanket withdrawal without a real serious review on a 5 to 10-year basis is — that should be unacceptable.

It seems that the military has had a — there's been a dual standard as far as environmental permitting and the activities that — the impact that's been allowed to happen by the DOD. There's obviously a dual standard there. And I don't know how that can — how that can be. It shouldn't be. If anything, our military should be held to a higher standard, even, than private industry. But that is absolutely not the case, based on what we've seen here.

Well, all in all, if you're going to use — if there's going to be an impact, a negative impact to the region, which there is environmentally, just the public access, removing the access for minimal entry, which is restricting a revenue base for this community, then you need to pay for it. Any other — any other business or

SOC-A002

SOC-A002 and **A003**: The realignment process of Fort Greely required public hearings and National Environmental Policy Act (NEPA) documents be completed. The impact of realignment is beneficial to the Fairbanks area and detrimental to the Delta area.

The importance of the military to the Delta Area was highlighted in Chapter 3.19 with the negative effects of realignment discussed. The present study examined the effect of non renewal by indicating the impact on the Fairbanks North Star Borough Economy, not Delta Junction. There was no assertion that the Delta area would benefit economically from continued withdrawal as it had in the past.

Let it be stated unequivocally that the primary economic benefits to continued withdrawal are within the Fairbanks North Star Borough. Whereas Delta has had substantial economic benefits from the military presence in the past, this will be reduced after realignment is completed. Yet, the land will still be reserved from mineral entry, agriculture, or other alternative uses.

ALT-A002

USE-A002

ALT-A002: Noted. Periodic review of the Army's use and management of the withdrawal lands would occur under the Preferred Alternative. In accordance with the Sikes Act, U.S. Army Alaska is preparing Integrated Natural Resources Management Plans for Fort Wainwright and Fort Greely. Plans are written for a 5 year period with public, Federal and State agency participation in the development process.

USE-A002: Federal agencies are generally held to the same level of standards when implementing projects and programs on their lands. This LEIS was completed as a requirement of the National Environmental Policy Act (NEPA). This Act establishes policies and goals for the protection of the environment. The NEPA process includes the systematic examination of possible and probable environmental consequences of implementing a proposed action. The Army is required to comply with NEPA, as are all other Federal agencies.

All Army actions fall into one of the following environmental review categories. The category determines the NEPA documentation to be completed. Categories are: 1) Exemption by Law, e.g. national security exemptions which prohibit or exempt compliance with NEPA; 2) Emergencies, e.g. immediate actions to promote national defense or security and actions necessary for the protection of life or property are excluded from NEPA to avoid delay of action; 3) Categorical Exclusions are actions which do not require NEPA documentation because they do not individually or cumulatively have a significant effect on the environment; 4) Environmental Assessment; and 5) Environmental Impact Statement.

SOC-A003

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entity in the country would have to pay, or return something for that use. And that's just not happening here.

If you're insistent upon looking at it on — the interior as a region, you can use Fairbanks numbers and make it look very positive economically. But if you're going to separate it from the realignment, then let's go ahead and take the bigger picture where there is no Ft. Greely and no economic — positive economic impact to our community at all, then it's just a lose-lose situation. We have our land mass, we have it impacted, we don't have access to minimal entry or tourism on those properties. And that's not just to the community.

That's about all I have. (Statement concluded at 6:25 p.m., January 5, 1999.) (No further statements were given on

January 5, 1999.)

REPORTER'S CERTIFICATE I, CAROL A. McCUE, RMR, hereby certify: That I am a Registered Merit Reporter for Heartland Court Reporters and Notary Public for the State of Alaska; that the foregoing proceedings, the various statements, were written by me in computerized machine shorthand and thereafter transcribed under my direction; that the transcript constitutes a full, true and correct

record of said proceedings taken on the date and time indicated therein;

Further, that I am a disinterested person to said action.

IN WITNESS WHEREOF, I have hereunto subscribed my hand and affixed my official seal this _____ day of _____, 1999.

CAROL A. McCUE, RMR
Registered Merit Reporter
Heartland Court Reporters
23 My Commission Expires: February 15, 2002

HEARTLAND COURT REPORTERS 907-452-6727

в Fort Greely Lands Withdrawal Renewal

First, I support a strong military and I view its role as a protective one.

However, we now have the Army asking for a 50 year continuation of withdrawal from public use of over 660,000 acres to continue the 'mission' of Fort Greely. The effect would be to make this area impervious to outside concerns, even concerns expressed locally in the Delta Junction area, and prevent further reviews for the next 50 years!

How can this be so important, if the current Base Realignment indicates there will be very few military personnel located in this area? If you want to leave us, do so clearly and completely! We have the most powerful military in the world, but Delta residents did not expect it to turn on them. Essentially, we have the US Army waging a verv successful economic war on the Delta area, taking away jobs, jobs with which they once paid for the wanton destruction they do to this area. Afterward they will continue the destruction and abuse of the land and the local people, perhaps at an increased rate!

If the US Army is intent upon removing civilian employment from the Delta area, then it would seem the best thing to do would be to completely close Fort Greely, and give it to the BLM. The next few generations of Delta residents could be gainfully employed cleaning up the Army's mess on the 660,000 + acres!

The picture on the front cover of the impact statement shows the natural beauty of this area. This is the view all tourists, visitors and local residents have from the Richardson/Alaska Highway. Why should this area be a bombing range? Delta would be better served by a loop road beginning south of Donnelly Dome, running eastward across the front of the Alaska Range, going north and then returning eastward to Delta Junction itself. This would create a 'tourist loop' unexcelled anywhere, including Denali National Park. The caribou, moose, sheep, grizzly, black bear and other populations could recover their natural habitat, and be there for tourists to see. In addition, local subsistence hunters could access these game populations, to feed their families. (Although the military might deny it, most hunters and fishermen do not want to deal with the military for access. Generally speaking, the local subsistence hunting population does not consider the military 'user friendly'.)

The military currently shakes our homes with their explosions, which we are also forced to hear. Tourists who stop here in the summer often can't believe our explanation of the 'thunder' they hear! Finding the tranguil pristine wilderness they seek so terribly flawed, they frequently decide to look elsewhere in Alaska. And now the military is removing their economic support by way of local jobs, and expecting us to continue to endure their 'aifts'.

The military also provides us with smoke from their forest fires. This is a wonderful opportunity to test your lungs. We do not appreciate summers spent breathing smoke. Never, during any of these fires, has the military attempted to find those vulnerable to

RESPONSES TO COMMENT B

ALT-B003: Noted. Periodic review of the Army's use and management of the withdrawal lands would occur. In accordance with the Sikes Act, U.S. Army Alaska is preparing Integrated Natural Resources Management Plans for Fort Wainwright and Fort Greely. The plans are written for a 5 year period with public, and Federal and State agency participation in the development process.

SOC-B004: Noted. Thank you for your comments.

ALT-B004: If Congress does not renew the military land withdrawals in Alaska, future management of the withdrawal lands will be determined by the agency who has jurisdiction over the lands. This could be the Bureau of Land Management or State of Alaska.

SUB-B001 and B002: You make the point that the hunting regulations on Fort Greely, e.g., requirements to check-in and check-out, discourage subsistence users. It is not the intent of U.S. Army Alaska to discourage use, but rather to provide a means to allow use without significant disruption of the military mission or undue exposure to human safety hazards created by military operations.

U.S. Army Alaska is planning to implement hunter education certification, as required by Department of Army Regulation 210-21 on January 1, 2000. The Army recognizes there is a lack of instructors in the Fort Greely area and is working with the Alaska Department of Fish and Game to get classes scheduled on Fort Greely.

There are fewer requirements for recreational or subsistence hunting on Fort Greely than are normally found on military installations with similar missions within the United States. U.S. Army Alaska will continue to review means to minimize both the inconvenience involved with public use of Fort Greely and costs of administering the user-access program, but continuation of the military mission and minimizing human safety risks will continue to be important factors.

NOISE-B001: Noise impacts from the military would continue under the Preferred Alternative as has occurred on the withdrawal lands over the past 50 years. Subsonic aircraft flights are the dominant military noise source (subsonic flights occur at speeds below the speed of sound level and so not produce sonic booms).

Overall, few noise complaints have been received by the Army for artillery, explosions, or small arms firing. Most noise complaints have been from helicopter overflights while traveling from the Fort Wainwright Airfield to the Fort Wainwright Yukon Training Area or Fort Greely. As Army use of the relatively loud UH-1 "Huey" helicopter shifts to the quieter UH-60 Blackhawk helicopter, noise complaints are expected to decrease (Zeman, pers. com. 1998). Noise complaints received by the U.S. Air Force for let aircraft in the vicinity of the Yukon Training Area and Fort Greely average 24 complaints per year (Gifford 1998). The noise is usually from low flying aircraft entering or exiting an Impact Area.

Mitigation measures are listed in Chapter 4.22 and Chapter 4.23.

FIRE-B001: The Army is concerned about smoke and air quality during fires. Military personnel and their families are subjected to the same exposures as the civilians of Delta Junction and Fairbanks. The Alaska Department of Environmental Conservation (ADEC) is the regulatory agency responsible for air quality and smoke management on both State and Federal lands. Written approval is required from ADEC for prescribed burns, other than those used to combat wildland fire. ADEC is responsible for issuing air quality advisories and declaring air episodes. A representative from ADEC is on the Alaska Wildland Fire Coordinating Group. During a wildland fire, air quality and smoke management issues are addressed. Press releases are issued with recommended actions that individuals can take to protect their health.

The Army does take measures to decrease the potential of fires from incendiary devices. Information on these measures can be found in Chapter 4.15 under Existing Mitigation. Also read the response FIRE-C002.

NOISE-B001

FIRE-B001

ALT-B004

ALT-B003

SOC-B004

SUB-B001

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the conditions they create and attempt to provide assistance to them! During this most recent fire there were reports that live ordinance had been found six miles north of the Fort Greely boundary. How safe are we if the military has difficulty dropping their bombs on the 660,000+ acres they now have?	USE-B003	under the Preferred Alternative. Affects on convoys as a result of the BRAC action at Fort Greely are outside the scope of this withdrawal renewal action. Those affects should be addressed in the NEPA documents being prepared in accordance with BRAC.
Between Delta and Fairbanks the Richardson Highway consists of two lanes. I have personally met almost one hundred military vehicles in convoys while I drove between between my home in Delta and Elelson Air Force Base. During this trip there were two occasions where people attempted to pass and came close to hitting me. Convoy	OTH-B001	SOC-B005 and B006 : As indicated in the report, there is no specific Delta "area" that may be conveniently referred to because most of the area is unincorporated, including the area referred to as "Dry Creek". Many places in interior Alaska are referred to by milepost, by topography, etc.
vehicles were too close together, and they could not get back into their own lane. Does the cost of increased transportation of military personnel justify their regular transport between Greely and other bases? How about using air transport and clearing our highways? Perhaps the military should build a four lane highway between Eielson and Greely to eliminate the potential for injury and loss of life to civilians traveling this route! Perhaps Fort Greely should be closed!		The religious community of Whitestone Farms was mentioned in the report, which is principal to the settlement of Dry Creek. But its location was incorrectly placed near Big Delta. The state Department of Community and Regional Affairs lists the current population of Dry Creek at 134. It is West of Tok and East of Delta on the Alaska Highway.
If this draft environmental impact statement is complete, how was the Dry Creek community overlooked? It is larger than both Healy Lake and Dot Lake, and located physically closer. This is a relatively large group of people who do harvest wild game	SOC-B005	USE-B004: The West Training Area of Fort Greely extends from the Little Delta River on its western boundary to east of the Delta River near the Richardson Highway (see Figure 1.a). The 13 Firing Ranges on the West Training Area are located east of the Delta River (see Figure 2.c).
On page 2-10, would you please explain how the 13 Firing Ranges located in the West Training Area are EAST OF THE DELTA RIVER?	USE-B004	MIN-B001: Rocks in the southwest part of the Fort Greely withdrawal (Figure 3.5.b) are similar to those in the Pogo area. However, the areal extent of exposed rocks is actually quite small compared to the size of the withdrawal. Most of the withdrawn lands are covered by floodplain denosits and thick overburden, and there are very few outcross. It should be noted that the Pogo
On page 3-17 you mention that the "Geology and geochemistry in this area of the withdrawal are similar to the Pogo deposit (Smith et al. 1998)." As the Pogo mine is regarded as perhaps the richest gold deposit in Alaska, and perhaps the world, what	MIN-B001	deposit is some 400 feet below ground, and its geology is very complicated. If not for the extremely high grade of the ore at Pogo, development would not have been economically viable.
possibility is there for potential development? Gold mining could certainly provide jobs that the military is currently taking away from the Delta area.		Management Plan for Fort Wainwright and Fort Greely in cooperation with the Alaska State Historic Preservation Office. The draft plan sufficiently addresses both the inventory and
Page 3-89It seems the military is ignoring archeological work that must be done in these areas. Current efforts by the military are more in line with obliterating them.	CULT-B001	protection of archaeological sites. The Army complies with all applicable laws concerning cultural resources sites.
P 3-97 Socio economicsAgain, the Dry Creek community is ignored. They are larger than Dot Lake and Healy Lake, as well as being closer. Don't you even know they are there? If not, why not?	SOC-B006	REC-B001: The Provost Marshall's Office plans to implement Army Regulation (AR) 210-21, dated May 1997, which states that any person hunting with a firearm on U.S. Army Alaska (USARAK) lands must first attend an 18 hour. National Rifle Association certified (or equivalent)
Subsistence: 3-106 et alFederal agencies tell residents of Delta Junction that there is no federal land near Delta for them to provide a subsistence priority on. Yet the Federal Government has 660,000+ acres butted up against our give limited Wake up	SUB-B002	hunter safety course. Persons who only fish or trap on Army lands are exempt. This regulation is set to be in place January 1, 2000.
military, you do nothing to encourage subsistence hunters to use military lands. In fact, present policies discourage it. You will soon put into place a requirement for hunter education certification, yet there is no current way Delta residents can comply since there is no hunter education certification available here. This can be construed as an indirect means of denying access, as can other procedures, such as having to	REC-B001	Currently Alaska is the only state in the country that does not require a hunter safety course to hunt statewide. The State does plan to require this in the future. Implementation for the Interior (Fairbanks, Delta Junction area) is scheduled for January 1, 2001. USARAK is petitioning the Army for exemption or a delay of hunter certification requirement in AR 210-21.
USE-B003: During the 1998 Carla Lake fire, live ordnance was located approximatel limit of the Buffer Zone) of the Kansas Lakes Impact Area, close to the Oklabo	y 2 km north (the outer	The current Army regulations are to ensure public safety and were not written to harass the public. The Army is able to inform the public on present closures and military activity, at the time of contact. Persons calling in, giving information on their intended general location, have been rescued in the past based on the call in information. Civilians who choose not to comply with current regulations are

notified several times before action is taken to deny access.

USE-B003: During the 1998 Carla Lake fire, live ordnance was located approximately 2 km north (the outer limit of the Buffer Zone) of the Kansas Lakes Impact Area, close to the Oklahoma Impact Area, and approximately 3 km inside the military reservation boundary. The ordnance was from the 1940s or 1950s. An explosive ordnance disposal (EOD) team was called in and the ordnance was destroyed.

OTH-B001: Movement of troops and vehicles occur between Fort Wainwright and Fort Greely. Large convoys occur primarily during the military's major training exercises. Military use of Fort Greely will continue

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telephone first to check in to go on military land, telephone immediately after you leave to say you are off. Failure to comply results in future denial, etc.... Penalties and threats are a great method of discouraging people from using military lands.

P4-71 Please guote the source of the statement, and clarify "the planned opening of the Delta Junction Closed Area by ADF&G and the Army to moose hunting would increase opportunities for harvesting moose on Fort Greely." As a member of the Delta SUB-B003 Junction Fish and Game Advisory Committee, I can tell you that no such plan currently exists. Again, there is too much red tape for locals to deal with for extensive hunting and trapping. Locals often complain because military hunters do not even have to buy an Alaska hunting license to hunt on military land. We also realize that they take game on adjacent State land because they do not know where the boundaries actually are.

Subsistence is a term that does not even receive real consideration by the military, including within this document. They do not give any form of preference to SUB-B004 subsistence users. The only priority they give is to military personnel. I do not see that the No Action Alternative has any negative effects. Please explain them to me if I am incorrect. Reversion to the BLM is the only way a local subsistence priority could be put into effect. I know this from my membership on the Eastern Interior Federal Subsistence Advisory Council. Please do not mislead others! BLM lands are generally far more accessible to the public than are military lands.

Finally, since Fort Greely no longer plans to contribute substantially to the local SOC-B007 economy, I would prefer to see it closed completely. All neighbors should be good neighbors, and one that is completely negative is not appreciated!

Nachaniel M. Good - Mat Jord Nathaniel M. Good Delta Jet 99737

I am a member of the following organizations, but am representing myself personally on this response. I wish I had the time to more completely do so!

Delta Fish & Game Advisory Committee

Eastern Interior Federal Subsistence Council

Delta Junction City Council

Gerstle River Test Site Expansion Area RAB

SUB-B003: You are correct. This wording originally appeared in the Fort Greely Integrated Natural Resources Management Plan but has since been removed. Thank you for pointing this out.

SUB-B004: Chapter 4.20 did not clearly state that access for subsistence users would improve under State as well as BLM control. The wording has been changed accordingly.

SOC-B007: Noted.

С

Ed Sheehan Box 472 Delta Jct, AK 99737 907-895-4806 5 January 1999 To whom it May Concom, 1. The following comments are submitted concorning the alaska army Lands Withdrawal Renewal, Draft Legislative Environmental Impact State ment (LEIS), Volumes I and II. my commute only relate to the Fort Greeky, alaskar (FGA) East and West Training wear. 2. I would like to complement the vork done by me Cindy Herdrich (the outracter Project Managerc) and me Douglas W. Johnson (the USARAK Program manager) on the LEIS. These managers, and thier teams, die a great jur - this is ease chally true when one considers the lack of information wailable in some very discussion areas. OTH-C002

3. Up front, the LEIS Executive Summary stated that complicate of public we concorning access to the land and we ACC-COOS space in question will not be resolved **RESPONSES TO COMMENT C**

OTH-C002: U.S. Army Alaska appreciates Mr. Sheehan's time and effort to provide comments and concerns throughout the preparation of this LEIS.

ACC-C005: The Executive Summary states that the issue of access will not be resolved. This statement was made because the public is requesting access changes that the Army cannot implement, due to the military mission or safety factors. As you realize, the Army cannot identify specific areas on the withdrawn lands to be permanently open to public use. This would hinder military training activities and jeopardize the military mission. The Military Lands Withdrawal Act PL 99-606 Section 3.3 "Closure to Public" states "If the Secretary of the military require the closure to the public use of any road, trail, or other portion of the lands withdrawn by this Act, the Secretary may take such action as the Secretary determines necessary or desirable to effect and maintain such closure. Any such closure shall be limited to the minimum areas and periods which the Secretary of the military department concerned determines are required to carry out this subsection."

The the less, yet, this issue is discussed throughout the text. Public a ccess is an obvious LEIS concerns, and must be addressed. The concernsional Public Land Order (PLO) which will result from this LEIS should be specific concerning public access. Otherwise, subordinate commander und range controllers will be making ourgessional policy as they close large tracts of land and wire space when there is no military training or safety justification for puch actions. In the immediate plet, and they be de closwies of land and wire appare have frequently occurs in contradiction to the wire plo.

4. Throughout the LEIS, increased USAF activity at FGA is abricans. The USAF Atates that no new impact areas are proposed for there use. The Kansas, arigona, newada, Oregon and michigan Indress Impact areas of are new dedicates impact areas which are not justified within the text of this LEIS or in the previous approved EIS. Greation of additional impact areas, and the resulting inexclosed munitions, cause problems for the State of Glaska and the Docal community as discussed in the BRAC

ACC-C005 cont.

USE-C005: This LEIS is not proposing to create new Impact Areas on Fort Greely or change the use of existing Impact Areas. The Kansas, Arizona, Nevada, Oregon, and Michigan Lakes (see Figure 2.c) are designated as Impact Areas. All are used for limited periods and are normally used for non-dud producing ammunition or explosives, which are cleared and returned to other training support purposes following termination of firing. This use of the Lakes Impact Areas will continue through the proposed withdrawal renewal.

USE-C005

tactimony and in a letter from the

5. Accept for a USAF decontamination plan for the two impact weap (Deta treet and Okenhama) They plan to use, the LEIS does not a device decontamination of the remaining impact weap (Lakes hussippin, ac Washington. as imput to a PLO that may be in effect for 50 years (almost in long is that has been in existance), the LEIS planded address proper records herping and interpes did minitions disposed for my opinion, the military planded declar that a total decontamination of previously fired minitions in the Delta hiven and Theta Greek Impact areas is not familie.

6 Some of responses to public comments found in the LEIS Scoping duminary are incomplete (not justified eleswhere in the text) on are uninitionary (mutter off as inappropriate for the LEIS). For example, the FGA Training area wear can be interpreted as closed to public so coso when one reads the preferred atternative of the LEIS.¹⁰ with proper

3

ACC-C006

MIT-C001 MIT-C001: Please refer to the response for POL-A002.

ACC-C006: The entire Fort Greely West Training Area is not closed to public access. Areas within the Training Area are listed as having permanent or limited closure. These areas are described in Chapter 3.16 and shown in Figure 3.16.b.

(

Lange control planning and coordination with State Departmento, both the military and the public can continue to enjoy FGA Training wreas as it has in the past

7 my concerns relative to the publics use of the FGA Training areas would be pationied if the LEIS Executive Summary stated that the LEIS represented no major USE-C006 change to the content PLO, and assigns responsibility as to who in USARAK or the USAF can would the intent of the PLO or EIS in the future. Additionally, the concerns of the local community should be addressed. Para phrased, These concus are:

a. The environment should be USE-C007 convictered concurrent with military. Analytic plans. Condination with State OTH-C003 and some Federal agencies is prequently. required.

b. ho new in part areas should be USE-COOS used without an additional EIS submission.

USE-C006: U.S. Army Alaska is requesting to renew the land withdrawals under the same stipulations and conditions of the Military Lands Withdrawal Act in 1986 and for the same military purposes which have been conducted over the past 15 years. This statement has been added to the Executive Summary. The renewal legislation passed by Congress will specify who has the authority to relinquish all or any of the lands withdrawn. The Military Lands Withdrawal Act specified the Secretary of the Army files a Notice of Intention to relinquish with the Secretary of the Interior.

USE-C007: Training exercises conducted on Alaska military lands are regulated by U.S.Army Alaska Range Regulation 350-2. It provides procedures for planning, requesting, and operating ranges and training areas, and highlights certain environmental aspects to be taken into consideration. This regulation is described in detail throughout various sections in Chapter 4. Specific natural resource

protection requirements include the restriction of off-road maneuvering during spring thaw (1 April to 15 May) and summer months (usually May to September) in designated creek bottoms, wetlands, and alpine areas above 2,000 feet in elevation. Vehicles are also instructed to remain on marked trails and designated routes until directed otherwise during tactical deployment.

To guide and regulate the actions of Army personnel using and managing training lands, the Army has developed the Integrated Training Area Management (ITAM) program. This program is described in detail in Appendix 2.D.

Stream crossings conducted during the winter months can only occur at designated ice bridge locations. Ice bridges are permitted to be constructed each season in the same location and each site has a specific amount of water scheduled for use. New applications for permits must be submitted to the State of Alaska when the existing permits expire or for an activity that significantly deviates from the approved permit.

Impacts to wetlands are minimized by various Army, Federal, and State laws and regulations. The Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act require permits before construction work using mechanized equipment occurs.

It is also Department of Army policy to avoid adverse impacts to existing aquatic resources and offset those adverse impacts where they are unavoidable. The Army will continue to "strive to achieve a goal of no net loss of values and functions to existing wetlands, and permit no overall net loss of wetlands on Army controlled lands" (U.S. Army Regulation 200-3, Land, Forest, and Wildlife Management).

Proposed mitigation would implement a program to gather baseline data to develop a longterm monitoring and remediation program for physical and biological resources as outlined in Chapter 4.23.

The Army is protecting sensitive wildlife species and their habitat through the Integrated Natural Resources Management Plans. Changes reflecting new management areas are identified in Chapter 3.12. The Army and Bureau of Land Management manage the resources as directed in the Military Lands Withdrawal Act PL 99-606.

The Army has completed a floristic survey of Fort Wainwright and is conducting a survey on Fort Greely. If threatened or endangered species are found, necessary protection and management will be implemented. Please refer to Chapter 4.11 Vegetation and review the Existing and Proposed Mitigation.

OTH-C003: Coordination with State and Federal agencies is occuring now through the development of the Integrated Natural Resources Management Plans for Fort Wainwright and Fort Greely, obtaining permits, and complying with Federal, State, and local laws and regulations. This will continue to occur throughout the withdrawal renewal period.

USE-C008: No new Impact Areas are being proposed in this LEIS. U.S. Army Alaska policy states that new contaminated Impact Areas will not be created on withdrawal lands without approval per Army regulations and the Bureau of Land Management (AR350-2) and applicable Federal laws, including the National Environmental Policy Act.

c. Decourtamination planning, execution and surgenvision should exist for all impost areas.

d. Range control and explosive admand disposed (FOD) personnel should exist at FGA, <u>or</u> the UTIS should explain how USE-C009 The publics safety concerns can be USE-C009 patisfied without these personnel.

e Range and tenain utilization records muser be maintained and supervised. USE-CO10

f. USARAK and USAF Range Use Regulations muer be coordinated, and adequate to provide for military and public safety USE-CO11

q. Trainero much consider the potential frie heyerd and coordinate with State this manages in the local community. Oben necessary potential fire hozard areas should net be fired apon. Impact areas must be reduced in size and scope so that fire fighting can be accomplished on the ground when necessary. With progres name control pluming a coordination, impact areas can be used without causing wild fires and the destruction of flora and fourna.

5

MIT-C002: Please refer to the response for POL-A002.

MIT-C002

FIRE-C002

USE-C009: No decision has been made on retaining Range Control and Explosive Ordnance Disposal personnel at Fort Greely after the realignment becomes final in 2001.

USE-C010: Non-dud ammunition records are kept for an indefinite period with other range statistics. Records on dud-producing expenditures are kept permanently per Army Regulation (AR385-63). U.S. Army Alaska recognizes the inconsistencies in its record keeping on Range Use at Fort Wainwright and will correct that situation.

USE-C011: U.S. Air Force use of U.S. Army Alaska ranges is coordinated through Interservice Support Agreements and Memorandums of Understanding. The Air Force's Range Regulations were developed in compliance with the provisions of these agreements. If additional guidance is needed, the Air Force institutes guidance through their Range Regulations.

FIRE-C002: U.S. Army Alaska Range Control offices and fire departments, with input from the Bureau of Land Management, Alaska Fire Service (AFS), have developed a Fire Prevention System based on the Canadian Forest Fire Danger Rating System (CFFDRS). The Army and the Air Force follow fire indices and stops the use of pyrotechnics, during periods of high fire danger. The Army also ceases live firing during high hazard periods. Each Impact Area is managed according to its fire hazard. Impact Areas are not proposed to be reduced in size.

9-19

С

OTH-C004

OTH-C005

USE-C012

8. Members of the Department of Defense, Department of the Interior and Congressional Staffers, who will ultimotity formalize the PLO, should consider the following which is not well understood by reading the LE!

a. The Delta River which marks the exaction most boundary of the FGA Training when where is a major river abstacle. Oround access is usually difficult, but less so from 15 hovember until 15 march when the river is frozen."

b. The boundaries of the FGA Training Wien Wist, and its impact areau, have not been purveyed, finsed on marked.

9. Go a result of the BRAC decision to (Downsize FCIA, as convently planned, all of the military and civilian personnel spaces needed to support live fining at FGA will be deleted. On area as large as new fram will be woild of normal emergency services which is now provides 12 auctioned by FGA personnel.¹² after the BRAC, FGA will continue to be a Majoi military simulated and live fire training area, but without any on -site Supervision. Many of no believe this is a descater waiting to happen.

Signature

IN SERT # 1

The impact areas located in the Delta River and Delta Cruek are composed primarily of self and growd, and do mot present the same fire hagard as the remaining woosted impact areas.

ITCM	
 132	PAGE(S)
I	ES.10, 4-16+17, 4.60+61 SEP 58-72
2	2.17-20
-	5CP . 48
4	2.29 2.6
5	2.11-25
6	SCP 57-59
11	2-25-26
8	SCP. 68-72 4.60-61
9	SCP 1-105 4.60-61
10	4.60-61
11	2.39
12	50.70

OTH C004: Stream freezing and low flows are discussed extensively for the withdrawal area water bodies in Chapter 3.8.1.3 *Low Flow/Aufeis*.An additional statement describing the Delta River was added to Chapter 2.1.3 Preferred Alternative under the section heading Fort Greely West and East Training Areas Army Facilities.

OTH-C005: A legal boundary description and property history for Fort Greely are in Appendix 1.A of the LEIS. The legal boundaries were published in the Federal Register. See Appendix 1.A for the legal descriptions. No surveys of the Fort Greely boundary have been completed and are not required.

Army Regulation 385-63 requires marking range boundaries every 200 meters. A waiver for Fort Greely concerning this regulation is on file at the Directorate of Plans, Training, Security, and Mobilization at Fort Richardson. The cost of placing signs every 200 meters around the Impact Areas is estimated to cost millions of dollars. Fort Greely Range Control announces temporary closures and areas that are off-limits permanently via weekly radio announcements. Please review Figure 3.16.b for locations of access restriction signs and gates.

USE-C012: Noted. NEPA documents, including Environmental Assessments, are being prepared to analyze the impacts of the realignment on Fort Wainwright and Fort Greely. The Environmental Assessment for Realignment of Personnel and Military Functions to Fort Wainwright was published in June 1997. It is anticipated the Environmental Assessment for Realignment of Personnel and Military Functions from Fort Greely will be published in October 1999.

No decision has been made on retaining Range Control and Explosive Ordnance Disposal personnel at Fort Greely after the realignment becomes final in 2001.

U.S. ARMY ALASKA LANDS WITHDRAWAL RENEWAL ENVIRONMENTAL IMPACT STATEMENT

COMMENT SHEET

DATE: 1/5/99

	<u> </u>	
COMMENTOR'S NAME	FRONTY PORVER	

COMMENTOR'S ADDRESS: P.O. Box 605

Delta Tel At

ORGANIZATION: Y COMMENTOR REPRESENTING: SELF:

ORGANIZATION

NAME: ANE

ADDRESS: 45 ABOVE

COMMENTS: BRIDGE Inquire of subsuitage studies fory WATER-D002 That affect ground unter table T Was directed to cold weather test Section people and fort Rich. There is a weed disturbance it any to know what IF A ice sill is Defuis when he low surface Formed litse what Empert that may cause Also tackeded interes I wanted to encourage cooperation between FISH-D002 Army & ADES'S to maintain / conhonce Fishing opportunities on military lands.

RESPONSES TO COMMENT D

WATER-D002: The Alaska Department of Fish and Game and the Cold Regions Research and Engineering Laboratory (CRREL) are in the early stages of developing a study matrix. CRREL and the Army are evaluating study proposals for assessing the impacts of ice bridges on groundwater.

FISH-D002: Maintaining and enhancing fishing opportunities are discussed in Chapter 4.13 under the Preferred Alternative and Proposed Mitigation. Proposed Mitigation states that fishing opportunities for the public will be maintained, habitat for stocked fish will be improved, and wild fisheries habitat suveys will be conducted.

Army seeks 50-year extension of land withdrawals

Ε

Military land withdrawals covering 871,537 acres of Interior Alaska expire in less than three years, and the U.S. Army is quietly asking Congress to renew them for 50 years, three times longer than the current withdrawal terms.

9-22

There are three withdrawals involved. The Fort Wainwright Yukon Training Area covers 247,-952 acres east of Elelson Air Force Base in the uplands between -the Chena and Salcha rivers. The Fort Greely East and West training areas stradle the Richardson Highway in the Donnelly Dome area south of Fort Greely, and together cover another 623,585 acree.

The land was dedicated for military training maneuvers during the 1950s in a flurry of federal land grabs that preceded Alaska becoming a state.

After 1958 Congress required that it approve any withdrawal of more than. 5,000 acres. In 1961 Congress authorized the Yukon Training Area withdrawal for only a 10-year term. That was extended by a public land order for an additional five years in 1971, and by a bureaucratic annifie for another 10 years after that expired. Fred Pratt

Congress renewed the withdrawal in 1986 for only a 15-year term. At that time the Army turned loose 1,600 acres that is now part of the Chena River Stats Recreation Area.

Now the Army wants the land for a 50-year term, and its contractor just finished the draft of an environmental impact statement advising Congress and the public of the issues surrounding the decision.

A public hearing is acheduled on the EIS in Fairbanks Jan. 6, from 2 to 8 p.m. at the Carlson Center. Other hearings are set for Delta Junction on Jan. 5 (same hours, at the Diamond Willow Club) and in Anchorage Jan. 7.

There are a lot of potential public concerns about the continuing withdrawals that the Army hopes don't come up.

The Yukon Training Area

covers a huge region near Fairhanks with an enormous potential for mineral development, recreational use and timber sales. It's covered with roads and trails, it adjoins Chens River State Recreation Area and even includes 13,440 acres of the park that the Army refuses to transfer to the state. The trans-Alaska pipeline right of way crosses one corner.

The military training areas are open to hunting, fishing, trapping and other recreational uses now, but are often cheed during manetivers and some "impact gones" used for artillery and aerial bombardments and surrounding "buffer zones" are permanently closed. The airepace over the training areas is also closed to an altitude of 20,000 feet during maneuvers.

The state of Alaska has filed land selections on parts of the Yukon Training Ares, hoping to acquire the land if the withdrawals should ever axpire.

Of course much of the land is covered with hazardous materials and unexploded "dud" warheads. The U.S. Army Corps of Engineers estimates that it would cost \$47.4 million to clean up the Stuart Creek Impact Area in the Yukon Triining Area. The total bill for cleaning up all three training areas is estimated at \$249.9 million.

The EIS warns that federal agencies might just declare the land too polluted to release and it might not be declared available for state selection even if the withdrawels expire. The key state selections avoid these heavily polluted impact areas, however.

The EIS considers only two options: Letting the withdrawals expire or extending them for 50 years. The EIS team in Colorado rejected any shorter term, as well as the request from the state that the tiny portion on the northeast border be transferred to the Chene. River Recreation Area.

The EIS is prepared by the Center for Ecological Management of Military Lands at Colorado State University. This organization acts like it or its clients in US. Army Alaska should never have to commit to anything on paper when dealing with the public until and unless it is legally required to do so.

The EIS and the required public hearings were announced in small display advertisements run in the Daily News-Miner this month. The ad gives no physical location for places to get a copy de

ALT-E006

the document, but simply states that for further information oneshould call a Steve Reidsma at Fort Wainwright, and it lists what turns out to be a bogus phone number.

I called the Fort Wainwright information operator and was told Mr. Reidsma wasn't on their list of personnel. I was transfarred to the base personnel office, where I was told that there was no civilian employee on Fort Wainwright with that name either.

Aftar transposing one number listed in the ad I got Mr. Reidsma's phone answering machine. We connected a few days later and I finally got a copy of the EIS in the mail two weeks aftar my initial attampt. Even though I informed them about the incorrect contact phone number in the newspaper advertisement, it continued to be published. The correct phone number is 353-9685.

Any operation that goes to these lengths to stall and divert the public can't be doing an honest job on the EIS.

Fred Prett, a free-lance journalist in Fairbanks, is a longtime reporter and observer of Alaska politics.

MIN-E002 REC-E002 FOR-E001

ALT-E005

RESPONSES TO COMMENT E

MIN-E002: It is noted that some mineral potential exists. See Chapter 3.5 Mineral Resources.

REC-E002: The Fort Wainwright Yukon Training Area covers approximately 247,952 acres. The Beaver Creek-South Fork Area is approximately 13,440 acres. In 1975 the Alaska State Legislature designated the boundaries of the Chena River State Recreation Area, which includes a portion of Yukon Training Area land referred to as the Beaver Creek-South Fork Area. This State action did not transfer title of the land nor was it supported by Federal agencies. The Army and Air Force considered an alternative to relinquish this portion of the Yukon Training Area (see Chapter 2.3.3) to Alaska State Parks, but eliminated it from further study due to the excessive impacts to military training and the importance of this area's training infrastructure in achieving combat readiness. The State of Alaska has not identified this land as high priority for conveyance to the State.

FOR-E001: The Army plans to implement a project to inventory forest resources on Fort Wainwright and Fort Greely, and develop a forest ecosystem management plan. The study would identify potential timber harvest areas and the feasibility of timber sales. The Bureau of Land Management (BLM) controls timber rights on the withdrawal lands under Public Law 99-606. Any timber harvesting would require the efforts of U.S. Army Alaska and the BLM.

ALT-E005: Military use of the Yukon Training Area started in 1956. In 1975 the Alaska State Legislature designated the boundaries of the Chena River State Recreation Area, which includes a portion of Yukon Training Area land referred to as the Beaver Creek-South Fork Area. This State action did not transfer title of the land nor was it supported by Federal Agencies. The Army and Air Force considered an alternative to relinquish this portion of the Yukon Training Area (see Chapter 2.3.3) to Alaska State Parks, but eliminated it from further study due to the excessive impacts to military training and the importance of this area's training infrastructure in achieving combat readiness.

ALT-E006: The Army and Air Force developed the Preferred Alternative and determined other alternatives to be analyzed in the Draft LEIS based on military operational parameters and training needs (see Chapter 2.1). The Army and Air Force eliminated alternatives from further consideration if they impaired their ability to complete their missions in Alaska (see Chapter 2.3). The Center for Ecological Management of Military Lands analyzed the viable alternatives as determined by the Army and Air Force.

Alaska: the great bombing range

Military proposal needs closer look

What would you say if the military proposed to shoot 3,500 rockets packed with high explosives into a drainage of the Chena River upstream from the state recreation area? What would you say if, at the same location, they also wanted to drop 4,300 bombs each weighing up to a ton? And, on top of all that, shoot off 50,000 additional high explosives?

Would you wonder if these munitions can contaminate the soil? (They can). Would you ask if the contamination can spread to surface and ground water? (It can). Would you be concerned about unexploded rockets and bombs lying out in the brush or burrowed into the soil? (You should).

The fact is, the bombing statistics quoted above are not what the military is proposing to do. It is what the military already has done in just five years at the Stuart Creek Impact Area which includes the South Fork of the Chena River. A similar list of bombs and rockets and missiles have been sot into the countryside along the Delta River adjacent to Ft. Greely in the last few years, according to a Draft Legislative Environmental Impact Statement (LEIS) just released by the Army.

The document was produced in support of the Army's proposal to continue using the two areas. totaling 1,300 square miles of Alaska land, as bombing ranges, Another million or so acres of the Tanana Flats is also used as a bombing range, but it is not part of this application. In the past, these renewals have been for 5-15 years, but now the Army wants to be permitted to continue bombing for 50 years.

What effect are all these exploding bombs, rockets and missiles-or nonexploding duds-



likely to have on soil and water quality in the Chena basin or the Delta River? The military doesn't know. They haven't conducted soil contamination studies there. What is known is this. TNT and RDX, the dominant explosives used, are mobile in the soil, and "residues of these chemicals in the soils can be a source of pollution both on Army installations and beyond installation boundaries." Presumably the morethan-residual contents of a cracked open dud can be a source of pollution as well. Streams crossing the bombing zone are likely to be the transport mechanism to carry contamination offsite. The possible risk to people, animals and plants is not addressed

Very likely, chemical contamination of soil and water is a nonissue compared to the effect of dud munifions. It is virtually impossible to find all the duds, and the military estimates it would cost \$250 billion to clean up these two bombing ranges. Besides risks to people and animals, wildfires are a frequent result of these duds or flares or pyrotechnic ordnance. Even if dropped in the winter, they can reignite themselves when the snow melts. Often, these fires cannot be fought because of the risk to firefighters of exploding duds

Obviously, the military has to train somewhere. But there is a lot to question here. Why, for example, is it necessary to drop live bombs and rockets when aerodynamically-alike dummies-which the military also uses-provide the same training? Shouldn't live munitions be dropped in more manager assured him that he did

barren locales so that unexploded not regard the designation as a ones can be removed? Instead, a tremendous quantity of live ordnance lies hidden in the brush. making thousands of square miles of Alaska countryside a noman's land. Permanently.

Consider the testimony of Ed Sheehan, a retired Lt. Colonel who has been associated with Ft. Greely for 38 years and has had indirect authority over the bombing range activities there. He spoke at two public meetings on this issue a year ago and his comments are part of the public record. Concerning removing all the duds from the Delta River. which is routinely bombed directly, he said, "I would say you can never clean up the Delta River, which is one of the big impact areas, and you can never clean up the Little Delta Creek."

At another point he said, "There are more duds in the Delta River than there are in the Oklahoma Range (part of the Ft. Greely complex). And I'm telling you that in all of the '60s and early '70s the Air Force used Oklahoma as much as they are using it right now. It was a steady thing. And they didn't pick up the duds before they left. This dud picking up business started about '82. Before that, they used to send statements, certificates that said there were no duds, or all the duds were cleaned up.'

Sheehan, who has served as acting post commander at Greely. also made very plain his objection that this renewal application enlarges the impact areas. He was mainly concerned about the fire danger to residents around the town of Delta. But he says the Army is labeling all of the country between the Delta River and the Oklahoma Range an "impact area," though it had not been a bombing range in the past. Rather, it had been used as a maneuvering area or a buffer zone. When the current range

change, that "it's already a bombing area now. I mean it can be bombed," the Lt. Colonel replied: "It is not now and has never been a bombing area... I ran range control for 17 years... I drew those boundaries. I know what's supposed to be done there... if you're going to use it, tell us you're going to use it. If you're not going to use it, tell

them they can't use it.' The Army's LEIS is not particularly forthcoming in its history section, either. Unmentioned is the fact that at Ft. Greely's Gerstle River Test Site the army once experimented with some of the most deadly chemical agents known to man. Several authors have tracked military use of the lethal nerve gases VX and VG, as well as mustard gas being packed into rockets and artillery shells and fired into the Gerstle River area. At Delta Creek the army also released germ-warfare organisms into the environment. including strains of the tularemia bacteria. The point is, if we intend to learn from history, we will be more than a little circumspect when we review military proposals that request to bomb our public lands for the next half a century.

Do the people of Alaska agree with Sen. Stevens when he says he wants to make Alaska the military training capital of the world, with foreign air forces invited to bomb our landscapes? Are we so dependent on military subsidy that we would sell our birthright for it? Wouldn't federal money be better spent cleaning up the mess the military has already made?

The advertised "public hearing," which is really an "open house," on the proposed 50-year extension of bombing ranges will be Jan. 5 at the Diamond Willow Club in Delta Junc- USE-F013 tion from 2-8 p.m., a second takes place Jan. 6 at the Carlson USE-F014 Center from 2-6 p.m.

RESPONSES TO COMMENT F

USE-F013: Training ordnance is used extensively by the military. Most bombing by the Air Force on the withdrawal lands is with training bombs (see Tables 2.i and 2.i). The experience of training with live ordnance is a necessary requirement for combat readiness. Expending live ordnance tests and evaluates both logistical and operational training programs. It tests and analyzes all necessary steps of an ordnance system to ensure its effectiveness during combat. As with all simulated military training, the more realistic the training, the better our forces are trained for combat.

USE-F014: Acquiring other public lands in Alaska for military training and testing facilities would be cost prohibitive even if the necessary acreage was available. It seems unreasonable and impractical to relocate military training to other public lands and commit resources at these alternate sites as High Hazard Impact Areas without the technology to completely decontaminate an Impact Area at an economically feasible cost. It is also cost prohibitive for the military to deploy units to other locations for training. Also see Mr. O'Neill's two other comment letters. H and T in this section.

PUBLIC COMMENTS REGARDING THE DRAFT LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT ALASKA ARMY LANDS WITHDRAWAL RENEWAL U.S. ARMY ALASKA DEPARTMENT OF THE ARMY

> Proceedings Held at The Carlson Center Pioneer Room Fairbanks, Alaska

HEARING PROCEEDINGS HELD ON Wednesday, January 6, 1999

Volume 1 of 1 Pages 1 to 15, inclusive

Reported by: Carol A. McCue, RMR Heartland Court Reporters

HEARTLAND COURT REPORTERS 907-452-6727

PROCEEDINGS

(The following is the statement by Mr. Robert Layne from the State of Alaska, Division of Natural Resources, Division of Land, given at 2:58 p.m., January 6, 1999.) MR. ROBERT LAYNE: I guess I should begin by saying I already gave you a deposition back the last time you had meetings in December of - I think of last year for our division. And our primary interest in what's going on here with this renewal, it's Ft. Greely that we're primarily interested in right now. The ownership of the Delta River is something that the State of Alaska claims through the Statehood Act and Submerged Lands Act, and we believe that we have ownership of that corridor as it runs through Ft. Greely as a navigable waterway. And it's our concern that the activities that

RESPONSES TO COMMENT G

LAND-G001

LAND-G001: The State of Alaska, Department of Natural Resources, Division of Land has indicated interest in the Delta River, including an ownership interest in the lands submerged under the high mean water mark of the Delta River. The United States Army Alaska is reviewing the Division of Land's ownership claim.

Please refer to Executive Summary and Chapter 1.8. Additional information regarding water quality and the jurisdiction of submerged lands has been added to these sections. Chapters 3.1.1 and 4.1 describe submerged lands and their relation to land use. A reference to current issues has been added to Chapter 4.1. Chapter 4.8.2 describes the issue relating to water quality, monitoring, and decontamination of submerged lands.

have been going on there over the last 50 years and are ongoing are potential public safety and health hazards. And we are — would like to see some — basically, you know, that some of these things are at least looked into, and ultimately that we would like to have the corridor cleaned up and made safe.

The reason that I say that we believe that we

HEARTLAND COURT REPORTERS 907-452-6727

own that is because Statehood occurred in 1959. This land was not withdrawn to the public domain to Ft. Greely until 1961, two years later. So we feel we have a solid position on that.

And we have no — there's a high incidence of cancer and other problems in the Delta area that may or may not be associated with some of these activities. And the fact that the waterway is navigable is important in that if there are unexploded ordinance or dangerous chemicals out there, that they are accessible to the public, as the river corridor is at nearly all times.

And also to the wildlife that inhabits that corridor. And those things that they pick up, the wildlife, who spend most of the time out there, are ingested by the local populations, and others; and so therefore, those things can be carried into the system that affects humans as well as animals.

So we, you know, we are trying to work with the military. We have sent them some correspondence to the effect that we own the land and that we would like to see it cleaned up and that we would like to have some control over what goes on there.

And to date, we haven't received a very positive response to our requests. But we're still working with that. We're still willing to work with the military in

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any ongoing negotiations. But as we consider locking this land into another 50 years of this kind of use, which basically equals the entire time it's been used, we have some major concerns about how this is going to influence not only that particular corridor that runs through Greely, but that which is influenced by it downstream. And those are very important things.

We have population centers there and we have some of our most important salmon spawning grounds **POL-G004:** The State Epidemiologist was not aware nor had information relating to a high incidence of cancer in the Delta area. The Tumor Registrar at Fairbanks Memorial Hospital indicated the incidence of cancer at Delta Junction is not abnormal nor statistically significant compared to the Northern Region of the State of Alaska (1997 most current data available) (Pam Peters, pers com. 1999).

Recent surface water quality surveys have not been completed for the withdrawal lands by the military or any other State or Federal entity. The most recent water quality investigation of Fort Greely was a baseline study conducted by the U.S. Environmental Hygiene Agency in 1990 to determine if munitions fired into the Impact Areas were having any adverse effect on water and sediment quality. No explosives were detected in the water samples and the data indicated the stream chemistries were not adversely affected by munitions. Please refer to Chapter 4.8.2 *Water Quality, Munitions* and Appendix 3.8.D for further information.

Prior to this study, water samples were collected from the Delta River above Jarvis Creek near Fort Greely by the U.S. Geological Survey in 1986 (See Appendix 3.8.D). All analyzed munitions values were below detectable limits. No other water samples collected within the withdrawal areas were analyzed for munitions.

Please refer to responses for POL-A001 and POL-A002. Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources as outlined in Chapter 4.23.

FISH-G003: Please review response POL-A001 and the mitigation for Pollution in Chapter 4.23. The proposed mitigation for wild fisheries found in Chapter 4.13.2 states that wild fisheries habitat surveys will be conducted.

FISH-G003

POL-G004

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downstream in there, and so the things that are going into the waters and influencing those areas are of concern to us. That's about it.

Also, the Delta River, the Little Delta River and all these tributaries that come into the Tanana there, where they come into the Tanana is some of the most important spawning ground within the interior of Alaska. That whole part of it.

And so obviously, whatever goes into the water there is going downstream and can — if it's in solution, it could be picked up by the fish; and if it gets into the sediments, it can be picked up by the fish. So those are some side issues to the issues that were already there, you know, from public safety involved with unexploded ordinances.

Also, it's my — I'm given to understand that

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there are a number of landfills that have been put into the Delta River corridor over time, which, as the river changes and conditions change, may or may not be exposed and carried downstream to further influence this. So these are also concerns about what's going on.

(Statement concluded at 3:03 p.m., January 6, 1999.) (The following is the statement given by Christine Storey at 3:57 p.m., January 6, 1999.)

MS. CHRISTINE STOREY: My comments are mainly with the Chena River recreation area, Chena Hot Springs Road. And I would like the Army to give more consideration to giving that land back to the state so it can be used for the park. I think the Army has enough land elsewhere. That's it. (Statement concluded at 3:58 p.m.,

(Statement concluded at 3:58 p.m., January 6, 1999.)
(The following is the statement given by Mark Backes at 4:24 p.m., January 6, 1999.)
MR. BACKES: Opening statement, huh. Oh, man.
Well, gosh. I think the military should put the land back to the people. For one, I think they are polluting the land, and their cleanup efforts are poor, unless they

HEARTLAND COURT REPORTERS 907-452-6727 are forced to actually clean up. And so for sure, they

POL-G005: The Army received a permit from February 1, 1984 to November 1988 to operate a landfill at the edge of the Delta Creek Assault Strip, which is located in the floodplain of Delta Creek. All combustibles were burned prior to burial. The landfill was primarily used for training debris disposal, including human waste, packaging, and daily use items during large training exercises. Targets are placed on gravel bars no less than 50 feet from flowing water in the Delta River and Delta Creek. During clean-up, debris is removed from the riverbeds and not buried within the floodplain.

The only items that are placed within the Delta River corridor are those related to targetry, which include items constructed to resemble helicopters, aircraft, hangars, tanks, bunkers, armored personnel carriers, and vehicles. They are constructed of plywood, steel drums, concrete, or salvaged metal vehicles. Clearance of Air Force targets on the Stuart Creek and Oklahoma/Delta Creek Impact Areas are conducted on an "as needed" basis during annual decontamination operations.

ALT-G007: Noted. Military use of the Yukon Training Area started in 1956. In 1975 the Alaska State Legislature designated the boundaries of the Chena River State Recreation Area, which includes a portion of Yukon Training Area land referred to as the Beaver Creek-South Fork Area. This State action did not transfer title of the land nor was it supported by Federal agencies. The Army and Air Force considered an alternative to relinquish this portion of the Yukon Training Area (see Chapter 2.3.3) to Alaska State Parks, but eliminated it from further study due to the excessive impacts to military training and the importance of this area's training infrastructure in achieving combat readiness.

ALT-G008: Noted. Routine decontamination operations by the Air Force are defined in Chapter 2.1.3.

ALT-G008

POL-G005

FISH-G003 cont.

should clean up before they mess up any more. And I think they should have a yearly cleanup problem — or process, rather than let it get so bad they can't afford to do it and don't want to let it go back because it's too messed up.

I think access to the land, I think it's very very important for people of Alaska because our recreational use and hunting and fishing is limited by the access, and when you have large — large areas like these, these areas that are nonaccessible, it's pretty remote, I guess, to use the stuff, I mean.

And as far as, you know, if there would be, you know, if these lands would turn back to the state and possibly the military people would, you know, have to relocate and that, you know, they are — I kind of see a little bit of problem there because they are saying that they put a lot of money into the government, but they also take a lot of resources out of the government.

For one, they take the Permanent Fund with them, which is a lot of money. And they have ways of taking it with them when they leave. And I don't think that's really fair. I don't think they even personally deserve to even get the Permanent Fund. They are getting paid extra money to live here, they are getting their travel

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paid to get here, they are getting their housing, they are getting moved at expense to the government, and plus they are getting the Fund. And I think if that's the case, I don't think people that are getting paid to be here, COLA and whatever, that's — that should be enough.

They are not considered a resident, I don't believe, because they are not here on their own will. They are here because of their job. And someone is paying their way. So I think it's a little — it's a little corrupt.

And as far as the Air Force, I think the Air Force are a pretty good group of people, but I think all in all, the Army is a poorer class of people and I think they cost us, the government, a lot of money, just because you have to police them more. And they do cause trouble in town, surrounding areas.

They do have a pretty bad reputation, the Army boys do, out in the woods, too, for not taking care of things. And maybe they learned from the government themselves because the government's pretty wasteful and MIT-G003 N

ACC-G007

MIT-G003: Please refer to the response for POL-A002.

ACC-G007: The use of the withdrawal lands by the Army does limit access for recreational activities. The Army permanently restricts access to approximately 9% of the withdrawal lands, leaving approximately 91% available to public access. Please refer to Chapter 3.16 for more information on access.

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trashes the country, and maybe that's where they get their ideas from, but not all. But I mean, there are a few and that makes it bad for everybody. And it's kind of like everything in life.

So, I guess I would like to see the land come

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back to the state. I would like to see it cleaned up, for sure. Even if they don't decide to put it back in the state's hands, it should get cleaned up. And then start from square one again.

And you know, they are trying to be nice to the people now. You know, they are forgiving people for having cabins on their land and trespassing right at this point, but you know, what will it be next year? On a 50-year lease, everything could change, they get a new commander or something.

So if they are going to let the people use it now, you know, then that should be in writing so they can use it for the next — for the duration of the lease, or contract, however they work. I don't know.

I don't think I have anything else to say. THE REPORTER: Thank you very much. (Statement concluded at 4:28 p.m., January 6, 1999.) (The following is the statement given by Mr. Andy Montoya at 4:36 p.m., January 6, 1999.)

MR. ANDY MONTOYA: I just don't approve. I don't understand why they are taking the cabins away. You know. We've had them forever. And now that they are changing their ways, we are losing our playground. ACC-G008

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Places we go, we go out and stay a week at times.

I just don't understand why they are doing that. Because it's unusable land unless you have got a snow machine or an air boat. The military can't use it. You know. They are — people aren't going to walk around out there. I just wonder why.

I don't have a lot to say, other than, you know, I just wanted to find out if they were going to leave the cabins or not. But I guess not, huh?

I'm pretty much done, I believe. I don't like to see what they are doing to our playground. (Statement concluded at 4:38 p.m.,

ALT-G009

ALT-G009 and ACC-G008: Under the Military Lands Withdrawal Act, the military lands are withdrawn from all forms of appropriation under the public land laws, except where the land is subject to valid existing rights. Trespass structures constructed on the withdrawal lands are illegal. U.S. Army Alaska does not authorize trespass structures on its lands.

January 6, 1999.) (The following is the statement given by John Balko at 7:16 p.m., January 6, 1999.) MR. JOHN BALKO: You guys are leaving in 40

minutes and I haven't read this since it came out a week ago. I'm just concerned about all these unexploded munitions and exploded munitions, what kind of affect we are going to have on the ground water. **WATER-G003**

You two being female, the child bearing species, I mean, you should be more concerned about this than I am. Because you should be. Children, pregnant women, elderly. All this is upstream, it's only going to come downstream. There's no other choice.

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POL-G006

What surveys have been done for ground water? For streams, rivers. I mean, all this is upstream from our water supply.

And I would just like to make comment that before we go, granting the military another 50 years, another year to go drop additional bombs, futuristic weapons, what are they going to contain? Before we go lease this out, you know, maybe we should make studies and see what effect this is having.

I understand there's already a study for Ft. Greely — or correction, I'm sorry, the Delta area, saying that the residents there have a higher cancer rate than the rest of the State of Alaska. Is there a connection? Is there a connection between the bombing range there and the Delta area and what's upstream from Fairbanks? I think we need to look at this before we go blindly rushing into just blindly giving the military another 50 years.

Granted, we need a strong military, I think we need to have a place for them to practice their bombing runs, but at the same time, we need to look out for ourselves and for our children. That's all.

(Off record, then back on record.)

MR. JOHN BALKO: No, that's not all. Keep on going.

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Having just spent 20 years in the Navy, based all over the Lower 48, I've seen the results of blindly rushing in for housing developments, with a clear-cut of **WATER-G003:** Very limited information is available which describes the quantity and quality of the groundwater that underlies the withdrawal areas. No groundwater wells have been drilled in the vicinity of either Stuart Creek or Oklahoma/Delta Creek Impact Areas. Samples collected at various wells near the withdrawal areas, as listed in Appendix 3.9.A, were not analyzed for munitions. Thus, the effect of munitions on groundwater is unknown for the withdrawal areas.

Mitigation has been proposed to review existing groundwater quality and quantity data to determine the scope of a future groundwater monitoring network. Please refer to Chapter 4.9.2 and Chapter 4.23.

POL-G006: The State Epidemiologist was not aware nor had information relating to a high incidence of cancer in the Delta area. The Tumor Registrar at Fairbanks Memorial Hospital indicated the incidence of cancer at Delta Junction is not abnormal nor statistically significant compared to the Northern Region of the State of Alaska (1997 most current data available) (Pam Peters, pers com. 1999).

Although it is impossible to predict what future military operations or weapons will involve, current trends in warfare have moved toward a highly mobile air and ground force supported by massive firepower capable of attacking over much wider and deeper areas. The increased range, speed, and firepower inherent in combat units equipped with modern weapon systems have increased the need for maneuver acreage.

Proposed mitigation would implement a program to gather baseline data to develop a longterm monitoring and remediation program for physical resources (see Chapter 4.23).

OTH-G006 OTH-G006: Noted. Refer to Chapter 4.23 for existing and proposed mitigation. Thank you for your concern.

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every tree, and the effects this has between — between slapping additional students in overcrowded schools, roads that weren't meant to handle an additional 200 family units in the small area.

Before we go blindly rushing into unstudied or unevaluated growth, you know, maybe we should look at this as the bombing range also. Before we go blindly giving this land over for another 50 years, it just doesn't make sense if we do this without considering our health. That's all.

(Statement concluded at 7:19 p.m., January 6, 1999.) (The following is the statement given by Hugh Fate at 7:41 p.m., January 6, 1999.)

MR. HUGH FATE: By and large, we are very fortunate to have the military presence in Alaska. They are good neighbors, but there are some caveats here.

One is the request for renewal of lands expanding 50 years. I am not secure in the feeling that a 50-year lease of lands that are taken out of circulation, basically, at the same time that the

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ALT-G010

ACC-G009

population of Alaska is expanding is a good thing for the State of Alaska, nor is it a good thing for the people who like to recreate in the wilderness. As more people come in, the less wilderness there is to enjoy one's self in, and at the same time, the pressure on any of these withdrawals would increase, possibly mandating the military to close its boarders.

As I see it, in particular, the Ft. Greely west area is important for our Cope Thunder Air Force and the MOAs, but the MOAs cover only a very small military withdrawal. Airspace is one thing, but securing topography is an entirely different thing.

And we see this again as an example in — in Ft. Greely west withdrawal, where there are several lakes and several areas that are tremendous for recreation and hunting that are within the withdrawal that really shouldn't be.

That withdrawal extends so far to the west, and I'm sorry we don't have a map to show it here to describe it, but they have a line drawn across, for example, a **ALT-G010:** Noted. The Army's selection of a 50-year renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A credible operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources to protect resource values and implement natural resource management measures.

ACC-G009: A legal boundary description and property history for Fort Greely are in Appendix 1.A of the Draft Environmental Impact Statement. The legal boundary was published in the Federal Register. A legal description of the lands withdrawn, and maps showing the boundaries of these lands, were filed with the Committee on Energy and Natural Resources of the United States Senate and the Committee on Interior and Insular Affairs of the United States House of Representatives. The northwest boundary of Fort Greely West Training Area does divide Koole Lake and South Koole Lake into Army withdrawal land and State property. The Army does not deny access to the lakes from the State side of the lakes or from the Winter Trail access to the lakes. Please refer to Chapter 4.16 and 4.17.

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little lake called Coo Lake that people like to go and fish in, and it bisects the lake. So on the north side is the state land, on the south side is the military land. They couldn't even follow the contour of the lake, allowing the people to recreate uninhibitedly on the

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entire lake.

These are things that should be looked at. And to pursue this withdrawal in the face of these conflicts for another 50 years flies in the face of good judgment and common sense. So these are basically the things that should be looked at.

And once again, I want to emphasize that we do need a certain amount of military withdrawal up here. They have been good neighbors, we want to continue to be good neighbors, but we want to look at this very, very closely, instead of just making a carte blanche withdrawal for the next 50 years based upon what has happened in the preceding 50 years. End of statement.

Oh, you might also mention in this, if you will, that I am the co-trustee of the Birch Lake town site. There's a federal trustee and there's a civilian trustee. One is in Anchorage. And this was set up during the period when the township was formed at the time when Birch Lake was sought after by the military. The entire eastern side of Birch Lake at one time was sought after by the military.

And so from personal experience, we know what can really happen. We prevailed, the civilian people who had property, even though it was not proven up on, it was kind of squatted on or homesteaded up on, they had the

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opportunity to buy their property after the town site was formed, which they did, and the town site exists today.

And there was funds put in this town site for not only improvement for the town site, but certain things that were required by the federal government to meet certain standards. There's still money in that fund, and this is why I'm the trustee there. There's a federal and another person who is a resident — not resident, but a property owner at the town site.

We're concerned because so many people from our little town site go over and recreate in these areas,

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plus the fact that we've had the experience of these supposed takeovers from the military. So we are sensitive to it. Second end of second statement.

> (Statement concluded at 7:47 p.m., January 6, 1999.) (No further statements were given on January 6, 1999.)

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REPORTER'S CERTIFICATE

I, CAROL A. McCUE, RMR, hereby certify: That I am a Registered Merit Reporter for Heartland Court Reporters and Notary Public for the State of Alaska; that the foregoing proceedings, the various statements, taken January 6, 1999, were written by me in computerized machine shorthand and thereafter transcribed under my direction; that the transcript constitutes a full, true and correct record of said proceedings taken on the date and time indicated therein;

Further, that I am a disinterested person to said action.

IN WITNESS WHEREOF, I have hereunto subscribed my hand and affixed my official seal this _____ day of , 1999.

CAROL A. McCUE, RMR Registered Merit Reporter Heartland Court Reporters

My Commission Expires: February 15, 2002

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DAN O'NEILL 2590 HOME RUN FAIRBANKS, ALASKA 99709 PH. & FAX: 907/479-2988

January 6, 1999

TO WHOM IT MAY CONCERN:

The following comments are offered on the US Army's Alaska Army Lands Withdrawal renewal: Draft Legislative Environmental Impact Statement:

Retired Lieutenant Colonel Ed Sheehan gave written and oral comments on this topic for the record at several public meetings a year ago. Mr. Sheehan was the former Acting Post Commander and the former head of the Army's Northern Warfare Training Center. During his 38-year association with Ft. Greely, he had indirect authority over bombing range activities for 17 years.

Many of the comments Sheehan made were ignored completely in the LEIS. Others were not adequately addressed in the minimal and formulaic responses in the "Response/Reference" section of the LEIS (p. SCP-1). Generally, the response simply referenced a section of the report where generic EIS verbiage could be found. Sheehan's comments deal with serious issues presented by perhaps the person most qualified to comment on the Army's bombing activities. They require a straightforward, point-by-point response.

If Sheehan's comments are accurate, it seems unwise to extend the military's occupation of this public land for next half century. Obviously, if this EIS is to achieve any credibility, it must respond honestly to these comments:

- Is it true as Sheehan says that "there's been more destruction in the past 15 years than has been done in the history of that land, rivers, or what have you. I can bring you around, anybody can bring you around and show you this. Mass destruction, needless destruction....And most of it is done with total disregard of existing EIS's..."? (LEIS p. SCP-81)
- Is it true, as Sheehan says, that there have been "all manner of live fire blunders including numerous violation of Ft. Greely environmental statement..."? (LEIS p. SCP-83)
- 3. Is it true as Sheehan says that there are safety problems in the Delta River Impact Area when airplanes use laser-equipped ordnance: "I would like to have anyone show me how the Army...or the Air Force...can fire a laser from an aerial platform while flying or shooting north-south or south-north, and still meet DOD safety requirements. It can't be done"? (LEIS p. SCP-84)
- 4. Is it true as Sheehan says that these lasers can create a public safety problem due to "refraction and reflection, and ricochet problems with tungsten carbide cores and spent uranium cores, you have to be very, very careful to keep that stuff on post. And you all know as I know that

RESPONSES TO COMMENT H

USE-H017

USE-H018

USE-H015: The destruction on the ranges has occurred at the same rate and it is cumulative. Approximately four years ago, the Army adopted a four part approach to reversing the destruction. The program is called Integrated Training Area Management (ITAM). Scientific data is collected on the extent of the damage, mitigation measures are implemented, training schedules are modified, and troops are educated on maneuver damage avoidance. (See Appendix 2.D for a detailed discussion of the ITAM program.)

USE-H016: Inherent to military training and testing is the possibility of munitions misfires and malfunctions. Rules and regulations exist to remove ordnance which lands outside approved Impact Areas. The Army is unaware of any "violations of the Fort Greely environmental statement" to which the commentor refers. The Army is subject to all applicable environmental laws and regulations.

USE-H017 and **H018**: Laser employment is only conducted on approved targets. Each target has been evaluated for laser use in accordance with Department of Defense health and safety standards. Approval is based on despecularized conditions, which means no reflective materials on the target or within 2,000 feet of the target. Reflection occurs only in areas of standing water (mirror-like pools), but the energy is reflected back into the air at the same angle that it hits the water. Due to absorption and divergence, the reflected beam poses no threat to airborne individuals. The only threat would be to individuals looking directly into the main beam. All individuals within 2,000 feet of the targets utilize protective eyewear so there is no threat from lasers. All military training is restricted when caribou or bison are present on the ranges.

Army range policy does not allow Depleted Uranium for general use on Impact Areas. It is only authorized under a special use permit.

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	H		USE-H019: The
	you can lase and blind animals and blind people if it's not being done right and you can do it at tremendous distances"? (LEIS p. SCP-84)		complex used to c fragments, debris,
5.	Is it true as Sheehan says that the Ft Wainwright Yukon Training Area lacks "the terrain required by regulation to keep fired munitions and laser beams within prescribed impact areas, boundaries and on post"? (LEIS p. SCP-45)	USE-H019	Impact Area is the ammunition, and e fire weapon system weapon system In
6.	Is it true that the military is, in effect, expanding the bombing areas because it has labeled The Lakes area as a bombing area though Sheehan says "It is not now and never has been a bombing areaI drew those boundaries. I know what's supposed to be done there"? (LEIS p.	USE-H020	Point or to a posi appropriate Depar
7.	SCF-80) Is the military's record keeping of bombing activities so lax that it can be characterized as, in Sheehan's words, "continued, uncontrolled contamination"? (LEIS p. SCP-58)	USE-H021	change the use of Michigan Lakes Im for limited periods
8.	Is it true as Sheehan says that "there are more duds in the Delta River than there are in Oklahoma Range. And I'm telling you that in all of the 60's and early 70's, the Air Force used Oklahoma as much as they are using it right nowand they didn't pick up the duds before they left"? (LEIS n SCP-86)	USE-H022	which are cleared firing. This use of renewal.
9.	Does the military intentionally drop bombs right in the water of the Delta River? Does it also drop bombs right in Delta Creek? Does the military realize that its own LEIS defines these explosive residues—not to mention the more-than-residual compounds found in duds—as a pollution that no how the hardwise creation unterpreted to the term in	USE-H023	USE-H021: Non- statistics. Records regulations. U.S. A use at Fort Wainw
	realize that the most important chum spawning grounds in the Tanana watershed is around the mouths of these two streams?	FISH-H004	USE-H022: Rout Creek and Oklahor
10.	Is it true, as I understand Mr. Sheehan to say, that the military issued bogus clean-up documents: "This dud picking up business started about '82. Before that, they used to send statements, certificates that said there were no duds or all duds were cleaned up? Does it also drop bombs right in Little Delta River? (LEIS p. SCP-86)	USE-H024	ordnance and inert tactical targets. Th access ways are operations are con
11.	How many duds of what description fall into these various impact areas annually? Does the military keep records of each bomb, rocket or missile that does not explode? If not why not?	USE-H025	A discussion of the
12.	If it does not keep these records, and if it refuses to do so, can it say what percentage of each type of ordnance is statistically predicted to be a dud based on a reliability ratio for each type of ordnance? If not, why not?	USE-H026	USE-H023: Air F flowing water along Oklahoma/Delta C
13.	The military claims that, on average, one-fifth of the impact areas are "cleared each year of live ordnance." On what basis is the claim made that the ranges are "cleared of live ordnance"? How many duds of what type are actually collected each year? How does this number compare with the actual or predicted number of duds? Isn't it true that as	USE-H027	program to gathe program for physic contamination mig
	Sheehan says, "you can never clean up the Delta River, which is one of the big impact areas, and you can never clean up the Little Delta Creek"? (LEIS p. SCP-24)	USE-H028	FISH-H004: Plea the present time no
14.	With respect to unexploded bombs and rockets, what are the chances that the military will ever tell the public how seriously its activities are likely to contaminate the public's land? And isn't that what this	USE-H029	affecting critical sa if contaminants oc
	environmental impact statement is supposed to do?		USE-H024: Curre documented. The

Impact Area is the ground and associated airspace within the training contain fired or launched ammunition and explosives and the resulting and components from various weapon systems. A weapon system area within the surface danger zone used to contain fired, or launched xplosives and the resulting fragments, debris, and components. Indirect n Impact Areas include probable error for range and deflection. Direct fire npact Areas encompass the total surface danger zone from the Firing ition downrange representing the maximum distance (AR350-2) and tment of Defense Range Safety Regulations.

LEIS is not proposing to create new Impact Areas on Fort Greely or f existing Impact Areas. The Kansas, Arizona, Nevada, Oregon, and pact Areas (see Figure 2.c) are designated as Impact Areas. All are used and are normally used for non-dud producing ammunition or explosives. and returned to other training support purposes following termination of the Lakes Impact Areas will continue through the proposed withdrawal

dud ammunition records are kept for an indefinite period with other range s on dud-producing expenditures are kept permanently per military rmy Alaska recognizes the inconsistencies in its record keeping on range right and will correct that situation.

- ine decontamination operations are conducted each year on the Stuart ma/Delta Creek Impact Areas by the Air Force. Each year, all unexploded residue are cleared to a radius of 1,000 feet from each of the Air Force's e access ways into the tactical targets and 100 feet on either side of the also cleared each year. The Air Force's routine decontamination ducted on the Army's Impact Areas they utilize for training.
- e existing and proposed mitigation efforts can be found in Chapter 4.23.

orce target arrays are placed on gravel bars no less than 50 feet from the Delta Creek stream corridor. Army targets are also located within the creek Impact Area and the Mississippi and Washington Impact Areas, Delta River flows. The Army's proposed mitigation would implement a r baseline data to develop a long-term monitoring and remediation sical resources (see Chapter 4.23). An investigation of potential ration routes is also included within this program.

ase refer to proposed mitigation in Chapter 4.23 concerning pollution. At o State or Federal agency has expressed concern about military actions Imon habitat. Through the proposed mitigation, the Army will be studying cur from military activity.

ent decontamination efforts on the withdrawal lands by the Air Force are Air Force completes a form indicating the type, amount, or weight of the live ordnance and munition residue it removes from the Impact Areas. Appendix 2.C

for Sting

contains a compilation of the decontamination reports filed by the Air Force since 1986 on its decontamination efforts of the Stuart Creek and Oklahoma/Delta Creek Impact Areas.

USE-H025 and **H026**: Based on the live ordnance the military uses on Alaskan ranges, the dud rate would not exceed 5%. Records on dud-producing munition expenditures are kept permanently per military regulations.

USE-H027: Current decontamination efforts on the withdrawal lands by the Air Force are documented. The Air Force completes a form indicating the type, amount, or weight of the live ordnance and munition residue it removes from the Impact Areas. Appendix 2.C contains a compilation of the decontamination reports filed by the Air Force since 1986 on its decontamination efforts of the Stuart Creek and Oklahoma/ Delta Creek Impact Areas.

USE-H028: Current, on-going decontamination efforts by the military are described in the response to POL- A002.

Cost and lack of unexploded ordnance characterization and excavation technologies are two major impediments to efficient and effective clearance of unexploded ordnance. As technologies improve, the effectiveness of remediation should increase and the time, cost, and environmental impacts for remediation should decrease.

USE-H029: This LEIS discloses all known impacts from the military's use of the withdrawal lands. Additional data needs to be collected to more completely assess the military's impacts on the environment. Chapter 4.23 discusses the proposed data collection and monitoring programs which will be implemented if the withdrawals are renewed. These programs will provide U.S. Army Alaska the scientific data to determine the extent of damage and formulate mitigation measures to reverse and prevent further environmental damage. This data is a critical component for the Army's Integrated Training Area Management Program (see Appendix 2.D for a detailed discussion of the ITAM program).

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U.S. ARMY ALASKA LANDS WITHDRAWAL RENEW ENVIRONMENTAL IMPACT STATEMENT
COMMENT SHEET
DATE: 1/6/99 COMMENTOR'S NAME: Dennis Schlotfeidt
COMMENTOR'S ADDRESS: Box 71752 Fairbartes AK 99707
COMMENTOR REPRESENTING: SELF: \times Organization
ORGANIZATION NAME:
ADDRESS:
COMMENTS: Great Presentation - I Strongly Suppo,

Strongly Jupport Continued Mulitary withdrawal BUT I think who ever hurster the section on Subsistance SUB-1005 fails to mention under the passibility of lander going to the state that access would increase along linth other builting. I think the authors bias that control by BLM would my be an improvement and control by the state only a decreate demonstrate a lock of Knowledge of the reality and an obvectoriation political bies towards Falleralism, I dou't that aloskens appreciate the 'Spin'

1

RESPONSES TO COMMENT I

SUB-I005: Chapter 4.20 did not clearly state that access for subsistence users would improve under State as well as Bureau of Land Management control. The wording has been changed accordingly.

U.S. ARMY ALASKA LANDS WITHDRAWAL RENEWAL ENVIRONMENTAL IMPACT STATEMENT

J

COMMENT SHEET

DATE: 1-6-99 COMMENTOR'S NAME: COMMENTOR'S ADDRESS: 99701 ORGANIZATION: COMMENTOR REPRESENTING: SELF **ORGANIZATION** NAME: ADDRESS: agn COMMENTS: ACC-J010 NM. h

RESPONSES TO COMMENT J

ACC-J010: Temporary closures can occur due to military activity. Temporary and permanent closures of roads or trails may occur to meet resource management objectives. Several planned resource management projects will improve trails. U.S. Army Alaska does not have plans to close any of the existing roads on Fort Wainwright Yukon Training Area or Fort Greely.

7

K	
U.S. ARMY ALASKA LANDS WITHDRAWAL RENEWAL ENVIRONMENTAL IMPACT STATEMENT	
COMMENT SHEET	
date:_1/6/99 commentor's name:TODD_BOYCE	
COMMENTOR'S ADDRESS:	
NORTH POLE, AK 99705	
/	
COMMENTOR REPRESENTING: SELF: \mathcal{V} ORGANIZATION:	
ORGANIZATION NAME:	
ADDRESS:	
COMMENTS:	
exclude the Beaver Creek area from the	
venewal. This area should be incorporated	
into the Chang Ruer State Recreation Area. In	ALT-KO11
this regard, it is not acceptable to lock up this	
avea for the next 50 years. The military	/
should slightly shift their bombing area to the	
an alternate site to allow this area to sately	/
become usable to the public.	

RESPONSES TO COMMENT K

ALT-K011: Noted. Please refer to Chapter 2.3.3 for a discussion of the importance of this area's training infrastructure in achieving combat readiness and the excessive impacts to military training with the loss of the Beaver Creek-South Fork area. Loss of the Beaver Creek-South Fork Area would severely hamper the use of northern target formations, which would reduce the effectiveness of military training by affecting the military's ability "to conduct realistic combat training. This ultimately degrades the combat capability of military units in Alaska. Due to the excessive impacts to military training and the importance of this area's training infrastructure in achieving combat readiness, the Army and Air Force eliminated this alternative from further study.

U.S. ARMY ALASKA LANDS WITHDRAWAL RENEWAL **ENVIRONMENTAL IMPACT STATEMENT**

L

COMMENT SHEET

DATE: 6 JAN 99

COMMENTOR'S NAME: JOHN & KARISH

COMMENTOR'S ADDRESS: P.O. Box 56628

NORTH POLE, AIL 99705

SELF: COMMENTOR REPRESENTING:

ORGANIZATION:

ORGANIZATION NAME:

of

ADDRESS:

ALASKA AND the U.S.

COMMENTS: A WEIL PREVACED PRESENTATION. I FIRMLY BELIEVE THE CONTINUED USE OF This RELATIVELY SMALL ALT-LO12: Noted. TRAINING IS VITAL TO THE CITIZENS ALT-LO12 ALT-LO12: Noted. Thank you for your comments.

RESPONSES TO COMMENT L

9-39

Μ

ALASKA ARMY LANDS WITHDRAWAL PUBLIC SCOPING MEETING OPEN HOUSE

Thursday, January 7, 1999 2:00 p.m. to 8:00 p.m. Volume 1 of 1

Proceedings Held at Egan Center Board Room 555 West Fifth Avenue Anchorage, Alaska

Reported by: Deirdre J.F. Radcliffe, Verbatim Shorthand Reporter

MIDNIGHT SUN COURT REPORTERS (907) 258-7100

2

PROCEEDINGS (First statement convened at 3:06 p.m.) PAMELA MILLER: I'm Pamela K. Miller, and I'm a biologist and program director of Alaska Community Action on Toxics, which is a nonprofit organization dedicated to protecting environmental and human health from the toxic impacts of contaminants, and I'd just like to register some oral comments today, and I'll be submitting more detailed written comments by the comment deadline.

But I want to say I have a very fundamental concern about the extension of the withdrawal for the continued use of these training areas by the military for bombing and other training activities involving artillery, primarily because there has been no ecological assessment of the impacts of past and present testing on those ranges, and I'm concerned not only about the safety hazards

RESPONSES TO COMMENT M

POL-M007 POL-M007: Please refer to responses for POL-A001 and POL-A002. Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources as outlined in Chapter 4.23.

G

¹ to humans but also the chronic and cumulative

long-term impacts of the toxicological hazards

associated with the munitions testing and the potential contamination of surface and groundwater.

And my opinion about this is that the

military should not be allowed continued use of these

lands until a comprehensive assessment has been done

MIDNIGHT SUN COURT REPORTERS (907) 258-7100

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to determine what the impacts have been, major extent of the contamination that exists on the land, and the potential migration of contaminants into surface groundwater and into other potential exposure pathways, including wildlife and humans. So I guess that's all I'd like to say right now. I will be submitting written comments. (Statement concluded at 3:08 p.m.)

MIDNIGHT SUN COURT REPORTERS (907) 258-7100

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CERTIFICATE

I, DEIRDRE J.F. RADCLIFFE, Verbatim Shorthand Reporter and Notary Public in and for the State of Alaska, do hereby certify:

That the foregoing proceedings were taken before me at the time and place herein set forth; that the proceedings were reported stenographically by me and later transcribed under my direction by computer transcription; that the foregoing is a true record of the proceedings taken at that time; and that I am not

a party to nor have I any interest in the outcome of the action herein contained.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal this day of , 1999.

DEIRDRE J.F. RADCLIFFE Notary Public for Alaska My Commission Expires: 5-19-02

9-42

U.S. ARMY ALASKA LANDS WITHDRAWAL RENEWAL ENVIRONMENTAL IMPACT STATEMENT

Ν

COMMENT SHEET

DATE: 1/7/99

COMMENTOR'S NAME: Jack &. McCombs

COMMENTOR'S ADDRESS: P.O. Box 71128

Fair banks, AK 99707

COMMENTOR REPRESENTING: SELF: # ORGANIZATION:

ORGANIZATION NAME:

ADDRESS:

COMMENTS:

- 1) 50 Year renewal far too long a period of withdrawal. Things change rapidly in the world and there is every likelihood that Ft. Wainwright will not even exist in 50 years, and if it wasn't for Sen. Stevens, probably wouldn't exist even now. TEN YEARS MAX.
- 2) Public access must be maintained to the old Johnson trail (Johnson rdad, newly developed and named Brigadier boad, etc.) to the upper Salcha River valley. Originally a tractor trail established in the 1930's to support mining activities in the upper Salcha river valley, its use has expanded in the last 25 years or so as increased numbers of persons have become dependent upon these roads/trails to access their homes/ cabins/ traplines/mines during seasonal transitions and during emergencies.

RESPONSES TO COMMENT N

ALT-N013: Noted. The Army's selection of a 50-year renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A credible operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources to protect resource values and implement natural resource management measures.

ACC-N011: The Army would not permanently close Brigadier Road if it retained the Yukon Training Area. The road could be closed temporarily due to military activity within the training areas and for activities in the Stuart Creek Impact Area where the road crosses the Buffer Zone.

U.S. ARMY ALASKA LANDS WITHDRAWAL RENEWAL ENVIRONMENTAL IMPACT STATEMENT

COMMENT SHEET

DATE: COMMENTOR'S NAME: COMMENTOR'S ADDRESS

ORGANIZATION:

COMMENTOR REPRESENTING: SELF:

ADDRESS:

ORGANIZATION

NAME:

COMMENTS Q,H 0x1essive remon Mener R Surrenderes resource contrib. Barris conor. When pomilo OWNERS RALLERS State NOT The (aulitary) are woo altorion

ALT-0014

ALT-0015

RESPONSES TO COMMENT O

ALT-O014: Noted. The Army's selection of a 50-year renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A credible operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources to protect resource values and implement natural resource management measures.

ALT-0015: Army and Air Force needs require renewal of the existing withdrawals in their entirety. Please see Chapter 2.3 for a discussion of the alternatives eliminated from consideration in this withdrawal renewal action, which includes the reasons for their elimination.

Ρ

ALASKA TRAPPERS ASSOCIATION P.O. Box 82177 Fairbanks, Alaska 99708

January 14, 1999

Ms. Cindy Herdrich Center for Ecological Management of Military Lands Vocational Education Building Colorado State University Fort Collins, CO 80523

Re: Draft Legislative EIS - Alaska Army Lands Withdrawal Renewal

Dear Ms. Herdrich:

Thank you for the opportunity to comment on the EIS and your process for presenting it to the public. Our non-profit group was established more than 25 years ago. We have just over 1000 members and represent trappers across Alaska. We strive, through various activities and programs, to ensure that furbearers, trapping and trappers are treated fairly.

We have some general comments about process and presentation as well as some more specific ones about the impacted furbearer resources and trapping.

1. We were very disappointed to find out the meeting in Fairbanks on January 6 that was widely billed as a public hearing, was actually nothing more than a public relations exercise by **OTH-P007** the military and your organization. We often deal with bureaucracies pushing unpopular activities and plans, so we are aware that agency personnel are trained to use the "open house tactic" to deflect criticism. But there are times when public hearings are appropriate. When your monitor at the doorway encouraged us to sign in for the "public hearing," we believe you should actually hold a public hearing and take testimony.

2. It is unrealistic to summarily dismiss other obviously workable and publicly popular (though perhaps not as palatable to the military) alternatives. To suggest that the only options are no withdrawal or withdrawal for 50 years is disingenuous at best. A more reasonable approach is to discuss other, shorter time frames. We suggest that a 10 year withdrawal is far more appropriate considering the dynamics of military training requirements and the general land management situation.

3. It is also obvious that the military should consider relinquishing the many areas it does not actually use. The tactic of claiming that the areas are all too contaminated and it is impossible **ALT-P017** to clean them up or certify them as clean, is just too transparent to be used anymore.

4. Our reluctance to endorse a withdrawal of a longer duration is based on our extensive

RESPONSES TO COMMENT P

OTH-P007: The advertisements in the *Fairbanks News Miner, Anchorage Daily News*, and the *Delta Wind* newspapers announced Public Meetings the first week in January to obtain comments on the Draft LEIS. The ad further explained the meetings will be conducted as Open Houses to give the public the opportunity to meet with representatives on an individual basis. The dates with the locations clearly stated Open House with a time period from 2-8:00 p.m.

During the scoping process, both Open Houses and Public Hearings were held to obtain testimony. The positive feedback from individuals participating in the Scoping Open Houses led the Army to utilize an Open House meeting format to obtain comments on the Draft LEIS. In addition, the Open House format allowed a six hour time period during which the public could provide comments. During Public Hearings, individuals are usually limited to the amount of time they can speak. The Open House meeting format did not limit the amount of time an individual spent addressing their concerns or comments with the representatives present. In addition, U.S. Army Alaska provided a court reporter at each Open House for the six hour duration to record the testimony of those attending.

All individuals attending the Open Houses were asked to sign a log so their names and addresses could be added to the distribution list to receive a copy of the Final LEIS.

ALT-P016: Noted. The Army's selection of a 50-year renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A creditable operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources to protect resource values and implement natural resource management measures.

ALT-P017: Please see Chapter 2 for discussions on Military Operational Parameters and the military's use of the withdrawal lands.

Contaminated areas on the withdrawal lands are those used as Ranges or Impact Areas. The level of necessary decontamination efforts determines its cost. In addition, extensive decontamination efforts impose significant impacts on the environment. Total decontamination efforts must be weighed against the feasibility of incurring a tremendous cost, both monetarily and environmentally.

ALT-P016

experience with the impacts of military control on our user group. With continued military control comes a dizzying array of confusing and discriminatory regulations. For example, trappers are required to attend a military orientation and safety course, sign liability waivers, and call in to the MP station before entering the lands to trap. Meanwhile, any number of recreational snowmachiners, dogmushers, ATV's, etc use the areas without restriction or requirements.

5. Though a minor point, we found it disconcerting when we visited the Open House, to find the Wildlife Station adorned with a photograph of a coastal brown bear. Don't your wildlife "experts" know that these bears are not found anywhere in the area being considered?

6. Trapping and furbearers are dealt in a disappointingly superficial way. To not deal with these subjects in depth is irresponsible and makes other sections of the EIS suspect.

Trapping is the primary civilian use of these areas for 5 to 6 months of every year. This fact alone would indicate that the subject deserves a more complete discussion. You cannot evaluate impacts on this activity by simply ignoring it. As far as we could tell, no impacts to furbearers (under either alternative) were discussed at all.

7. At the Open House in Fairbanks, our representative pointed out this failing to the lady at the Wildlife Station. She at first claimed that only ADFG managed furbearers and trapping and that no data was available. When we informed her that we knew that the military was requiring trappers to fill out harvest reports, she then said that the military had not furnished any such information and that she "did not have time to look for it."

We would submit that much more appropriate and detailed information and data are available. Just because one of your employees finds it difficult to locate does not give you license to ignore it in your EIS.

In short, we feel that the "fix is in" for a 50 year withdrawal and that nothing the public says will change anyone's mind; the EIS as submitted is just fulfilling a legal requirement. The EIS does not deal responsibly or adequately with the furbearer resource. Finally, you should seriously consider the option of renewing the withdrawal for a more reasonable period of time. We suggest 10 years.

Thank you for the opportunity to comment.

Very truly yours,

Pete Buist President

REC-P003: The following is required to trap on the withdrawn lands.

A. Register your trap line.

REC-P004

B. Receive a Hunting, Trapping, and Fishing card from the Army. This requires filling out a form and signing a safety waiver stating that you will be aware of the military regulations. A supplement copy of the regulations is provided to trappers at the desk and a permanent copy is also available.

- C. Place signs at the start of your trap lines.
- D. Call in and out when entering and leaving Army lands.
- E. Fill out a harvest report at the end of the season.

These requirements do not appear to be extreme, confusing, or discriminatory. These requirements are basically the same for all hunters. Black bear baiters also must register bait stands, mark the area with a sign, and send in an additional harvest report for spring black bears.

REC-P004: No one representing the Alaska Trappers Association attended the scoping meetings, nor did anyone contact us with concerns about trapping on withdrawal lands. The trapping information given in the DLEIS is very brief. At the time the DLEIS was being written, the harvest reports for the posts were not available. Because the Army would not significantly change its regulations on trapping and since concerns were not raised during scoping, minimal discussion of trapping was included in the Draft LEIS. The public expressed concern about sensitive wildlife habitat and therefore more time was given to this topic to cover this significant issue. Please review Chapter 3.17.2 for trapping harvest numbers for Fort Wainwright. Harvest numbers are not available for Fort Greely.

Alaska Army Land Withdrawal Comment/Conserns Submittals

Q

Monday, 25 January 1999

Name:	Bill Barron	
Orginization:		
Address:	Box 59	
	Detta Junction, AK 99737	
Comment:	My family and I are opposed to any lease extension for the Fort Greely West / Yukon Training Area.	ALT-Q018
	During the summer of 1998 there was a wildfire in that area. Military authorities did not permit firefighters to enter the ranges because of the danger. As a result the fire grew out of control and threatened to jump the river and destroy Delta Junction. This fire destroyed thousands of acres of land.	FIRE-Q003
	Secondly, the Fort Greely ranges are not secure and are open to the public. If the area is so dangerous, then why is not completely secured ?	ACC-Q012
	Finally, the troop convoys on the road from Fairbanks create hazardous traffic situations both in the winter and in summer. The Richardson Highway is in poor condition and dangerous in the winter. The recreational vehicles in the summer are numerous and add to the problem.	OTH-Q008
	Please do what is necessary to restore these ranges to the way they were before the army destroyed them.	

Thanks

RESPONSES TO COMMENT Q

ALT-Q018: Noted. Thank you for your comments.

FIRE-Q003: Firefighters were removed from the military land during the 1998 Carla Lake fire due to ordnance being found in the fire area. An air attack was continued. While removal of ground personnel may have contributed to the fire escaping military lands on May 27th, it cannot be known for certain. The events of June 8th show that given an almost identical situation in terms of containment and weather conditions, the ground-based attack on State of Alaska land, with 750 personnel assigned, also failed to contain the Carla Lake fire. The community of Delta Junction was never threatened by the fire (Dave Jandt, Fire Management Officer, Military Lands, Alaska Fire Service, 1999).

ACC-Q012: Army Regulation 385-63 requires marking range boundaries every 200 meters. A waiver for Fort Greely concerning this regulation is on file at the Directorate of Plans, Training, Security, and Mobilization at Fort Richardson. The cost of marking the Impact Areas every 200 meters is estimated to cost millions of dollars. Fort Greely Range Control announces temporary closures and areas that are off-limits permanently via weekly radio announcements Please review Figure 3.16.b for locations of access restriction signs and gates and Chapter 3.16 and 3.17 for more detailed information on area closures.

OTH-Q008: Movement of troops and vehicles occur between Fort Wainwright and Fort Greely. Large convoys occur primarily during the military's major training exercises. Military use of Fort Greely will continue under the preferred alternative. Affects on convoys as a result of the BRAC action at Fort Greely are outside the scope of this withdrawal renewal action. Those affects should be addressed in the NEPA documents being prepared in accordance with BRAC.



January 23, 1999

Ms. Cindy Hirter Center for Ecological Management of Military Lands Vocational Education Building Colorado State University Fort Collins, CO 80523

Re: Alaska Army Lands Withdrawal Renewal, Draft Legislative Environmental Impact Statement (LEIS)

Dear Ms. Hirter,

The Alaska Miners Association appreciates the opportunity to review and comment on the proposal to extend existing withdrawal of about 871,500 acres of public land in Alaska for military purposes as outlined in the referenced LEIS. The LEIS proposes to extend the existing withdrawals that expire November 6, 2001 for a period of 50 years, or November 6, 2051.

The Alaska Miners Association appreciates and supports the Military role in Alaska. However, **ALT-R019** we have several concerns about both the length of the proposed withdrawal and the lack of any reasonable consideration of mineral values of the withdrawn land.

Length of the Proposed Withdrawal

The LEIS notes that the State of Alaska also has valid state selections for recreation, minerals, wildlife, forestry, agriculture, and settlement values on these lands. The LEIS did not consider (1) changing nature of the Army and its potential need for these lands, and (2) the impact of delaying for 50 years the State of Alaska's opportunity to fulfill its Congressional entitlements under a variety of Federal Laws.

Our specific concerns are directed to the mineralized land that are outside the "High Hazard Impact Area" and the "Impact Area Buffer Zone" shown in Figures 2.b through 2.e when compared to geology and minerals shown in Figures 3.4.a and .b and 3.5.a through 3.5.c.

The LEIS seems to premise the recommended 50-year extended withdrawal period for the of these public lands simply on the basis that the land has been withdrawn for about 50 years. There is no analysis about how the role of U.S. Military has changed in the past 50 years or on how it is projected to change by 2051. Based on the changes in even the last 10 to 15 years in Alaska, it is entirely plausible that new weapons, communication and guidance systems and a smaller, more specialized military force would no longer need the entire 871,500 acres in the near future. To extend the closures for 50 years without an effective evaluation of these two issues, (1) and (2) above, would make the LEIS defective and would be arbitrary and capricious.

RESPONSES TO COMMENT R

ALT-R019: Noted. Thank you for your comments.

ALT-R020: Refer to Chapters 1.2 and 2.1.3 for a discussion of the military's continuing need for the withdrawal lands.

The State of Alaska has top-filed on the military withdrawal lands; these top filings are not valid State selections. For comparison analysis in this LEIS, it was assumed the lands would be adjudicated to the State under the No Action Alternative. It is impossible to predict the likelihood these lands would be adjudicated to the State. At this time, the withdrawal lands top filings are not designated high priority selections by the State. However, the State updates its conveyance priorities annually, so the selection status could change.

ALT-R021: The trend in warfare has moved toward a highly mobile air and ground force supported by massive firepower capable of attacking over much wider and deeper areas. The increased range, speed, and firepower inherent in combat units equipped with modern weapon systems have increased the need for larger training areas. See also Military Operational Parameters, Chapter 2.1.1.

The Army's selection of a 50-year renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A credible operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources to protect resource values and implement natural resource management measures.

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Recommendation: The period for withdrawal should not exceed a period of ten (10) years, or no longer than November 6, 2011. This will require the federal government to reevaluate the role of the Military in Alaska and how these withdrawals fit. It will also allow the State of Alaska to reevaluate its outstanding land entitlements to see if it still wishes to get title to all or parts of the existing withdrawal.

Minerals Alternative

P.L. 96-606 provides for mineral prospecting and mineral extraction of large portions of many military bases. In our comments to the Bureau of Land Management Military Withdrawals Planning Team on February 14, 1994 we noted "Many...bases, like Fort Wainwright, are used, in some areas, for maneuvers and live ammunition firing. The two activities, military training and mining, can with forethought and planning take place on the same or adjoining lands...." The LEIS considered and rejected Alternative 2.3.4 that would give the Bureau of Land Management the exclusive authority, *without* military concurrence, to grant use of the withdrawn lands for mineral extraction under General Mining Laws, material sale, and mineral leasing laws. We agree that as long as there is a viable military mission requiring these land that non-military uses require input from the military. It is reasonable and responsible to eliminate that alternative from further consideration.

The LEIS shows there are significant areas within the 871,500 acres having suspected economic mineral values that are lightly used and are not associated with either the high hazard or buffer zones. Given this fact, there is clearly an unevaluated alternative that provides reasonable access to public land under the General Mining Laws, materials sale, and mineral leasing laws that must be given full and thoughtful consideration. We made this very observation to the to BLM in 1994. For this reason, the LEIS is defective in not considering a viable alternative that is now working successfully on other military bases and to do so is arbitrary and capricious.

Recommendation: We respectfully request that full consideration be given to an alternative having public land in a military withdrawal open to the operation of the General Mining Laws, materials sale, and mineral leasing laws in full consultation with the appropriate base commander having the responsibility of determining when there would be a conflict between the military mission and exploration and extraction of minerals. We are ready and willing to assist in developing such an arrangement and procedure. Minerals uses in the high hazard and buffer zones are likely not appropriate, but this should be evaluated to validate that fact.

The LEIS on page ES-7 argues that "mining activities, if not done carefully, can destroy habitat and affect water quality" is a reason why the existing military withdrawals should be extended for 50 years. The Alaska Miners Association strongly objects to the inference that mining under federal and state law and regulation would be done other than "carefully" when under the full requirements of both the Secretary of the Interior, Secretary of Defense and State of Alaska. The Alaska State reclamation law specifically to all lands in the state and this includes military lands. **The statement should be deleted from the final LEIS.**

ALT-R022 ALT-R022: Noted. See previous two responses.

ALT-R023 ALT-R023: Noted.

MIN-R003 MIN-R003: Please refer to Chapter 2.3.4 for a discussion of an alternative where the Bureau of Land Management would retain authorization for mineral extraction on the withdrawal lands.

ALT-R024: The statement "if not done carefully" was omitted from the Final LEIS. The commentor correctly states that mining is subject to stringent State and Federal environmental regulations, and the same point is made in the Draft LEIS (Chapter 4.5). Permits would not be issued for mining activities on any State or Federal lands without an assessment of potential impacts and mitigating measures.

ALT-R024 The analysis of the No Action Alternative describes potential impacts if Congress does not grant the withdrawal renewals. The discussion is not provided to support the withdrawal renewals, but to provide a comparison of potential impacts under each alternative.

R Federal Legislation to Extend the Existing Military Withdrawal

The Alaska Miners Association assumes that federal legislation will be proposed to implement the final LEIS. As discussed above, any federal legislation to extend the existing withdrawals should be not extend beyond the year 2011 and should contain a provision for shared decision making by Department of the Interior, Department of Defense and State of Alaska to provide reasonable access for mineral prospecting and mineral extraction when determined compatible with the primary military mission.

Several provisions unique to Alaska need to be considered in the legislation: (1) application of the General Mining Laws, mineral sale, and mineral leasing laws to certain areas, (2) completion of modern geologic and geophysical studies of the areas to evaluate the areas for mineral development that have been selected by the State of Alaska. These are discussed below:

Mineral Information

The LEIS indicates that the mineral values of the withdrawn lands are not known because the land has been withdrawn from location and entry under the federal mining laws since the 1950's. The methods used to locate mineral occurrences and evaluate their prospective economic values have changed as much as military weapons systems over the same period. The Fort Knox mine to the north and west of Fairbanks and the recent Pogo mineral property northeast of Delta Junction are two examples of new geologic models. These models did not exist even 15 years ago and today they are providing new jobs and economic opportunities to these communities where military facilities and activities are being reduced or eliminated. It is like comparing the technological ability of a Corsair to complete a mission with and A-10 or a Cobra gunship. The State of Alaska Geological and Geophysical Surveys has an excellent reputation for working cooperatively with a variety of Native Corporations, local entities, industry, and Bureau of Land Management to conduct airborne geophysical surveys that provide a threshold identification of potentially economic mineral deposits.

Recommendation: In addition to opening various lands to operation of the General Mining Laws, the LEIS and draft legislation should include recommendation for joint airborne geophysical surveys and associated on-the-ground technical evaluation of lands not opened. This would be done jointly during the next 6 years by the military, Bureau of Land Management, and Alaska Division of Geological and Geophysical Survey and would allow meaningful consideration of the mineral potential of the military lands not opened to operation of the General Mining Laws and prepare the military for the next review of the lands prior to expiration the then existing withdrawal.

State Selection and Federal Mining, Materials Sale, and Mineral Leasing Laws.

A valid State selection segregates the federal land selected from location and entry under the General Mining Laws, materials sale, and mineral leasing laws. Under Alaska mining law, a person may enter selected land and by posting and notice create a prospective future private mineral right. That future right is consummated only when two things happen: (1) The State receives title to the land from the federal government [such cannot occur until the military withdrawals expire or the area is no longer needed for military purposes and the withdrawal is

ALT-R024 cont.

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MIN-R004 MIN-R004: The LEIS (Chapter 4.5) also emphasizes the role of modern methods in locating important mineral deposits.

Conducting airborne geophysical surveys for mineral resource development is not a requirement for the military use of the withdrawal lands.

MIN-R005 MIN-R005: Please refer to the response to comment ALT-R020.

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removed] and (2) The land has not otherwise been closed to mineral entry under State law. Mineral properties located under this provision can be developed into operating mines only with specific approvals of both the State and Bureau of Land Management, and in this case the local base commander.

MIN-R005 cont.

The state selection, therefore, creates a dilemma that can only be solved in the federal legislation. There are at least two way that the federal legislation can resolve this dilemma:

(1) Explicitly recognize the existing provision of State mining law to create prospective future private mineral property right with Department of the Interior, base commander, and State of Alaska controlling the on-the-ground mineral activity with due deference to the Military mission, or

(2) Explicitly recognize the existing state selection but permit entry and mining operations under the General Mining Laws, mining, materials sale, and mineral leasing laws with a provision that the federal mining claims be converted to state mining claims automatically when the land is transferred to State ownership.

Conclusion

In conclusion, the Alaska Miners Association supports the Military mission in Alaska and many of our members are veterans of WW II, Korea, Viet Nam, Desert Storm, as well as other conflicts. We strongly believe that there is reasonable, compatible opportunity for mining activities to occur on some of the lands now proposed for withdrawal and we have addressed these above.

Attached is a copy of the most recent report on mining in Alaska which includes comments about the significance of the Fort Knox and Pogo projects. The available minerals information for the military lands suggests the strong possibility for Fort Knox and Pogo style mineral deposits may lie in the lands now being considered for continued withdrawals.

Please contact use if we can be assistance in clarifying our comments or in drafting federal legislation to implement an extension of the existing withdrawals that would not exceed 20 years.

Sincerely,

Steven C. Borell, P.E. Executive Director

enclosure - Alaska's Mineral Industry, 1997. Special Report 52 (only with letter to addressee)

cc: Senator Ted Stevens Senator Frank Murkowski Congressman Don Young Governor Tony Knowles DNR Commissioner John Shively



February 5, 1999

Ms. Cindy Herdrich Center for Ecological Management of Military Lands Vocational Education Building Colorado State University Fort Collins, CO 80523

Subject: Additional Comments on - Alaska Army Lands Withdrawal, Draft Legislative Environmental Impact Statement

Dear Ms Herdrich,

There are additional documents that should be considered as part of your evaluation of this Alaska Army Lands Withdrawal, Draft Legislative Environmental Impact Statement (DEIS) and some analysis of the mineral potential of the subject areas that need to be considered in your evaluation of this withdrawal.

Past Army Planning Documents and Promises

The two additional documents that must be considered and our comments on these documents and the promises made in them are as follows:

Document1: Proposed Resource Management Plan for the Fort Greely Maneuver Area and Fort Greely Air Drop Zone, Final Environmental Impact Statement. Dated 1994. This document was developed by the Department of the Interior, Bureau of Land Management, Steese-White Mountains District and the U.S. Army 6th Infantry Division (Light).

On page 17 this document contains the following statement (our bold for emphasis) regarding mineral resources:

"Proposed Action 22 The withdrawal area will remain closed to the operation of the Mining Law of 1872, the mineral Leasing Act of 1920 as amended, the Mineral Leasing Act for Acquired Lands of 1947, and the Geothermal Steam Act of 1970. Pursuant to Sec. 12(a) of the Military Lands Withdrawal Act, the Army and BLM, by 1996 and at least every five years thereafter, will jointly reconsider whether it would be appropriate to open portions of the withdrawal to the operation of the mineral laws."

On page 56 this commitment to joint review and evaluation is repeated: "...reexamine what areas may be suitable for opening by 1996 and at least every five years thereafter." This management plan also states that no consideration was given to lode mining or coal development. This means that some of the most important mineral projects in Alaska were not considered in the Army/BLM joint findings. One example is the Pogo Project located about 35 miles northeast of Delta Junction. With an estimated resource of more than 5.2 million ounces of gold, Pogo is now the highest priority exploration target area in North America and the surrounding lands are nearly all covered with state mining claims. This has all occurred over the past 5 years. Regarding coal, in 1994 the State of Alaska held a competitive coal lease

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sale in the Jarvis Creek Coal Field to the south of Delta Junction. Given the mineral endowment of the area and the tremendous interest by mineral companies it is crucial that lode minerals and coal be evaluated in all planning and the Final LEIS.

Document 2: Proposed Resource Management Plan for the Fort Wainwright, Yukon Maneuver Area, Final Environmental Impact Statement. Dated 1994. This document was developed by the Department of the Interior, Bureau of Land Management, Steese-White Mountains District and the U.S. Army 6th Infantry Division (Light).

Pages 16 and 46 of this Fort Wainwright 1994 document repeats the statements the Fort Greely document referenced above regarding joint Army/BLM evaluation of the minerals every five years.

The Fort Knox Mine is near Fort Wainwright and the lands being considered in the EIS are prospective for the same type of mineral deposit found at Fort Knox. Fort Knox is one of the largest gold mines in the U.S. and is producing at a rate of 400,000 ounces per year while providing more than 250 skilled, permanent, year-around jobs. These jobs are extremely important, especially considering the recent and on-going reductions in the military activity in Alaska. There are also numerous adjacent mineral properties such as True North and these were also evidently ignored in the joint Army/BLM finding.

The Final LEIS should: 1) include a complete evaluation of the mineral potential of the lands inside the two military withdrawals; 2) evaluate and discuss the findings regarding mineral development compatibility with Army uses as promised in these documents; 3) specifically show the rationale used by Army/BLM and the extent that mineral exploration and production were or were not compatible with military use inside and outside the hazard/buffer areas shown in the 1998 LEIS; 4) present and discuss how the mineral compatible finding commitment will be completed for the five-year period 1996-2001; 5) fully justify the change from a joint 5 year evaluation to the 50 year closure being proposed; and 6) as discussed below the adverse impacts to mineral lands outside the withdrawals where access would likely be through the withdrawal.

Finally, will the 1996-2001 minerals reconsideration be available for consideration prior to the introduction of legislation to extend the existing withdrawals, and if not, why? Given the inconsistencies between the current proposed 50 year withdrawal and past promises of joint Army/BLM evaluation every five years, to not fully evaluate the mineral potential and address the other related issues would be arbitrary and capricious and constitute a fatal flaw for the Final LEIS.

Analysis of Mineral Potential

Alaska exploration geologist Tom Bundtzen, of Pacific Rim Geological Consulting, talked at length with one of the Army's consultants Carol Klein about mineral resource potential during the fall of 1997. He provided her with a run-down of the geology and resource potential of the areas now being proposed for withdrawal and supplied references, maps, and a list of other experts that she could contact. Mr. Bundtzen provided me with additional comments on the minerals discussion in the Draft LEIS which I summarize below.

1. Given the recent discoveries of the Pogo, Fort Knox, and many other granite-hosted gold-polymetallic deposits in the Yukon-Tanana Upland, the mineral industry will be very interested in exploring the Eielson Pluton and other plutonic bodies in both the Wainwright and Greely withdrawn areas. This is especially the case for the Fort Wainwright-Yukon Training area, if it was open to mineral entry. The statement that appears on page 3-16 "The geochemistry of the Eielson Pluton is not considered favorable for gold deposits" is based on an iron oxide fugacity/alkaline ratio, which has been used by some to predict gold favorability. However, negative geochemical results would not deter modern exploration from looking

MIN-R021: The publication provided by Alaska Miners Association provides details about the mining industry's activities, expenditures, jobs, and production in Alaska in 1997. The LEIS (Chapter 3.5) acknowledges the high level of activity in Alaska's mining industry, and recognizes the importance of the Fort Knox and Pogo projects. However, lands within the withdrawals were not previously identified as high priorities by the mining industry. Access issues notwithstanding, the withdrawals are largely covered by floodplain deposits and thick overburden which, in the past, made them somewhat less attractive for exploration.

1) Conducting an evaluation of the mineral potential is not a requirement for the military use of these withdrawal lands.

2) Mineral development compatibility with Army uses has been evaluated by the military and the BLM on a case-by-case basis whether it is appropriate to open the withdrawal lands to the mining laws that do not conflict with the military mission.

MIN-R021 3) The primary use of the withdrawal lands is to complete the military mission.

4) An evaluation of the compatibility of mineral development with Army uses during 1996-2001 is not within the scope of the LEIS because these lands are currently withdrawn until November 6, 2001. This LEIS proposes to renew the withdrawal beginning November 6, 2001.

MIN-R022

MIN-R023

5) The 50 year withdrawal renewal has no bearing on the 5 year joint evaluation.

6) To this date, no access through the withdrawal property has been requested. If this issue does arise, the Army and BLM will address it appropriately.

MIN-R022: This request is outside the scope of the LEIS. This LEIS only address issues that will occur after 2001. These requests are evaluated on a case-by-case basis.

MIN-R023: The additional input from AMA is appreciated. As discussed in the response to MIN-R021, the withdrawals are largely covered by floodplain deposits and thick overburden which, in combination with the land status, has made them somewhat unattractive as exploration targets in the past. However, the mineral industry's current interest is noted.

Regarding the Eielson Pluton, Chapter 3.5 *Locatable Minerals* will be amended to note that geochemistry is not always a conclusive indicator of gold favorability.

at the Eielson pluton for its potential to host gold mineralization. Plutonic rocks that host gold mineralization at Donlin Creek in southwest Alaska, for example, do not always show a positive gold favorability using this method.

2. As indicated in the Draft LEIS, the potential to host massive sulfide deposits that contain lead, zinc, copper and precious metals is moderate to high for both the Fort Greely and Fort Wainwright areas. For example Grayd Resources recently announced a significant grade and tonnage estimate for their volcanogenic massive sulfide (VMS) deposits on Dry Creek, about 6 miles west of the western boundary of the Fort Greely military withdrawal. It is certain that both withdrawn areas would be explored for massive sulfide deposits of either the shale-hosted (like Red Dog) or VMS types, if these lands were open to mineral entry under either the federal or state mining laws. The VMS deposits are associated with a belt of Devonian-Mississippian metamorphosed volcanic rocks that crop out more-or-less continuously across the Fort Wainwright withdrawal and along the southern and western boundaries of the Fort Greely withdrawal. A parallel belt of black shales may contain shale hosted minerlization. The deposit description summaries are correctly stated in the Draft LEIS, however, the potential areas as depicted on Figure 3.5a should be extended to include the lands described above because they are underlain by lithologic units having a high potential for economic mineral deposits.

3. One of the chief concerns with the Draft LEIS is the lack of any discussion on surface access. This means surface access to high potential mineral lands adjacent to the military withdrawals and how the withdrawals impact those exploration and development activities outside the two withdrawals. The uplands on three sides of the Fort Wainwright withdrawal are currently a beehive of exploration activity by more than 15 mining companies searching for Pogo, Fort Knox or other deposit types in the historic Goodpaster Mining District. The entire western flank of the For Greely area is the focus of extensive exploration for VMS deposits as indicated above.

4. Because much of the geological data was collected more than 25 years ago (before modern systematic mineral exploration was deployed), there is a compelling need for a systematic, field-based mineral resource assessment. A mineral resource assessment that would utilize detailed 1:63,360 mapping, and airborne geophysics is essential to help better quantify the mineral resource potential of the areas proposed for withdrawal. A mineral resource assessment is also essential for the military and BLM to fulfill the promises for periodic mineral review referenced above.

Thank you for the opportunity to comment on this important issue. If we can be of assistance in development of a plan to effectively evaluate the mineral potential of these two withdrawal areas, logical access routes across the withdrawal areas, or other such issues please contact us.

Sincerely,

Steven C. Borell, P.E. Executive Director

cc: Senator Ted Stevens Senator Frank Murkowski Congressman Don Young Governor Tony Knowles DNR Commissioner John Shively MIN-R024: Changes have been made in Figures 3.4.a, 3.4.b, and 3.5.b to conservatively extend some of the geologic units beyond the withdrawal boundaries. The text in Chapter 3.5 has also been amended to include a discussion of current exploration for VMS mineralization in the Bonnifield District.

- **MIN-R025 MIN-R025:** As discussed in Chapter 4.16 *Public Access*, public access on the withdrawn lands is a significant issue with residents of Fairbanks, Delta Junction, and the surrounding communities. Under the Preferred Alternative, the Army would continue to provide public access onto and through the withdrawn lands, subject to necessary constraints for safety and security.
- **MIN-R026 MIN-R026:** The statement will be omitted from the Final LEIS. The commentor correctly states that mining is subject to stringent State and Federal environmental regulations, and the same point is made in the Draft LEIS (Chapter 4.5). Permits would not be issued for mining activities on any State or Federal lands without an assessment of potential impacts and mitigating measures.

The analysis of the No Action Alternative describes potential impacts if Congress does not grant the withdrawal renewals. The discussion is not provided to support the withdrawal renewals, but to provide a comparison of potential impacts under each alternative.

Conducting an evaluation of the mineral potential, including airborne geophysical surveys, is not a requirement for the military use of these withdrawal lands.

DAN O'NEILL 2590 HOME RUN FAIRBANKS, ALASKA 99709 PH. & FAX: 907/479-2988

January 26, 1999

Ms. Cindy Herdrich Center for Ecological Management of Military Lands Vocational Educational Building Colorado State University Fort Collins, CO 80523

The following comments are offered on the Alaska Army Lands Withdrawal renewal: Draft Legislative Environmental Impact Statement. These comments are in addition to comments I submitted on January 6, 1999.

Recordkeeping

In recent statements reported in the Alaska press, Army Secretary Louis Caldera has presented the Army as a "good environmental steward," and noted efforts to remedy "mistakes of the past and make sure we don't repeat those mistakes." One of the mistakes of the past is the matter of recordkeeping. In the past, as one military historian has written about nerve gas testing at the Gerstle River Test Site, records were either destroyed, not kept or lost:

When the program terminated in the late 1960's, records of the testing inexplicably disappeared, apparently destroyed. What files remain confirm sloppy record-keeping which failed to identify the type of weapons being tested or how and when they were disposed of. (Neilson, Johnathan M.; Armed Forces on a Northern Frontier: The Military in Alaska's History, 1867-1987; Greenwood Press; 1988; p. 210.)

I wonder if the secretary is aware that the US Army in Alaska is currently sending tens of thousands of munitions annually into public lands and failing to record the quantity and type of these munitions? Incredibly, on page 2-23 of the LEIS, the Army indicates that only records for the last *two years* are available. And that fact is followed by this rather amazing notation:

For both years reported, Army records had 595 entries that ammunition was used in training, but 439 entries showed either no data, unknown, or not available. Therefore, ammunition expenditure amounts are understated.

Well, they would be understated, wouldn't they, if Army personnel are failing to record the information 74% of the time? This raises some questions:

1.) Is the Army destroying these records every two years?

2.) Or is the Army refusing to make these records available to the preparers of this report?

RESPONSES TO COMMENT T

USE-T031 USE-T031: You are correct in your concerns about record keeping on range use of the withdrawal lands. U.S. Army Alaska recognizes the inconsistencies in its record keeping on range use at Fort Wainwright and will correct that situation.

Non-dud ammunition records are kept for an indefinite period with other range statistics. Records on dud-producing expenditures are kept permanently per Army regulation. U.S. Army Alaska provided two years of Range Data for the Yukon Training Area to the preparers of this LEIS. Impacts of continued military use of the withdrawal lands were assessed based on available records and reasonable assumptions concerning munition expenditures.

All munition records, except those subject to security concerns, are available to the public upon proper request.

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O'Neill--Page 2

3.) Is the Army deliberately failing to record the munitions expenditure information 74% of the time? If not, how does the Army explain a 74% failure rate?

4.) How can the impact of continued and expanded bombing activities be assessed unless the Army will disclose what types of munitions they are shooting into Alaska's public lands, and in what quantities?

5.) How can we ever hope to clean up what are, essentially, live minefields if munitions records are not established and maintained?

The Army should be required to provide what records they have regarding munitions expended on the ranges. And that information should be used in the LEIS to assess the adverse impact to public lands of the proposed action. That is what the law requires.

And, as would be obvious to anyone who valued the environmental health of Alaska public lands, the Army should be required to maintain permanent records of quantities and types of munitions expended.

Socioeconomics

Fires

The "Socioeconomics" section should deal with the economic costs of fires that are caused by bombing or that cannot be fought because of possible unexploded ordnance in the area.

- 1.) What is the dollar cost to fight these fires?
- 2.) What is the cost when fires cannot be fought because of the presence of unexploded ordnance?
- 3. What is the cost in lost resources such as:
 - a) the loss of commercially valuable timber?
 - b) the loss of wildlife habitat?
 - c) the loss of traplines?
 - d) the loss of recreational use?
 - e) the loss of scenic values relating to the area's earning power as a tourist destination?

A proper socioeconomic analysis will attempt to assign a value to these losses for past fires influenced by military activities. A cursory examination reveals substantial costs not addressed by the LEIS:

100 Mile Creek Fire

In June of 1996, military bombing started a fire on the Oklahoma bombing range. Because of the presence of unexploded ordnance there, the 100 Mile

USE-T031

cont.

SOC-T008 and **T009:** Please refer to Appendix 3.19.D for information on the dollar cost to fight fires on the withdrawal lands.

Loss of Wildlife Habitat

According to Bruce Dale of the Alaska Department of Fish and Game, wildlife populations are suffering from fire suppression rather than excessive fire. Animals are adapted to different stages of vegetation development. The mature black spruce forest does not support the vegetative diversity that a patchwork of burns does. The burns on withdrawal lands have provided forage for moose.

Traplines, Recreational Use, and Tourism

The Alaska Trappers' Association, the Snow Travelers' Association, and the Airboater's Association were contacted regarding the withdrawals. Military fires were not mentioned as a concern. The central concern for nonmilitary users was access. The Alaska Visitors' Association was also contacted, and could offer no data or opinion on tourism losses from military fires.

SOC-T008 The survey of military personnel (Appendix 3.19.C) clearly indicates that tourism is increased because of the military presence. Thus, a significant amount of tourism in the Delta area will be lost as troops are moved to Fairbanks. They will receive their visitors in Fairbanks instead of Delta.

Timber

The last 50 years experience does not show losses of commercial timber on State lands to be an issue. The Carla Lake fire would serve as an example where potentially a significant amount of commercially valuable timber could have burned. The Federal government is ordinarily liable for activities which cause losses to commercially valuable timber. This is a mitigation issue.

The Draft LEIS indicated the State harvests a very small fraction of the allowable cut. Recent opposition to State timber sales in interior Alaska serves to demonstrate that were the withdrawal lands of commercial timber quality, very little would in fact be sold.

STATE OF ALASKA

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TONY KNOW ES, GOVERNOR

DEPARTMENT OF FISH AND GAME

DIVISION OF WILDLIFE CONSERVATION

P.O. Box 605 Delta Junction, AK 99/37 PHONE: (907) 895-4484 FAX: (907) 895-4833 EMAIL: sdubois @ fishgame.state.ak.us

USE-S030

WILD-S002

January 25, 1999

9-54

Ms. Cindy Herdrich Center for Ecological Management of Military Lands Vocational Education Building Colorado State University Fort Collins, CO 80523

Dear Ms. Herdrich:

I would like to make the following comments about the Draft Legislative Environmental Impact Statement for the Alaska Army Lands Withdrawal Renewal.

- 1. I have attached copies of Fort Greely maps 3.12.c, 3.12.d, 3.12.f, and 3.12.g and corrected the range distribution illustrated for grizzly bear, moose, caribou, and bison respectively.
- 2. The EIS appears to subdivide the Lakes impact area into several new impact areas. Contaminating additional acreage with munitions will prevent use of the area for on-theground wildlife management activities and hunting by the public. I am opposed to live weapon firing into any areas on Ft. Greely that are currently uncontaminated with ordinance.
- 3. The prolonged 50 year duration of this land withdrawal makes it hard to comment on the impacts of the withdrawal for wildlife species that utilize early successional vegetative stages, such as moose and bison. The habitat for these species may change dramatically during the 50 year life of this withdrawal. Therefore, comments that are pertinent currently, could be significantly outdated and irrelevant before this plan expires, and important habitat areas may develop without being covered in the plan.
- It is also difficult to comment on this EIS from the wildlife perspective without the Army's 1998-2002 Draft Integrated Natural Resources Management Plan for Ft. Greely being finalized.

Sincerely,

Steve Av30.5

Steve DuBois Wildlife Biologist

RESPONSES TO COMMENT S

WILD-S001: The range distribution information has been added to the maps. See additions to Figure 3.12.c Sensitive Grizzly Bear Habitat, Figure 3.12.d Sensitive Moose Habitat, Figure 3.12.f Sensitive Caribou Habitat, Figure 3.12.g Sensitive Bison Habitat.

USE-S030: This LEIS is not proposing to create new Impact Areas on Fort Greely or change the use of existing Impact Areas. The Kansas, Arizona, Nevada, Oregon, and Michigan Lakes Impact Areas (see Figure 2.c) are designated as Impact Areas. All are used for limited periods and are normally used for non-dud producing ammunition or explosives, which are cleared and returned to other training support purposes following termination of firing. This use of the Lakes Impact Areas will continue through the proposed withdrawal renewal.

WILD-S002: This Environmental Impact Statement (EIS) is not intended to be a management plan for wildlife or any other resource. The Cooperative Agreement for Management of Fish and Wildlife Resources on Army Lands in Alaska, the Integrated Natural Resources Management Plans, required by the Sikes Act (16 USC 670a et seq.), and the Delta Bison Management Plan, are the documents governing wildlife management. The EIS does present mitigation for wildlife resources. The mitigation is in Chapters 4.12, 4.13, 4.14, and 4.23. The proposed mitigation includes the need for review of the Cooperative Agreement so changes can be made for management of wildlife species.

WILD-S003: The sensitive wildlife habitat maps within the LEIS give the latest information from the Alaska Fish and Game biologists. This information has been added to the Integrated Natural Resources Management Plan, which will assist in the analysis of wildlife impacts.

O'Neill--Page 3

Creek Fire was left to burn unchecked until it moved off the bombing range and threatened structures on state land. Ultimately, it burned 64,000 acres. The BLM has stated that \$661,000 of public money was spent to fight this fire.

Carla Lake Fire

Last year \$15 million of public money was spent to suppress the Carla Lake Fire. It was started by lightning on the bombing range, then grew substantially when fire crews were pulled off the job. The crews had to retreat after encountering an unexploded mortar round near their camp, which was outside the bombing range buffer zone. \$15 million dollars of public money seems an amount that ought to have been noticed by the Army in preparing a report that so carefully notes the economic *benefits* of bombing.

Hajdukovich Fire

Crews were also pulled off the 1994 Hajdukovich Fire in the Gerstle River Test Site area because it burned on to land that had been used by the military to test nerve gas munitions. Neither the BLM nor the State of Alaska would allow its crews into the area for fear of unexploded nerve gas rounds going off. It was a fire where the deployment of ground forces may have made a big difference, according to BLM. As it was, \$3 million of public money was expended in the effort.

Charley River Fire

In the early 1990's, a fire caused by flares dropped over the upper Charley River in the Yukon-Charley Rivers National Preserve burned 35,000 acres. A man I met who had been trapping that area for twenty years found his trapline, and thus his livelihood, destroyed. Some reckoning of these obvious socioeconomic costs ought to be part of this analysis.

Crime

Also ignored in the LEIS is the fact that posting thousands of 18- to 20something-year-old males to a community will have an effect on the crime rate. When when such a group of young men are all "fighting men," trained in the use of firearms, then the effect on the community's crime rate can be and, in Fairbanks, probably is—significant. The LEIS fails to consider this socioeconomic impact, as required by law.

What is the social cost in criminal activity currently borne by the residents of the Fairbanks/Eielson area by virtue of the of the two military bases' proximity? Said another way, what proportion of crime in the Fairbanks/Eielson area is attributable to military personnel? If the proposed land withdrawal extension is denied and training activities are scaled back, by what amounts can residents of the area expect crime to drop? To answer these and other relevant questions, crime statistics from the bases should be gathered and related to crime statistics for the wider area.

Sincerely, fan U New

SOC-T009 SOC-T008 and T009 cont.:

Crime

There are no statistics to show that military personnel contribute significantly to crime. Military personnel should not be characterized as prone to drunken driving, larceny, and theft, any more than persons in mining, forestry, fishing, or the tourist service industries (whichever occupations are employed in alternative uses of the withdrawal lands). Fairbanks compares favorably with the rest of the United States as far as crime is concerned.

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Jules V. Tileston 4780 Cambridge Way Anchorage, AK 99503

January 28, 1999

Cindy Hirter Center for Ecological Management of Military Lands Vocational Education Building Colorado State University Fort Collins, CO 80523

Subject: Alaska Army Lands Withdrawal Renewal, Draft Legislative Environmental Impact Statement (draft LEIS)

Dear Ms. Hirter:

I have reviewed the draft LEIS proposing a 50-year extension of existing military withdrawals on about 871,500 acres of land near Fairbanks and Delta Junction, Alaska. The existing withdrawal expires on November 6, 2001. If Congress enacts legislation to implement the proposal, the withdrawal would next expire on November 6, 2051.

For the record, I have been in Alaska since 1972. I am a former Bureau of Land Management, Alaska Deputy State Director for Resources and most recently retired from the State of Alaska Department of Natural Resources as the Director, Division of Mining and Water Management.

During the public meeting in Anchorage on January 8, 1999 I inquired about the reason for the 50year period, state selections, and consideration given to minerals. It is my understanding that:

- The 50-year period was selected primarily because that is about the same time the current withdrawals will have existed by the year 2001. It is further my understanding that there was no analysis showing how the military mission in Alaska would be in the intervening years.
- State selections cover the entire areas within the proposed 50-year extension of existing withdrawals.
- Minerals, except for mineral materials (sand and gravel) used by the Military were not now available. Therefore, no consideration was necessary.

I appreciate and generally support the role of the Military in Alaska. But I believe the draft LEIS is seriously, if not fatally flawed in its consideration of the three points above.

Withdrawal Time Frame and State Entitlements

The draft LEIS notes that the State of Alaska also has valid state selections for recreation minerals, wildlife, forestry, agriculture, and settlement values on these withdrawn lands. The draft LEIS did not consider the impact of delaying for 50 years the State of Alaska's opportunity to fulfill its Congressional entitlements under a variety of Federal Laws including the Alaska Statehood Act and the Alaska National Interest Conservation Lands Act. Setting aside the issue for the federal cost for eventually cleaning up the "High Hazard Impact Area" and "Impact Area Buffer" zones (hazard/buffer areas) shown in the existing withdrawals, there are significant acreages where other uses appear to be entirely compatible with Military use.

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I am strongly opposed to an arbitrary and capricious 50-year postponement for the State of Alaska and through the State, local governments to have an opportunity to get their Congressionally approved entitlements. Accordingly, I respectively recommend that the existing military withdrawals be for <u>not more</u> than 15 to 20 years.

This much shorter period also recognizes the fact that the Military mission in Alaska has, and continues to, evolve significantly. During the past 15 to 20 years some withdrawn lands have been determined to no longer be needed for Military purposes and the State now has ownership. Only recently the base at Adak and at Delta Junction, Alaska have been declared unnecessary for the future Military mission. I do not intend to imply that 871,500 acres are now excess, or that they will be excess. However, the draft LEIS provides no meaningful way to evaluate the projected future Military mission in Alaska until the year 2051!

An alternative not adequately considered in the draft LEIS is the option of transferring significant portions of the land outside the hazard/buffer areas to the State of Alaska for public recreation and mining with a proviso that the Military mission identified in the draft LEIS continues to be the superior use in accord with a land use plan jointly developed by the local Base Commander and the State.

Consideration of Mineral Resources

The draft LEIS considered a single minerals alternative that can be paraphrased as "Open to the full operation of the federal mining and mineral leasing laws under the exclusive jurisdiction of the Bureau of Land Management." I agree that this alternative is appropriately discarded from detailed consideration. But the draft LEIS is seriously flawed because it neither considers, nor evaluates any other minerals alternative. The draft LEIS ignores the fact that P.L. 96-606 does provide for other uses and that other military bases have concurrent access to mineral resources.

The LEIS notes that there is little current information on the type, location, and prospective value of minerals within the 871,500 acres. The recent discovery of the Pogo deposit, the new Fort Knox Mine at Fairbanks and the Red Dog Mine near Kotzebue are current examples of how mineral

RESPONSES TO COMMENT U

ALT-U025: Refer to Chapters 1.2 and 2.1.3 for a discussion of the military's continuing need for the withdrawal lands.

The State of Alaska has top-filed on the military withdrawal lands; these top filings are not valid State selections. For comparison analysis in this LEIS, it was assumed the lands would be adjudicated to the State under the No Action Alternative. It is impossible to predict the likelihood these lands would be adjudicated to the State. At this time, the withdrawal lands top filings are not designated high priority selections by the State. However, the State updates its conveyance priorities annually, so the selection status could change.

The LEIS states that present military uses will continue for the duration of the withdrawal renewal. At any time during the withdrawal period, if the military determines the withdrawal lands or portions of the lands are excess, those lands will be relinquished to the Bureau of Land Management under the terms of the legislation which withdrew the lands. The Military Lands Withdrawal Act states the procedures the Army must follow to relinquish any or all of the withdrawal lands. Since the Army is not proposing to change the terms of the withdrawal in this renewal, the Army is recommending these requirements be included in the proposed renewal legislation.

The alternative of military use under State of Alaska ownership was not considered in this LEIS. The impacts of State ownership of the withdrawals are analyzed under the No Action Alternative.

MIN-U006: The commentor correctly states that mining is subject to stringent State and Federal environmental regulations, and the same point is made in the Draft LEIS (Chapter 4.5). Permits would not be issued for mining activities on any State or Federal lands without an assessment of potential impacts and mitigating measures.

MIN-U006

The analysis of the No Action Alternative describes potential impacts if Congress does not grant the withdrawal renewals. The discussion is not provided to support the withdrawal renewals, but to provide a comparison of potential impacts under each alternative. 9-60

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exploration and mining have changed in Alaska. Each of these new mines has also produced new or revised geologic theories on where economic mineral deposits are likely to be discovered since the original withdrawal of these lands 50 years ago. Comparing hazard/buffer zones shown in Figures 2.b through 2.e with mineral resources in Figures 3.4.a and .b and 3.5.a through 3.5.c shows there are significant potential economic mineral resource areas that are not in conflict with a live-fire Military mission.

The final LEIS should evaluate the experiences of other Military bases where exploration and production of mineral values are considered ok. That new minerals alternative should also be based on the fact that mining operations in Alaska are controlled by both federal mining and mineral leasing a laws and by Alaska Mining Law. There are active partnerships between the State and Bureau of Land Management that provide for environmentally responsible mining operations that Governor Knowles describes as being "Open for Business" and "Doing It Right." That new minerals alternative also should make it clear that the appropriate Base Commander has the responsibility for determining what is or is not compatible with the Military missions described in the draft LEIS.

In order to determine whether there is likelihood of significant mineral resources on the withdrawn lands, the final LEIS and draft legislation should include a provision that the Military, Bureau of Land Management and Alaska Division of Geological and Geophysical Survey implement a *partnership to fund and conduct airborne geophysical surveys* and any necessary on-the-ground technical evaluation during the next 10 to 15 years. This will allow meaningful consideration about how mineral lands do or do not fit the Military mission 5 years prior to the expiration of the new withdrawals.

A valid State selection segregates the federal land selected from location and entry under federal mining, materials sale, and mineral leasing laws. Under Alaska mining law, a person may enter selected land and create by posting and notice a prospective future private mineral right. That future right is consummated only when two things happen:

(a) The State gets title to the land from the federal government [in this case when the military withdrawals expire, or if earlier when no longer needed for Military purposes] and

(b) The land has not otherwise been closed to mineral entry under State law. Mineral properties located under this provision may not be developed into operating mines and mineral exploration generally requires the specific approvals of both the State and Bureau of Land Management and in this case the local base commander.

The existing state selection, therefore, creates a dilemma that can only be solved in the federal legislation. There are at least three ways that the federal legislation can resolve this dilemma:

• Except for the hazard/buffer areas and areas occupied by base facilities, transfer the existing withdrawal to State ownership with a Military mission being the superior land use.

MIN-U006 MIN-U006 cont.: Mineral development compatibility with Army uses has been evaluated by the military and the BLM on a caseby-case basis whether it is appropriate to open the withdrawal lands to the mining laws that do not conflict with the military mission.

An evaluation of other military lands in regard to mineral exploration and production is outside the scope of this LEIS.

The alternative of a military use under State ownership was not considered. The impacts of State ownership of the withdrawals are analyzed under the No Action Alternative. The State of Alaska has not identified these lands as a high enough conveyance priority for this alternative to have been evaluated.

The statement "if not done carefully" is omitted from the Final LEIS.

• Explicitly recognize the existing provision of State mining law to create prospective future private mineral property right with Bureau of Land Management, Base Commander, and State of Alaska controlling the on-the-ground mineral activity with due deference to the Military mission.

MIN-U006

cont.

• Explicitly recognize the existing state selection but permit entry and mining operations under Federal mining, materials sale, and mineral leasing laws with a provision that the federal mining claims be converted to state mining claims automatically when the land is transferred to State ownership.

Finally, I strongly object to the assertion that "mining activities, if not done carefully, can destroy habitat and affect water quality" (draft LEIS page ES-7) as a reason to extend the existing Military withdrawals for 50 years. To suggest that mining under federal and state law and regulation would be done other than "carefully" when under the full requirements of both the Secretary of the Interior, Secretary of Defense and State of Alaska is inappropriate and should be *deleted* from the final LEIS.

Summary

I generally support and appreciate the historic role of the Military mission in Alaska. The Mission, however, is changing rapidly and there is no substantive discussion about why the withdrawal should be extended until November 6, 2051. The adverse impacts to the State and local governments from not getting a timely opportunity to reduce outstanding land entitlements granted by Congress to Alaska have not been considered at all.

There are likely significant economic mineral deposits that are not located in the hazard/buffer areas that have not been given serious consideration. There are several federal legislative means to have both a continuing viable Military mission and an expanding viable, environmentally responsible mineral exploration and mining on substantial parts of the existing withdrawal. The Military, Bureau of Land Management and the State should develop an active partnership to update the 50-year old minerals data through airborne geophysical and associated on-the-ground documentation.

I would be pleased to provide any clarification to my comments and recommendations if you have questions.

Sincerely,

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Jules V. Tileston

cc Senator Stevens, Senator Murkowski, Congressman Young, Governor Knowles, Commissioner Shively, Alaska Miners Association

9-62

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Jules V. Tileston 4780 Cambridge Way Anchorage, AK 99503

January 29, 1999

Ms. Cindy Hirter Center for Ecological Management of Military Lands Vocational Education Building Colorado State University Fort Collins, CO 80523

Subject: <u>Supplemental Comments</u> on the Alaska Army Lands Withdrawal, Draft Legislative Environmental Impact Statement (draft LEIS)

Dear Ms Hirter,

Please include these supplemental comments to my comments dated January 28, 1999.

I just came across two documents that I believe require consideration in the Final LEIS:

- Fort Greely--Proposed Resource Management Plan for the Fort Greely Maneuver Area and Fort Greely Air Drop Zone, Final Environmental Impact Statement, BLM/AK/PT/94/011-1600+080 prepared by the Department of the Interior, Bureau of Land Management, Steese/White Mountains District Office and the U.S. Army 6th Infantry Division (Light), dated 1994 and
- Fort Wainwright, Yukon Maneuver Area--Proposed Resource Management Plan, Final Environmental Impact Statement, BLM/AK/PT/94/011-1600+080 prepared by the Department of the Interior, Bureau of Land Management, Steese/White Mountains District Office and the U.S. Army 6th Infantry Division (Light), dated 1994

Page 17 of the Fort Greely 1994 document considering minerals resources says:

"Proposed Action 22 The withdrawal area will remain closed to the operation of the Mining Law of 1872, the mineral Leasing Act of 1920 as amended, the Mineral Leasing Act for Acquired Lands of 1947, and the Geothermal Steam Act of 1970. Pursuant to Sec. 12(a) of the Military Lands Withdrawal Act, the *Army and BLM*, by 1996 and at least every five years thereafter, will jointly reconsider whether it would be appropriate to open portions of the withdrawal to the operation of the mineral Laws." (Underlining and emphasis supplied)

Proposed Action 23 says that the land will remain closed to all form of mineral material disposal, both

sale and free use, other than that which supports military activity. (pages 17 and 18)

Page 56 repeats the commitment to jointly "...reexamine what areas may be suitable for opening by 1996 and at least every five years thereafter." The 1994 document also says that no consideration was given to lode mining or coal development. The Pogo project and Fort Knox Mine and adjacent mineral properties such as the True North are lode deposits and therefore ignored in the 1996 joint Army/BLM finding? Also in 1994, the State of Alaska held a competitive coal lease sale in the Jarvis Creek Coal Field to the south of Delta Junction. Accordingly both lode and coal mines should be considered in the Final LEIS. The lode mines on the basis of existing mining activity in the vicinity of the two withdrawals and coal from the aspect of whether it could be used to generate power for a large mine operation.

Pages 16 and 46 of the Fort Wainwright 1994 document repeats the statements the Fort Greely document referenced above, except these are now Proposed Action 15 and Proposed Action 16, respectively.

The Final LEIS should discuss the findings about mineral compatibility promised in Proposed Action 22 and Proposed Action 15. In particular the joint Army/BLM finding and the extent, if any, new mineral information such as the True North and other mineral properties near the Fort Knox Mine and the exploration work at the Pogo mineral property were or were not considered. Also the Final LEIS should specifically show the rationale used by Army/BLM and the extent that mineral exploration and production were or were not compatible with the Military use outside the hazard/buffer areas shown in the 1998 LEIS. The Final LEIS should also present and discuss how the mineral compatible finding commitment will be completed for the five-year period 1996-2001. Finally, will the 1996-2001 minerals reconsideration be available for consideration prior to the introduction of legislation to extend the existing withdrawals, and if not, why?

Sincerely,

Ulisi) June

Jules V. Tileston

cc: Senator Stevens, Senator Murkowski, Congressman Young, Commissioner Shively, Alaska Miners Association

MIN-U007 MIN-U007: Mineral development compatibility with Army uses has been evaluated by the military and the BLM on a case-bycase basis whether it is appropriate to open the withdrawal lands to the mining laws that do not conflict with the military mission.

MIN-U008: Changes have been made in Figures 3.4.a, 3.4.b, and 3.5.b to conservatively extend some of the geologic units beyond the withdrawal boundaries. The text in Chapter 3.5 has also been amended to include a discussion of current exploration for VMS mineralization in the Bonnifield District.

ALT-U026: Mineral exploration has not been precluded by the withdrawal. All requests for mineral exploration have been considered on a case-by-case basis.

MIN-U008

MIN-U009 MIN-U009: An evaluation of the compatibility of mineral development with Army uses during 1996-2001 is not within the scope of the LEIS because these lands are currently withdrawn until November 6, 2001. This LEIS proposes to renew the withdrawal beginning November 6, 2001.

3. No effort is currently being made to adequately address a clean up process, or in fact. if a clean up will ever be attempted. The referenced 5 year rotational range clean up is a "Police call" - pick up those cigarette butts" type action, that deals with only obvious, visible. surface contamination, removed by a number of servicemen walking in a line through the area. **h--1** Fairbanks. Alaska 99708-1814 Steve Adams P.O. Box 81 U.S. Army Alaska Lands Withdrawal Environmental Impact Statement Center for Ecological Management of Military Lands Colorado State University, р..... • to have whatever resources they need here in Alaska. Fort Collins, CO 80523-1500 Ms. Cindy Herdrich represent myself, my comments follow: Box 81814 < Renewal

financially or logistically - to clean up the ranges. Fairbanksans are well aware of the "Little guy" who was put out of business and bankrupted in Fairbanks in the not too 4. Very troubling is the unanswered question in the LEIS to whether or not it would ever be possible - either distant past over an issue of soil contamination by р С

RESPONSES TO COMMENT V

Chapter 4.23 USE-V032: See Chapter 2.1.3.5 Decontamination and Proposed Mitigation Ξ.

USE-V032 Chapter 4.23 continue through the proposed withdrawal renewal. Also see Proposed Mitigation in purposes following termination of firing. This use of the Lakes Impact Areas will ammunition or explosives, which are cleared and returned to other training support All are used for limited periods and are normally used for non-dud producing and Michigan Lakes Impact Areas (see Figure 2.c) are designated as Impact Areas. or change the use of existing Impact Areas. The Kansas, Arizona, Nevada, Oregon, USE-V033: This LEIS is not proposing to create new Impact Areas on Fort Greely

USE-V033

Air Force (see Appendix 2.C). decontamination efforts are described including an ordnance cleanup history by the MIT-V004, V005, and V006: Please refer to response for POL-A002. Current

MIT-V004

increase and the time, cost, and environmental impacts for remediation should ordnance. As technologies improve, the effectiveness of remediation should are two major impediments to efficient and effective clearance of unexploded decrease Cost and lack of unexploded ordnance characterization and evacuation technologies

is allowed, recognizing that the primary use of the land is for military use There are inherent risks associated with public access of military land. Public access

79-6

1-30-99

served in the U.S. Army at Fort Greely in the early '60's. so am familiar with the areas in question. I have a very deep concern for the fact that there seems to be no limit on what can take place on these lands, for 50 years if this is approved. No one, Military or civilian. should be granted support the mission of the U.S. Armed Forces. and want them that kind of license when polluting the environment ! I have several concerns, but want to assure you that I fully

under this plan, contaminated at will, with no restriction on the material to be dumped in there for 50 years. It appears that the ranges are, and will continue to be

deployed, again with no restriction on the materials used, or control of pollution for 50 years. It's not spelled out in the plan, and the Regulations referenced are. It appears, subject to change at the whim of the military. 2. It also appears that the areas of contamination will increase in size, and possibly substantially as newer and more destructive devices still in development are tested and

MIT-V005

automotive batteries. No effort was made to allow him to continue contamination the soll for the next 50 years. he was expected to clean it up ! Do we have a different standard for the government/military ?

5. If public access and use is really to be encouraged on the lands in question, how can that be reconciled with the obvious fact there are no standards for clean up or the amount of pollutants allowed to accumulate ?

6. I am very disturbed by constantly finding in the study that there is no baseline data for pollution and contaminates. It's hard to believe that in all the years that these areas have been in use by the military, no studies have been done. Seems to me I can recall the President. the Army's Commander-in-Chief. ordering that all agencies of the Federal Government were to take the lead and set the example for being environmentally correct and responsible. No baseline studies ?

7. A quick look at Table 4.6.a Tire and Track Date for the most Common Military Vehicles used On Fort Wainwright Yukon Training Area and Fort Greely (Richmand in Blaisdell 1991) is most instructive. Thirteen of the 21 possible responses are listed as unavailable. Nobody knew. or bothered to try and find out, the width of a truck and it's contact area? I would suggest that somebody could have made a trip (or a phone call) to any new truck dealer for at least some of the missing data.

8. The LEIS is woefully inadequate in addressing the danger of fire and fire suppression, especially in view of the Fort Greely realignment and closure and lack of personnel available to assist in preventing and controlling wildfire. It is interesting to note that the LEIS reports that "The majority of pollutants produced on Fort Greely result from forest fires.."

9. The LEIS does not address, as it probably cannot, the air quality issues that may arise as the result of weaponry now AIR-V001 in development. This again raises the issue of the long term withdrawal requested, and calls to question how and when those issues could/would be addressed, certainly not after 50 years ?

10. In the Issues section of the LEIS there are 2 issues that are blown off with the statement that "This issue will not be resolved in this LEIS." I can see where Access might well not be, however, under Submerged Lands there are 2 issues:

a. Impacts on water quality of submerged lands (property below the high mean water mark) due to military use. and MIT-V006: See previous page.

LAND-V002

POL-V008: No baseline studies to assess the effects of munitions on soils, groundwater, vegetation, or wildlife have been completed for the withdrawal lands or the surrounding areas by the military or State and Federal agencies. The Army's proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources as outlined in Chapter 4.23.

SOIL-V002: Please refer to Table 4.6.a. Additional information has been added to this table.

FIRE-V004: Fire Department personnel do not fight wildland fires. They are responsible for fires on the Main Post. The Bureau of Land Management, Alaska Fire Service is responsible for wildland fire suppression on the withdrawal lands. When fires on the withdrawal lands are called in, the Fire Department records coordinates, and then contacts the Bureau of Land Management, Alaska Fire Service (AFS). The ability of the Fire Department to record wildland fire locations will not change after the realignment. NEPA documents, including Environmental Assessments are being prepared to analyze the impacts of the realignment on Fort Wainwright and Fort Greely. The Environmental Assessment for Realignment of Personnel and Military Functions to Fort Wainwright was published in June 1997. It is anticipated the Environmental Assessment of Personnel and Military Functions from Fort Greely will be published in October 1999.

AIR-V001: Military activities conducted on the withdrawal lands are expected to be consistent with those conducted during the past 15 years. A description of these activities can be found in Chapter 2.1.3. The Army is proposing to renew the withdrawal areas with the existing military land uses. Fielding of future military weapon systems would require appropriate NEPA documentation. Chapter 4.2 Climate and Chapter 4.23 Existing and Proposed Mitigation discuss air quality mitigation measures currently used by the military on withdrawal lands.

LAND-V002 and V003: The jurisdiction of submerged lands on the withdrawal properties will not be resolved in this LEIS. The State of Alaska, Department of Natural Resources, Division of Land, has indicated interest in the Delta River, including an ownership interest in the lands submerged under the Delta River. U.S. Army Alaska is reviewing the Division of Land's ownership claim. The Division of Land has also requested cleanup of the Delta River. U.S. Army Alaska has noted that training uses of the area will continue.

9-65

b. Jurisdiction of submerged lands on the withdrawal properties, particularly the Delta River.

It would appear that nobody wants to be responsible for **LAND-V003** anything. Does it matter who has jurisdiction under (b) in determining the impact on water quality? At best it could be argued that one or another agency might have stricter standards than the other. but should not there be at least an enforceable minimum. Where is the impact on water quality to be addressed ? Must the Congress of the United States make a decision on this matter with the number of unanswered questions that exist ?

11. The LEIS states (4.6) "The environmental standards against which off-road vehicle disturbances and the extent of munitions damage are measured have not yet been adequately defined for the Fort Wainwright Yukon Training Area and Fort Greely." It goes on to say that a general rating scheme was presented in 1974 - that was 22 years ago! Has there been no effort since then to assess this issue ? This is another area that seems to have been "blown off" by the Military and those who developed the LEIS. Is the end result to be that in 50 years the same 1974 scheme will rule the day ? It is further stated that, "The majority of military activities conducted on Fort Wainwright Yukon Training Area involve off-road Maneuvering. which accounts for the majority of soil damage on the training areas. Who is to be accountable, and when will this ever happen, given the cavalier approach to this and many other issues in the LEIS ?

12. The LEIS states that. "The extent of soil contamination by ammunition has not yet been determined at Fort Wainwright Yukon Training Area and Fort Greely." This after how many years ? Does "Not yet" infer that a determination is forthcoming ? What affect will that have during the 50 year license to contaminate that is being requested ? Any appeal if a hazard is found to exist ?

13. "A baseline munitions study has not been completed for Fort Walnwright Yukon Training Area." Why not? Is it thought that one is not needed ? How will it ever be determined whether or not there is serious environmental impact if we do not have a starting point for making that determination. I would hope that is not the answer as to why there has been no study !

MIT-V007

14. There are several areas in the LEIS where you can find a statement to the effect that, " in the event of negatively impacted (you pick what), the impact would be identified and monitored, and areas restored when feasible (emphasis added). I found nowhere in the LEIS a definition of "when feasible", no agency or individual listed as being

LAND-V002 and **V003 cont.:** Please refer to Executive Summary and Chapter 1.8. Additional information regarding water quality and the jurisdiction of submerged lands has been added to these sections. Chapter 3.1.1 and Chapter 4.1 describes submerged lands and their relation to land use. Chapter 4.8.2 describes the issue of water quality, monitoring, and decontamination of submerged lands.

Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources as outlined in Chapter 4.23.

SOIL-V003: The intent of the soil damage rating scheme as presented in Chapter 4.6 was to serve as a general evaluation tool to assess the impacts of off-road maneuvering and munitions damage to the withdrawal lands. This particular rating scheme was chosen because (1) the military has not developed a soil disturbance rating scheme specific to the withdrawal lands, and (2) it was developed based on field tests and observations of off-road vehicular traffic on Arctic tundra in Alaska. This rating scheme is not included in the management of soils or permafrost on the withdrawal lands and was only used an an analysis tool within this LEIS.

Please refer to Appendix 2.D for a description of the current natural resources management programs for the withdrawal areas.

SOIL-V004: Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources as outlined in Chapter 4.23.

MIT-V007: Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources as outlined in Chapter 4.23.

OTH-V009: Military activities including restoration are conducted when funding, technology, priorities, and time permit.

Please refer to Appendix 2.D for a description of the current natural resources management programs for the withdrawal areas.

responsible for restoration. or to what degree restoration would be accomplished.

I'm concerned that throughout the LEIS are statements that lgnore or gloss over issues that, were they contained in a non-milltary LEIS, would stop any such project in it's tracks (no pun intended).

15. Chapter after chapter, page after page, the LEIS states that some adverse impacts have or can be assessed using baseline studies either at Greely or Wainwright. but not both, and I have to ask, why not ? Water is as Important an issue on both areas, soils are also, etc. An example is on page 4-27 regarding water: Ft. Greely had a baseline munitions study: Ft. Wainwright did not: data has not been collected regarding damage caused by the Air Force at STuart Creek and Oklahoma/Delta Creek impact areas...

16. I read time after time that "damage control steps are included in training plans...", range regulations, etc. Seems to me that this is a case of the fox guarding the her house. I have to question why the Army has to fill and level foxholes when the Air Force can bomb with abandon, ignoring their bomb craters, etc.?

Does the public have full access to the training plans. range regulations, etc. so they can be evaluated and concerns addressed ?

17. Preferred Alternative: Retention of the lands by U.S> Army Alaska would have some negative effects..."

Under the No Action Alternative, in most cases. "Land uses would be subject to local, <u>State</u> and Federal <u>Regulations</u> and <u>would involve specific planning procedures</u>. (Emphasis added).

State and local governments have to provide specific planning, but Federal Government does not ?

18. There should be a shorter time frame for the withdrawai so as to be able to review where we are 5 to 10 years down the road and deal with what then is the current status of weaponry and training needs. The fact that a 50 year renewal would match the current time of use is hardly a valid reason for repeating what may have been 50 years worth of mistakes.

I could go on but enough trees have already been used in the process of getting us to this point. The above are just one mans observations and opinions, but they are serious concerns to this one man.

Again. I fully support the military in Alaska and the rest of the United States. I also support the rights and well being of all it's inhabitants, and put environmental issues at or near the top of my concerns list. I sincerely hope that my observations will be taken as seriously as they were written, and not blown off with some bureaucratic babbling about the flag, motherhood and apple pie as is often shoved down our throats when valid concerns are raised over the workings of government and the future of the earth. There is only one earth, and as past misdeeds have shown, even if they have been for the most part ignored, we oftentimes only get one chance to do it right. Let's do this one right.



Fairbanks. Alaska 99708-1814

CC: Senator Stevens Senator Murkovski Pepresentative Young **POL-V009:** Baseline studies have not been conducted for all resources at Fort Wainwright and Fort Greely. All existing baseline studies for resources studied at both installations are included in the LEIS. Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources as outlined in Chapter 4.23.

MIT-V008: The Army and the Air Force have specific regulations regarding training and its impacts, including bombing. Craters from bombing are expected to result in the High Hazard Impact Areas. The Army digs foxholes in Training Areas, not impact Areas. Training Areas are accessible by soldiers and the public, and are maintained under management guidelines for those specific areas. Impact Areas are managed differently due to the unexploded ordnance hazard.

USE-V034: The U.S. Army Alaska Range Regulation (350-2) is a safety and procedure regulation for the Alaska Ranges. It is unclassified and available. The Army develops its training plans to comply with AR350-2.

ALT-V027: U.S. Army Alaska is required to follow applicable Federal, State, and local laws and regulations. See Chapter 1.10.3 and the individual resource sections in Chapters 3 and 4 for pertinent laws and regulations.

ALT-V028: The Army's selection of a 50-year renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A credible operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources to protect resource values and implement natural resource management measures.

Periodic review of the Army's use and management of the withdrawal lands would occur under the Preferred Alternative. In accordance with the Sikes Act, U.S. Army Alaska is preparing Integrated Natural Resources Management Plans for Fort Wainwright and Fort Greely. Plans are written for a five year period with public, Federal and State agency participation in the development and review process.

POL-V009

MIT-V008

USE-V034

ALT-V027

ALT-V028

W

Whit Hicks P.O. Box 1417 Delta Jct., AK 99737

Center for Ecological Management of Military Lands Colorado State University Fort Collins,CO 80523-1500

February 3, 1999

Dear Ms. Herdrich,

I oppose the 50 year withdrawal by the Department of Defense (DOD) of the Delta East and Delta West training areas. I have the several concerns and therefore, will offer suggestions to remedy the perceived problems.

Concerns:

- (1) Fifty years is too long to withdraw land from any other possible use. The base realignment of Fort Greely will devastate the local economy for years to come. In order to pursue potential alternatives to DOD use of this land mass, the community should have the opportunity to reconsider the land withdrawal after a shorter period of time.
- (2) Environmental remediation and clean-up has been irresponsible and negligent. The Little Delta river is an important part of the salmon ecosystem, as is the entire impact area in the Delta West training area. There has been unlawful road construction through wetlands, dumping in the flood plan of the Little Delta river, and stream crossings made with heavy equipment.
- (3) Insufficient geophysical and geological data have been collected within the proposed withdrawal area. Potential mineral and non-mineral resources are not accurately identified and no proper assessment of value has been ascertained.
- (4) No terms for compensation for use of the land to the local community (Delta region is 80% outside of the City of Delta Junction) has been negotiated with the community members.
- (5) There is unnecessary withdrawal of land. The size of the land withdrawal is excessive. Buffer zones are necessary; however, much of the land proposed for withdrawal need not be withdrawn for the proposed uses.

Suggestions for solutions:

(1) Reduce the withdrawal proposal to 10 years, at which time the public can **ALT-W031**

RESPONSES TO COMMENT W

ALT-W029: Noted. Thank you for your comments.

MIT-W009: Training exercises conducted on Alaska military lands are regulated by USARAK Range Regulation 350-2. All actions undertaken by the U.S. Army are required to consider their impact to the surrounding environment and to take certain precautions to avoid impact. These include the refilling and leveling of any foxholes, trench systems, tank traps, hulldown positions, or explosive excavations; conducting vehicular stream crossings in designated areas only; limiting cross-country vehicular travel to established roads and dry trails during spring thaw; and avoiding cross-country movement in creek bottoms, marshes, and moist tundra areas during summer months. By limiting these activities, the chance of erosion occurring and subsequent sedimentation leading to poor water quality will be lessened. There have been isolated instances where Range Regulation 350-2 has not been satisfied. However, remediation has been implemented as mandated.

ALT-W029 In addition to these environmental considerations, damage control steps are also included within individual training plans to minimize natural resources damage. These steps include the protection of known sensitive areas, repair of unavoidable maneuver damage, coordination and permitting of any ground disturbing activities, and scheduling of natural resources and hazardous material inspections of training areas to ensure regulation compliance. Fort Greely and Fort Wainwright Integrated Natural Resources Management Plans are being developed to ensure land stewardship and environmental protection.

Please refer to Appendix 2.D for a description of the current natural resources management programs for the withdrawal areas.

SOC-W010 Impacts to wetlands are regulated by various Army, Federal, and State laws. The Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act require permits before construction work using mechanized equipment occurs, in order to maintain wetland integrity. Section 10 of the Rivers and Harbors Act requires permits prior to commencing any work or building of structures in navigable water of the United States. Such work includes dredging and bank stabilization. Section 404 permits are required for the discharge of dredged or fill material into a water of the United States, including wetlands. These permits usually contain special provisions which require the permittee to maintain natural drainage patterns to prevent flooding or excessive drainage of nearby wetlands, stabilize construction

areas to prevent erosion, prevent encroachment upon adjacent wetlands, and implement a plan to avoid future disturbance and reestablish vegetation when such disturbance cannot be avoided.

The Army received a permit from February 1, 1984 to November 1988 to operate a landfill at the edge of the Delta Creek Assault Strip, which is located in the floodplain of Delta Creek. All combustibles were burned prior to burial. The landfill was primarily used for training debris disposal, including human waste, packaging, and daily use items during large training exercises. Targets are placed on gravel bars no less than 50 feet from flowing water in the Delta River and Delta Creek, and during clean-up, the debris is removed from the riverbeds and not buried within the floodplain.

MIN-W010: Conducting an evaluation of the mineral potential, including airborne geophysical surveys is not a requirement for the military use of these withdrawal lands.

SOC-W010: Noted. This is outside the scope of this LEIS.

ALT-W030: See Chapter 2 for a discussion of military use of the withdrawal lands and Military Operational Parameters.

ALT-W031: Noted. Refer to Chapters 1.2 and 2.1.3 for a discussion of the military's continuing need for the withdrawal lands.
review the activities by DOD over the past ten years and negotiate terms for extending the withdrawal for the next ten years.

- (2) Develop and implement an environmental cleanup plan for the withdrawal area. Before any further withdrawal agreements are approved by the people of the United States, the DOD should develop a plan to cleanup and remediate all impacts to the area that occur as a result of training activities during the withdrawal period. Even more important to the environment and the citizens of the region, is the need to cleanup and remediate impacts that have already occurred. DOD should designate 20% of its Alaska training budget to cleanup and remediation of its training areas. Before the withdrawal, the DOD should negotiate with the local communities, a reasonable amount of cleanup and remediation and at the end of the next ten year withdrawal, DOD must present the accomplishments before further withdrawal is granted.
- (3) There is insufficient geophysical and geological data available in the proposed withdrawal areas. DOD should fund a thorough geological and geophysical survey using the best modern technology available with the USGS to determine the resource base within the withdrawal areas. Since this potential revenue will be withdrawn from the local communities revenue base DOD should compensate the region for its value.
- (4) DOD should come to the table with the entire surrounding community to discuss fair and legal compensation for the use of this massive land area. The City of Delta Junction represents only about 25% of the local population. The greater community is in the process of forming a borough which will encompass the entire Delta East and West withdrawal areas. DOD representatives should come to the table with the borough planning committee before and withdrawal plans are finalized.
- (5) "It has always been withdrawn" is not a reasonable justification for tying up land that is not needed for military training. Some of the land being requested for withdrawal need not be withdrawn to accomplish the military training objectives. For example, most of the land east of Jarvis Creek, excluding the drop zones should be reclaimed and returned to the state for management. Other areas should also be examined to determine if they are critical to military training.

I believe my concerns are valid and represent many, if not most of the local residents in our community. I will share my concerns with as many other agencies and individuals as I possibly can. Please help this community to have a voice that can not be ignored. We have the most at stake.

Sincerely Whit Hicks

- MIT-W010 MIT-W010: Please refer to responses for POL-A001 and POL-A002. Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23).
- MIN-W011: Conducting an evaluation of the mineral potential, including airborne geophysical surveys is not a requirement for the military use of these withdrawal lands.
- **SOC-W011** SOC-W011: Noted. This is outside the scope of this LEIS.

ALT-W032 ALT-W032: See Chapter 2 for a discussion of military use of the withdrawal lands and Military Operational Parameters.



TONY KNOWLES, GOVERNOR

OFFICE OF THE GOVERNOR

OFFICE OF MANAGEMENT AND BUDGET DIVISION OF GOVERNMENTAL COORDINATION

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February 4, 1999

Ms. Cindy Herdrich Center for Ecological Management of Military Lands Vocational Education Building Colorado State University Fort Collins, CO 80523-1500

Dear Ms. Herdrich,

RE: Alaska Army Lands Withdrawal Renewal Draft LEIS

The State of Alaska resource agencies have reviewed the above referenced document. We offer the following comments.

As stated in comments submitted by the Alaska Department on Natural Resources (DNR) during the scoping phase of this process (letter from DNR Commissioner Shively to you dated January 23, 1998), we are concerned about the continuing military withdrawal status of lands within the boundaries of Chena River State Recreation Area. DNR expressed numerous reasons for supporting the eventual transfer of these lands from federal ownership to state ownership. In the draft LEIS, a strong argument is made for the military's continuing use of these lands (known as Beaver Creek-South Fork of the Chena area) in the Yukon Training Area. Therefore, we will not encourage use or development of this area until it is no longer of such critical need for military purposes. However, we believe we have communicated a clear need for these lands for recreation use and we continue to desire transfer to state ownership at some appropriate time in the future, after the area is cleaned up as necessary. We appreciate your continued designation of the area as a Prohibited Tactical Training Area (PTTA), so presumably the amount of contamination will be minimized.

Perhaps more importantly, however, we strongly believe an extension of the lease from BLM to the Army for a 50 year duration is much too long. Land use patterns can change dramatically in relatively short periods of time, and it may be desirable to revise public policy decisions to respond to those changes. We request that the timeline for review of the land lease renewal remain, as it has been, at 15 years. A full EIS may not be required at that

RESPONSES FOR COMMENT X

ALT-X033: Noted. Thank you for your comments.

ALT-X034: The Army's selection of a 50-year renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A credible operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources to protect resource values and implement natural resource management measures.

Periodic review of the Army's use and management of the withdrawal lands would occur under the Preferred Alternative. In accordance with the Sikes Act, U.S. Army Alaska is preparing Integrated Natural Resources Management Plans for Fort Wainwright and Fort Greely. Plans are written for a five year period with public, Federal and State agency participation in the development and review process.

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22 tranted on recycled above

ALT-X033

ALT-X034

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February 4, 1999 Page 2

time, but perhaps an assessment of what factors may be significantly different and worthy of discussion, i.e., a withdrawal "update", may be appropriate.

Additionally, we are available to work together, at the local level, to address some concerns that have arisen through this draft LEIS process. These concerns include how, or when, the PTTA can be available for public use, and how the area can be properly posted.

Thank you for the opportunity to comment. By reference, please include as part of our comments the letter from Steve Dubois, Wildlife Biologist, Alaska Department of Fish and Game, to you dated January 25, 1999. Please do not hesitate to contact me if you need additional information or discussion.

Alan Phipps' Sincerely llo-Rippet

Project Review Coordinator

cc: John Katz, Governor's Office, Washington D.C.
 John Sisk, Governor's Office, Juneau
 Gabrielle La Rouche, Acting Director, Division of Governmental Coordination
 John Shively, Commissioner, Department of Natural Resources
 Frank Rue, Commissioner, Department of Fish and Game
 Joseph Perkins, Commissioner, Department of Transportation and Public
 Facilities
 Michele Brown Commissioner Department of Environmental Conservation

Michele Brown, Commissioner, Department of Environmental Conservation Debby Sedwick, Commissioner, Department Of Commerce and Economic Development

ACC-X013

ACC-X013: This area is part of the Yukon Training Area and subject to the same access and use restrictions as other lands not permanently closed. This area is open to the public according to military training and scheduling.

January 31,1999

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Cindy Herdrich Center for Ecological Mgmt of Military Lands Vocational Education Bldg Colorado State University Ft. Collins, CO 80523

Dear Ms. Herdrich;

The following are a list of guestions I have concerning the requested 50 year lease of the training areas in Alaska noted below:

248,000 acre Yukon Training Range near Ft. Wainwright 660,000 acre training area near Ft. Greely

1. Why 50 years? Why not 5 years or 10?

2. Do we know what kind of weaponry will be tested on this land in 50 years? Do we even know what kind of weaponry will be tested in 5 years? Do we know that 5 or 10 years, or 20 years from now biological weaponry won't be tested on this land? The military has used the civilian population as test subjects in the past without their knowledge. What is to stop them from doing it again? At least, with a shorter lease, the actions of the test personnel would be subject to review every few years rather than giving them a free hand for almost a lifetime.

3. How can we sign control of such a vast area away, not knowing how it will be used? Will there be danger to the people living around it? Wouldn't a 5 year lease give the state more control over how the land is used?

4. Why can't there be a corridor on either side of the rivers and streams? I have seen munitions stored in the river bottoms below high water lines and blown up there, releasing who knows what into the water shed.

5. Why is it necessary to remove basic hunting camps from these areas? I am speaking of basic tent frames, etc. Hunting, trapping and fishing are allowed, if a person is willing to sit through a training film and sign a statement releasing the army from liability. What can a few small camps which are used only during hunting season possibly hurt? The effect on such a vast area of 40-50 little camps seems miniscule.

6. Why is it necessary for training in the field to take place in the month of September? The vast majority of civilian use would be during this month. It seems that there must be maintenance of weaponry or equipment that could be taught during that time.

I understand that the military needs this land to train. I don't dispute this fact. My argument is with the time. 50 years is too

RESPONSES TO COMMENT Y

ALT-Y035

USE-Y035

ACC-Y014

USE-Y037

ALT-Y035: The Army's selection of a 50-year renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A credible operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources to protect resource values and implement natural resource management measures.

USE-Y035: Military weaponry development evolves with technology. The need for testing and training of Army and Air Force personnel will continue in the future. The withdrawal legislation authorizes the military use the lands for training and testing. Any withdrawal renewal term will authorize military weaponry testing. Changes to the military's mission in Alaska would require appropriate NEPA documentation.

The Army's use and management of the withdrawal lands will periodically be reviewed during the withdrawal renewal period. In accordance with the Sikes Act, U.S. Army Alaska is preparing Integrated Natural Resources Management Plans for Fort Wainwright and Fort Greely. These plans are written for a five year period with public, and Federal and State agency participation in their development.

USE-Y036 See Chapter 4.23 for existing and proposed mitigation.

USE-Y036: Under the Preferred Alternative, the withdrawal lands will remain in Federal ownership. This LEIS describes the military's use of the withdrawal lands in Chapter 2.1.3. The Integrated Natural Resources Management Plans, which the Army is completing for Fort Wainwright and Fort Greely, describe the management, rehabilitation, and restoration the military will prescribe on the withdrawal lands. The Plans cover a five year term and their development is coordinated with State and Federal resource agencies, and the public. When the Plans expire, they are reviewed, updated, and approved under the same process for an additional five year term.

WATER-Y004: Targets are placed on gravel bars no less than 50 feet from flowing water in the Delta River and Delta Creek. During clean-up, debris is removed from the riverbeds and not buried within the floodplain. Remediation efforts have been proposed and are described in Chapter 4.23.

ALT-Y036 ACC-Y014: Under the Military Lands Withdrawal Act, the military lands are withdrawn from all forms of appropriation under the public land laws, except where the land is subject to valid existing rights. Trespass structures constructed on the withdrawal lands are illegal. U.S. Army Alaska does not authorize trespass structures on the its lands.

USE-Y037: Historically, September has been utilized for range maintenance. The military utilizes this period for annual Impact Area decontamination and target maintenance. To date, it has not resulted in the training lands being closed to the public. Please contact the Military Police to obtain access to military lands.

ALT-Y036: Noted. Thank you for your comments.

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long to lock up land without some kind of review by the public. We live here. We are being adversely affected by the impending closure of the Ft. Greely Army post. The ability to hunt and make use of the land near Delta Junction will become more important than it already is as family incomes take a hit from loss of jobs and the need to hunt for food for the table becomes vital to a family's existence. For many people, hunting is a way of life and as incomes decrease, traveling to distant areas to hunt will become difficult, if not impossible. The ability to hunt in these areas, with hunting camps as an aid will become more and more important to a family's livelihood and I can see no harm coming from their existence.

I will be interested to hear from you concerning the answers to these questions.

Sincerely,

Earl F. Malcolm

cc;

- Rep. Don Young
- Sen. Frank Murkowski
- Sen. Ted Stevens
- Gov. Tony Knowles

REC-Y005

REC-Y005: The primary use of the withdrawn lands is for military purposes. The Army allows hunting in areas that are safe for the public and do not interfere with military activities. Delta Junction is surrounded by State land where hunting is allowed.

Ζ

US Arniy Alaska Lands Withdrawal Renewal EIS

Comments +/22/97 2/57/99 June Thomasson, representing self 3175 Chinook Drive Fairbanks, AK 99709

- 1) The EIS should be approved for ten years only. The population of Fairbanks is continuing to grow, only partly as a result of military changes. This will place increasing stress on surrounding areas used not only for residences but especially for accreation. Needs of the broughs with respect to military lands deserve review every ten years. Also, environmental/coological knowledge and technology are rapidly changing, more frequent review will facilitate utilization of the latest expertise.
- 2) No additional areas of contamination should be allowed. To declare areas unsalvageable is dangerous to human and ecological health, to expand such areas is unthinkable in this era of increasing awareness of the pervasive spread and effects of toxins. Again, increasing populations increase the risk for damage.
- 3) Rc: 2.3 3 Beaver Creek South Fork of the Chena River This area should be relinquished to the State of Alaska, Division of Parks, as established by the legislature years ago. With the growing population of the Fairbanks area (which includes increasing military), the Chena State Recreation Area is heavily used. Military flights docrease the quality of the recreational or tourist experience, and harass wildlife. Restoring this area will help mitigate the effects of increasing human population.
- 4) Consider shared use of air training areas over Yukon Flats Training Area.

gune Thomassen

RESPONSES TO COMMENT Z

ALT-Z037 ALT-Z037: Noted. Thank you for your comments.

USE-Z038: No expansion or addition of Impact Areas would occur under the Preferred Alternative. U.S. Army Alaska policy states that new contaminated Impact Areas will not be created on withdrawal lands without approval per Army regulations and the Bureau of Land Management (AR350-2) and applicable Federal laws, including the National Environmental Policy Act.

ALT-Z038 ALT-Z038: Military use of the Yukon Training Area started in 1956. In 1975 the Alaska State Legislature designated the boundaries of the Chena River State Recreation Area, which includes a portion of Yukon Training Area land referred to as the Beaver Creek-South Fork Area. This State action did not transfer title of the land nor was it supported by Federal agencies. At this time, the State has not designated these lands as high priority for conveyance.

The Army and Air Force considered an alternative to relinquish this portion of the Yukon Training Area (see Chapter 2.3.3) to Alaska State Parks, but eliminated it from further study due to the excessive impacts to military training and the importance of this area's training infrastructure in achieving combat readiness.

Also see the letter from the State of Alaska (comment letter X in this section) dated February 4, 1999 received during the comment period on this LEIS.

ACC-Z015: All areas covered by Military Operations Areas (MOAs) are open to civilian pilots flying under Visual Flight Rules (VFRs). Restricted Areas are closed to civilian aviation during periods of scheduled activity. Civilian pilots can contact the Special Use Airspace Information Service (SUAIS) (1-800-758-8723 or 907-372-6913) at Eielson Air Force Base to hear the latest update on military activity in the MOAs. The Yukon Training Area is covered by parts of three MOAs and Restricted Area R2205. Please review Figure 1.b for specific boundaries of these areas.



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United States Department of the Interior

OFFICE OF THE SECRETARY Office of Environmental Policy and Compliance 1689 C. Street, Room 119 ANCHORAGE, ALASKA 99501-5126

ER 98/772

February 5, 1999

Ms. Cindy Herdrich Center for Ecological Management of Military Lands Vocational Education Building Colorado State University Fort Collins, Colorado 80523

Dear Ms. Herdrich:

In response to your request of October 15, 1998, we have reviewed the Alaska Army Lands Withdrawal Renewal Draft Legislative Environmental Impact Statement (EIS). We offer the following comments for your consideration in preparing the Final EIS.

General Comments

We believe the Draft EIS is inadequate as a basis for the Bureau of Land Management (BLM) to make recommendations concerning Congressional action regarding the granting of the proposed withdrawal. The Draft EIS does not meet certain requirements of the National Environmental Policy Act; for example, a section discussing specific mitigation measures is absent, as is a discussion of formal monitoring and enforcement activities.

The Final EIS should discuss hazardous or solid wastes, which are subjects of concern to the public and to BLM. In addition, discussions of Native American religious concerns, prime or unique farmlands, and wild and scenic river values should be added, even if they are addressed by negative declarations. We do not believe the Draft EIS adequately addresses cumulative impacts, particularly the unavoidable, eventual cost of cleaning up the land--or portions of the land--and either restoring it to the public domain or disposing of it. Also, there is no discussion of indirect impacts. We recommend that these issues be discussed in the Final EIS.

We believe Section 1.1 should be expanded to address the relationship between the preferred alternative and BLM policies, plans, and programs. This would give the reader a better understanding of how and why BLM is involved in management decisions on withdrawal areas.

We are concerned about the possible effects of a 50-year lease and we believe the Draft EIS should analyze more than two alternatives. Analyzing only a no-action alternative and a 50-year withdrawal fails to give decision makers enough information to assess potential effects of taking an intermediate course, such as authorizing the withdrawal for a shorter period, or establishing somewhat different boundaries to allow for greater public use. Adding alternatives for a shorter

POL-AA010 CULT-AA002 OTH-AA010 WATER-AA005 OTH-AA011

OTH-AA012

ALT-AA039

RESPONSES TO COMMENT AA

POL-AA010: Please refer to Chapters 2.1.3.3 and 2.1.3.4 for a discussion of fuels and munitions use on the withdrawal lands.

CULT-AA002: Archeological sites on lands proposed for withdrawal have produced no human remains, funerary items, or other objects of cultural patrimony requiring consultation with Native Alaskans, per the Native American Graves and Repatriation Act of 1990 (NAGPRA). In addition, U.S. Army Alaska does not curate any artifacts subject to consultation per NAGPRA (Alaska State Historic Preservation Office, 1998). Coordination with Native Alaskans during preparation of the Integrated Cultural Resources Management Plan (Alaska State Historic Preservation Office, 1998) and during this project has identified no sacred sites or other resources of religious significance on lands proposed for withdrawal that would require consultation per the American Indian Religious Freedoms Act of 1978 or Executive Order 13007, Indian Sacred Sites. This coordination was through the Tanana Chiefs Conference, Inc. and the Native Alaskan groups listed in the distribution for completion of this LEIS (Chapter 8).

OTH-AA010: No prime or unique farmlands occur on the withdrawal lands.

WATER-AA005: Please refer to Chapters 3.8.4 and 4.8.4 *National Wild and Scenic Rivers System.* Changes have been made regarding your comments.

OTH-AA011: Please refer to the introductory paragraph to Chapter 4, *Environmental Consequences*.

OTH-AA012: See Chapter 1.5 which defines the reasons the Bureau of Land Management is a Cooperating Agency on this document. Also, see Chapter 1.10 and Table 1.b which provides a listing of the laws and regulations relating to the withdrawal renewals.

ALT-AA039: NEPA requires the preparer of an EIS to define and consider reasonable alternatives. Reasonable alternatives are those that are technically implementable. The Army and Air Force eliminated alternatives from further analysis if they could not be implemented without adversely affecting the military's mission in Alaska (see Chapter 2.3). In addition, NEPA requires a range of alternatives be analyzed in an EIS. Neither NEPA nor the CEQ Implementing Guidelines defines range by indicating a specific number of alternatives. Rather, the nature of the project, the scope of proposed actions, and the differing levels of impacts all contribute to the definition of range. For the LEIS to analyze the proposed action under a range of alternatives consisting of various lengths of renewal periods would offer little effective impact analysis since the scope of actions would remain virtually the same under each time period. Chapter 2.1 and 2.3 describe the methods used by the Army and Air Force in establishing the alternatives to be analyzed in this LEIS.

period or with different boundaries would substantially strengthen the document and address a major cause of public controversy over the action.

Our concerns about the length of the proposed withdrawal would be reduced if there were mechanisms identified and fully discussed to ensure adequate mitigation and monitoring. We are aware that The Barry M. Goldwater Range in southern Arizona has developed a cooperative management council consisting of the heads of several agencies to coordinate management among defense and natural resource management agencies. This council, which operates by consensus, will produce a report every 5 years that evaluates the need for the withdrawal and assesses how well the goals and objectives of the council are being met. If the Final EIS were to integrate a proposal for such a council into the preferred alternative and include as one of the council's roles adequate monitoring of the activities that occur during the lifetime of the withdrawal, we would support such a council and would be interested in actively participating. Such an action would reduce our concerns about the length of the proposed withdrawal.

Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA) requires that any agency withdrawing public lands evaluate the effect of the withdrawal on subsistence uses and needs. If the agency determines that subsistence uses and needs may be significantly affected, the agency must hold public hearings and take several other steps prior to initiating the withdrawal. This determination is usually contained in an appendix because the requirements of ANILCA differ substantially from those of NEPA. We believe the determination in section 4.20 of the Draft EIS fails to meet all the ANILCA requirements, and that it should be expanded and moved to an appendix. Section 4.20 schuld be rewritten to meet NEPA's requirements. In addition, section 4.20 erroneously concludes that "As there is no subsistence activity as legally defined under ANILCA, the preferred alternative would result in no significant adverse effects on the customary or traditional subsistence uses of withdrawal lands on Fort Wainwright and Fort Greely." This statement is incorrect in that subsistence Board. We suggest this be corrected in the Final EIS.

Attached are detailed comments on specific sections of the Draft EIS.

We appreciate the opportunity to comment on this Draft EIS, which represents a very significant action having wide-ranging effects on land management patterns in the Interior of Alaska. We would be pleased to assist the Army in making modifications for the Final EIS. Please contact Bob Schneider, BLM field office manager, at (907) 474-2302 to further discuss these comments and any way we may be of assistance.

Sincerely

Regional Environmental Officer - Alaska

Attachment

*-AA040 ALT-AA040: Periodic review of the Army's use and management of the withdrawal lands would occur. In accordance with the Sikes Act, U.S. Army Alaska is preparing Integrated Natural Resources Management Plans for Fort Wainwright and Fort Greely. These plans are written for a five year period with public, and Federal and State agency participation in the development and update process. The Army and Bureau of Land Management have entered into discussions relating to the cooperative management of Federal lands used by the Army. Also see proposed mitigation in Chapter 4.23 for monitoring programs which will be implemented on the lands if the withdrawals are renewed.

SUB-AA006: We have made+changes to Chapter 3.20 and 4.20 based on your comments.

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ATTACHMENT

Specific (Comments
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In the following comments strikeout is used to show suggested deletions and shaded **bold** is used for suggested additions.

Vol. I, pg. ES-1, Executive Summary We suggest a complete citation is needed: This LEIS is required by the Military Lands Withdrawal Act (Public Law 99-606, 100 Stat. 3457, et seq.)	OTH-AA013	OTH-AA013: Added in Final LEIS.
Vol. I, pg. ES-3, para. 1 We suggest this rewording: "way or other authorization for" [See Sec. 3(a)3(B) of P.L. 99- 606 as source for this change.]	OTH-AA014	OTH-AA014: Change made to Executive Summary.
 Vol. I, pg. ES-5, para. 2 We believe this section needs clarification - perhaps by adding at the end of the paragraph: the lands of this withdrawal renewal. However, it does impact lands along the Richardson Highway located between the Ft Greely East and West Training Areas. 	OTH-AA015	OTH-AA015: Clarified in the Executive Summary the land on Fort Greely which will be surplused after BRAC is completed. Also added reference to Figure ES.a
Vol. I, pg. ES-5, para. 5 We suggest deleting the first sentence: All alternatives were considered. Two alternatives were considered in detail	ALT-AA041	ALT-AA041: Reworded Executive Summary.
 Vol. I, pg. ES-6, para. 5 We suggest the second alternative of partial land withdrawal reference the land utilization maps:Alaska. Therefore, the Army and Air Force eliminated this alternative from further study. Military utilization areas are shown on Figures 1.b, 2.b and 2.c. 	ALT-AA042	ALT-AA042: Added reference to Figure ES.a.
Vol. 1, pg. ES-6, para. 7 The title of the fourth alternative is improperly labeled. The BLM does not "retain" the land; the Federal Government retains the land. The BLM manages Federal land. The alternative could be more properly worded:	ALT-AA043	ALT-AA043: Changed titles on 2.3.4 and Executive Summary to Bureau of Land Management Retain Authorization for Mineral Extraction.
"4. Land Opened to Mineral Leasing and Location." This alternative would allow the Bureau of Land Management the right to grant use of the withdrawal lands for mineral extraction without Army concurrence. Surface use of the land would still require prior Army concurrence, limiting the opportunities for mineral extraction except by slant drilling, or similar extraction methods.		
This comment also applies to: <u>Alternative Considered</u> page 2-36 paragraph 1 (2.3.4 Bureau of Land Management Retai Subsurface Mineral Rights).	'n	

Vol. I, pg. ES-6, Alternatives Eliminated from Further Study

The scope of actions would <u>NOT</u> remain virtually the same during varying time periods. Changes in policy within the government at all levels and departments are continuous. Environmental management of lands under the care of the Army is subject to change with each new individual assigned to a responsible position affecting the implementation of resource management plans. Selection of shorter time periods would provide greater flexibility to the people of the United States to influence the management of the withdrawn lands. We believe additional alternatives should be addressed in the Final EIS.

Vol. I, pg. ES-6

We believe the Final EIS needs more explanation as to why 15- or 20-year renewals were not considered in detail. The "Preferred Alternative of Withdrawal Renewal" for 50 years is over three generations. Granted, Congress has the decision authority; however, we believe Congress should be provided facts and information as to why alternatives with 15- or 20-year time periods would not meet the military objectives.

Vol. I, pg. ES-6, para. 4

The last sentence of the first alternative to renew the withdrawal for varying lengths of renewal periods, is not the BLM preferred alternative, this should be corrected. We believe that sufficient studies have not been completed to evaluate the environmental impacts from the last 50 years of military use and that the evaluation is not sufficient to warrant more than the Federal Land Policy and Management Act mandate of 20 years maximum. A 15- to 20-year withdrawal, which has a monitoring plan - especially on the existing high impact areas - is preferred. Evaluation of the decontamination efforts implemented to date has not been completed - or at least is not evident in the Draft EIS. Alternate high impact areas may need to be evaluated to allow existing areas to be reclaimed. The proposal as written doubles the amount of land closed to the public in the Ft. Greely west area with almost no justification. These same comments apply to Sections 2.1.3 Preferred Alternative, page 2-5 and 2.3.1 Alternatives Considered, page 2-32.

Vol. I, pg. ES-7, Section 5, Acquiring Alternate Training Lands.

We believe that the military plans for the eventual clean-up and decontamination of impact areas should be explained. It may be desirable to limit the areas of actual impact of explosive ordinance so that clean-up and decontamination may be less cost prohibitive. It appears that many of the target areas (Figs. 2.d & 2.e) are located in or very near wetlands. These are the areas that are the most difficult to clean up, besides having the potential for water quality contamination.

Vol. I, pg. ES-7, para. 4 to end of page

The following are suggested to clarify the presentation:

1. The No Action Alternative would occur if Congress does not grant the requested withdrawal renewal. The lands would no longer be available for military use after November 5, 2001. These lands in conjunction with the recently approved Military

ALT-AA044: Periodic review of the Army's use and management of the withdrawal lands would occur. In accordance with the Sikes Act, U.S. Army Alaska is preparing Integrated Natural Resources Management Plans for Fort Wainwright and Fort Greely. These plans are written for a five year period with public, and Federal and State agency participation in the development process. Also see proposed mitigation in Chapter 4.23 for monitoring programs which will be implemented on the lands if the withdrawals are renewed.

ALT-AA045

ALT-AA046

MIT-AA011

ALT-AA047

ALT-AA045: The Army's selection of a 50-year renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A credible operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources to protect resource values and implement natural resource management measures.

ALT-AA046: U.S. Army Alaska is the preparer of this LEIS. Its Preferred Alternative is to renew the withdrawals for 50 years. The Bureau of Land Management's preferred term for withdrawal renewal will be included in its recommendation to Congress.

Sufficient studies have not been completed to fully evaluate the environmental impacts from military use. Proposed mitigation in this LEIS will collect the necessary data to assess impacts and determine the rehabilitation and restoration to be implemented through the Integrated Natural Resources Management Plans under the Army's ITAM (Integrated Training Area Management) program.

MIT-AA011: Please refer to responses for POL-A001 and POL-A002. Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23).

Impact Areas are permanently dedicated areas where shelling, bombing, explosive demolition, and direct fire from weaponry occurs. Areas that receive impact from ammunition are limited to the locations in the vicinity of Army and Air Force Target Arrays. Thus, current decontamination efforts are concentrated in these areas.

ALT-AA047: No Change Necessary.

Operations Areas provide a unique training opportunity. The loss of these training lands would severely reduce combat readiness for military units worldwide.

If the military land withdrawals are not renewed, jurisdiction of the land would revert to the BLM. If the lands are contaminated to an extent which prevents opening the lands to the operation of the public land laws, the military would be responsible for clean up and public safety under Section 8(e) of the PL 99-606. The State of Alaska has already selected these lands in accordance with the Alaska National Interest Lands Conservation Act (ANILCA, 94 Stat. 2371) for recreation, mineral rights, wildlife, forestry, agriculture, settlement and transportation values. Until the land is conveyed to the State, the land would be managed by BLM under the existing Resource Management Plans until new plans could be developed.

Conveyance to the State could preclude reestablishment of the training areas in the future. No other large Federal land masses with road access to military land exist in Alaska except parks, forests, and wildlife refuges.

Vol. I, pg. ES-8, para, 1

The Final EIS should be corrected to show that the BLM's preferred alternative is to renew ALT-AA048 for a maximum of 20 years, until November 6, 2021.

Vol. I, pg. ES-8 para. 2

We suggest the following corrections:

During the withdrawal period, the Secretary of the Interior and the Secretary of the Army would manage the lands subject to conditions and restrictions necessary to permit military use of these lands. The Secretary of the Army would close any road, trail, or portion of the land to public use if necessary for public safety, military operations, or national security. The Secretary of the Interior can issue a lease, easement, right-of-way, or other authorization for nonmilitary use of these lands with the concurrence of the Secretary of the Army. Hunting, fishing and trapping on these lands is permitted in accordance with the provisions of *Military* Reservations and Facilities: Hunting, Fishing and Trapping (Title 10 United States Code Section 2671).

Vol. I. pg. ES-11. Executive Summary, Issues

The issue of Submerged Lands is not clearly defined. We suggest re-wording this issue. LAND-AA004 Perhaps more than one issue exists relating to water quality and submerged lands and they could be separated for clarity.

Vol. I, pg. ES-85, Section 3.17.6, Aerial Tours and Guide Service

It should also be noted in the Final EIS that any commercially guided or outfitted hunts would ACC-AA016 need to be permitted by the BLM under Special Recreation Use Permit guidelines and with concurrence of the military.

ALT-AA048: U.S. Army Alaska is the preparer of this LEIS. Its Preferred Alternative is to renew the withdrawals for 50 years. The Bureau of Land Management's preferred term for withdrawal renewal will be included in its recommendation to Congress.

Sufficient studies have not been completed to fully evaluate the environmental impacts from military use. Proposed mitigation in this LEIS will collect the necessary data to assess impacts and determine the rehabilitation and restoration to be implemented through the Integrated Natural Resources Management Plans under the Army's ITAM (Integrated Training Area Management) program.

LAND-AA004: Please refer to Executive Summary and Chapter 1.8. Additional information regarding water quality and the jurisdiction of submerged lands has been added to these sections. Chapter 3.1.1 and Chapter 4.1 describe submerged lands and their relation to land use. Chapter 4.8.2 describes the issue of water quality of withdrawal lands.

ACC-AA016: Information has been added to Chapter 3.17.6.

 Vol. I, pg. I, Table of Contents We suggest this correction: Purpose of and Need for Proposed Action Vol. I, pg. ii, Table of Contents Affected Environment 3.8 Surface Water We suggest that Flootnames which are required to the suggest that Plootnames which are required to the suggest to the suggest the suggest to the suggest that Plootnames which are required to the suggest to	OTH-AA016	OTH-AA016: The title of Chapter 1 in the LEIS, <i>Purpose of and Need for Action</i> , is the recommended title of this chapter by the CEQ Implementing Guidelines for NEPA.
 by NEPA to be addressed, may be a more appropriate title for Section 3.8.1 than Streamflow. Vol. I, pg v, Table of Contents A section is missing after 4.22. A new section 5 needs to be added: 	MIT-AA012	WATER-AA006: Information regarding floodplains is contained in Chapter 3.8.1.2 High Flow/Floodplains, Figure 3.8.c Floodplains, and in Appendix 3.8.B Floodplains.
Monitoring Plan 5.1 Existing and proposed mitigation measures 5.2 Studies to be completed prior to future withdrawal renewal		MIT-AA012: Chapter 4.23 Existing and Proposed Mitigation has been added to the Final LEIS. This chapter describes existing and proposed mitigation measures for each resource evaluated in the LEIS. Mitigation measures are also described for each resource within Chapter 4 Environmental Consequences. Mitigation measures
We suggest this modification: "a lease, easement, right-of-way, or other authorization for" [See Sec. 3(a)3(B) of P.L. 99-606 as source for this change.]	OTH-AA017	Are also outlined in Chapter 2.1.3.6 Existing Witigation and Chapter 2.1.3.7 Proposed Mitigation.
Vol. I, pg. 1-2, Section 1.1.2, Description of Fort Greely West and East Training Areas	OTH-0018	OTH-AA017: Added word "other" on Page 1-2.
We believe a new paragraph is needed to explain separation of two training units and reference the map: "The two training areas are separated at the north by the main post withdrawal, Public Land Order 255, and at the south by a transportation corridor withdrawal, Public Land Order 5150, utilized by the trans-Alaska oil pipeline and the Richardson Highway (The parcel locations are shown on figure ES.a.)."	011-44016	OTH-AA018: No Change Needed. Figure 1.a is referenced.
 Vol. J, pg. 1-4, Section 1.2, Need For Action, para. 3 We suggest adding a new heading to clarify which land area is being discussed: Ft. Greely Training Areas, Army Use Fort Greely is suitable for testing 	OTH-AA019	OTH-AA019: Change not necessary.
 Vol. I, pg. 1-5, Section 1.2, Need For Action, para. 2 we suggest adding a new heading to clarify land area being discussed: Ft. Wainwright Yukon Training Area, Army Use Fort Wainwright Yukon Training Area is the closest 	OTH-AA020	OTH-AA020: Change not necessary.
 Vol. I, pg. 1-5, para. 3 We suggest adding a new heading to clarify additional land use: U.S. Air Force Use The U.S. Air Force is a major user of 	OTH-AA021	OTH-AA021: Change not necessary.
Vol. I, pg. 1-5, para. 5As written, we believe this section does not present a convincing need for the proposed action.We suggest adding a new heading and inserting text from chapter 2:	OTH-AA022	OTH-AA022: Change not necessary.
1.2.1 Military Operations Parameters & Training Needs		
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Realistic training situations must exist to ensure the combat readiness of our armed forces in all environments.... This in turn, threatens our military's national defense capabilities and our ability to protect U.S. forces and interests worldwide.

[insert section 2.1.1 from pgs. 2-1, 2-2, 2-3, and 2-4]

Training Needs

There are three general military land uses: 1) Cantonment or Main Post areas; 2) Impact Areas; and 3) Training Areas. The withdrawal renewal lands are utilized only for Impact Area and Training Area land uses.

Impact Areas

Impact Areas are permanently designated areas where.... A division-sized area of operations may range between 2-5 million acres (DA 1991).

Vol. I, pg. 1-6, Section 1.3, Proposed Action

We believe this discussion should reference a map describing the general location on the subject lands possibly with a new second paragraph as follows: The general location of the lands involved, in relationship with other military land withdrawals is shown in Figure 1.a

Vol. I, pg. 1-9, Section 1.8, Issues, para. 2

Under Access, we suggest changing the wording of the last sentence: Access: Conflicts of public use of the withdrawal lands and overlaying airspace for recreational activities. This issue will be further addressed in the Integrated Natural Resource Management Plans that are being prepared. Not be resolved in this LEIS:

Vol. I, pg. 1-9, Section 1.8, Submerged Lands

We recommend changing the wording of the last sentence: Submerged Lands: Impacts on water quality and contamination of submerged lands (property below the mean high level water mark) due to military use will be monitored in the future, and Jurisdiction of submerged lands on the withdrawal properties, particularly the Delta River may have to be resolved in court, where other lands withdrawn at the time of statehood are presently in litigation.

This comment also applies to: <u>Section 3.1.1 Submerged lands</u> page 3-2, last paragraph.

Vol. I, pg. 1-11, Regulatory Requirements

We suggesr additional citation information be included: The Engle Act of 1958 (43 U.S. Code 155 et seq.)
The Military Land Withdrawal Act of 1986 (MLWA, PL 99-606, 100 Stat. 3457)
The Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.) OTH-AA023 OTH-AA023: Added reference to Figure 1.a.

ACC-AA017 ACC-AA017: Change not necessary.

LAND-AA005: Please refer to Executive Summary and Chapter 1.8. Additional information regarding water quality and the jurisdiction of submerged lands has been added to these sections. Chapter 3.1.1 and Chapter 4.1 describe submerged lands and their relation to land use. Chapter 4.8.2 describes the issue of water quality of withdrawal lands.

OTH-AA024 OTH-AA024: Included in Final LEIS.

σ	Vol. I, pg. 2-8, Section 2.1.3, Preferred Alternative We suggest this paragraph reference Figure 2.d.	Vol. I, pg. 2-6, para. 1, end of line 3 We suggest adding a word: " these lands. Management of these lands would follow the Integrated Natural Resource Management Plans"	Conveyance to the State could preclude reestablishment of the training areas in the future. No other large Federal land masses with road access to military land exist in Alaska except a park, a forest, and a wildlife refuge.	Decontaminated land not conveyed to the State will remain withdrawn from all forms of appropriation, including location and entry under the mining laws and from leasing under the Mineral Leasing Act until further classified by BLM. Until the land is conveyed to the State (if ever), the land would be managed by BLM under the existing Resource Management Plans until new plans could be developed.	of Alaska subject to valid existing right and Native selection rights. However, lands listed as moderate to low priorities for conveyance to the State may be retained under BLM management.	Vol. I, pg. 2-5, Section 2.1.2, No Action Alternative The first paragraph needs additional wording to clarify the land status:	Vol. I, pg. 2-3, Military operational Parameters, para. 3 The last sentence states "These zones deny access" More accurate wording might be: These zones deny Access to land areas in safety zones when weapons are being used is denied.	Fort Wainwright Yukon Maneuver Area Resource Management Plan (BLM/AK/PT/94/011+1600+030)	Fort Greely Resource Management Plan (BLM/AK/PT/94/010+1600+080)	Vol. I, pg. 1-15, Section 1.10.3 We suggest explaining the relationship of this action to BLM policies, plans, and programs and summarizing land use determinations which affect the proposed action or alternatives by adding something similar to the following: This EIS does not pre-cempt or replace the existing resource management plans listed below. The following Resource Management Plans, prepared jointly with the Army in 1994, will continue to be implemented through MOU AK-930-9508 until November 6, 2001, or until the MOU is cancelled, extended, or renewed. Approval of the proposed Integrated Natural Resource Management Plans for these lands may require modification or replacement of the MOU. The plans are:
	ALT-AA051	ALT-AA050			ALT-AA049		OTH-AA026			OTH-AA025
	ALT-AA051: Change not necessary.	ALT-AA050: Included in Final LEIS.		Action Alternative in Chapter 2.1.2.	ALT-AA049: Removed "Native Selection Rights" under the No Action Alternative. Also included discussion of status of lands if not conveyed to the State under the No		OTH-AA026: Change not necessary.			OTH-AA025: See Chapter 3.1 Land Use. Change not necessary.

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Vol. I, pg. 2-9, Section 2.1.3, Preferred Alternative, para. 2 We suggest acreage necessary to support the operations be quantified. The Training Areas were established to support battalion-sized operations (47,000 to 61,000 acres) under varying terrain conditions. The Training Areas west of the Delta River can support brigade or task force-sized maneuvers or operations (94,000 to 190,000 acres).	
Vol. I, pg. 2-18, Section 2.1.3, Preferred Alternative, para. 1 We suggest ending the paragraph with a reference to Figures 2.c. 2.d and 2.e.	
Vol. I, pg. 2-20,We believe that the discussion under the subheading "Fuels" deals with solid and hazardous waste and that this information is important enough it should have its own heading in the Affected Environment Section - Chapter 3.	F
 Vol. I, pg. 2-26, Section 2.1.3.1, Existing Mitigation and Pg. 2-28, Section 2.1.3.2, Proposed Mitigation Since Cultural Resources are addressed in this EIS, we believe they should be included in the list of implemented programs to be continued in the future. 	
Vol. I, pg. 2-30, Section 2.2, Comparison of Alternatives, para. 3	

An assumption appears to have been made that all the lands presently under withdrawal would be conveyed to the State. This is not a very likely scenario. However, if that assumption is used for purposes of Table 2.k, the wording in paragraph 5 should be modified and a BLM management scenario added. Table 2.k assumes under the No Action alternative that all land in the withdrawal would be conveyed to the State. Any lands not conveyed to the State would be managed by BLM. The BLM management may involve issuing leases or authorizing other uses, but not conveyance into private ownership. Management of the land would be the same as in the proposed action except Army concurrence would not be required.

State resource management under the No Action.... This comment also applies to Table 2.1

Vol. I, pg. 2-31, Table 2.K

This entire chart is based on a comparison of the management policies of the Army and the State of Alaska. This is supposition of events in the future. Upon expiration of the withdrawal, the land ownership will remain unchanged unless and until it is made suitable for return to the public domain. The BLM will still be the Federal land manager. The chart should be modified in the Final EIS to reflect this fact, since future disposition of these lands is not the issue of this EIS nor is the hypothetical management policies of a possible future land holder.

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- ALT-AA052 ALT-AA052: Change not necessary.
- ALT-AA053 ALT-AA053: Change not necessary. Reference to figures are in the previous paragraph.
- **POL-AA011 POL-AA011:** Please refer to Chapters 2.1.3.3 and 2.1.3.4 for a discussion of fuels and munitions use on the withdrawal lands.
- MIT-AA013: Added existing mitigation to Chapter 4.18 and Chapter 2 under the Preferred Alternative.
- ALT-AA054 ALT-AA054: See Chapter 2.1.2 the No Action Alternative description.

ALT-AA055 ALT-AA055: To analyze impacts under the No Action Alternative, management policies and plans of the future land holder for the withdrawal lands were reviewed. The No Action Alternative (Chapter 2.1.2) defines what will happen to the withdrawal lands if the withdrawals for military use expire.

Vol. I, Chapter 3, Affected Environment

We suggest improving maps, such as Figures 3.11.a Ecosites (pp 3-140) through 3.11.e (pp 3-44) by adding geographic reference such as creeks, roads, or village names, to make them more useful.

Vol. I, pg. 3-1, para. 4 and 5, Land Acquisition

It was difficult to verify the information in this section without a reference number for the Public Land Orders and Legislation. We suggest adding those identified below below. Also, there are a few discrepancies with dates and wording, for example, BLM does not segregate land-withdrawal orders do:

In 1950 the Air Force obtained a non-expiring withdrawal of 22,600 acres through a Public Land Order (PLO) 684 within what is now known as the Fort Wainwright Yukon Training Area. Additional withdrawals were granted to the Air Force in 1952 (PLO 793) for 6,720 acres and in 1955 (PLO 1205) for 4,760 acres. These withdrawals were later transferred to the Army by PLO 1523. In 1956 the Army obtained permit from the Secretary of Interior for use of 256,000 acres (see BLM Casefile F-020174) and two NIKE missile test sites (see PLO 1523), making up the remainder of the Yukon Training Area.

After passage of the Engle Act in 1958...Congress passed legislation Public Law 87-326 withdrawing 256,000 acres of the Fort Wainwright.... That withdrawal was extended for an additional five years in 1971 1972 through a Public Land Order 5240. In 1976, the Bureau of Land Management The withdrawal application notice published in 1975 (BLM Casefile F-020174) segregated the Yukon Training Area from public use ... with the passage of the Military Lands Withdrawal Act by Congress Public Law 99-606, 100 Stat. 3457. At that time, the Army did not....

Fort Greely West and East Training Areas:

In 1950, the Army obtained a Special Land Use permit from the DOI. For use of The 572,000 acres now known as the Fort Greely West Training Area was segregated from public use by publication of withdrawal notice F-35871 in 1955. The permit was granted six month extensions until passage of legislation Public Law 87-326 in 1961 granting withdrawal for a ten year term. The withdrawal was renewed in 1971 1972 for five years by PLO 5238, excluding a five acre Trade and Manufacturing site near the western edge of the West Training Area. In 1976 the Bureau of Land Management The land remained segregated the West Training Area from public use pending renewal of...

Vol. I, pg. 3-1, Section 3.1, Land Use

We suggest adding some clarifying language: U.S. Army Alaska is currently preparing Integrated Natural Resources Management Plans for Fort Wainwright and Fort Greely, as required in the Sikes Act (16 USC 670a et seq.). It is working closely with the BLM. When

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VEG-AA001

VEG-AA001: Waterways have been added to Figures 3.11.a-3.11.e.

LAND-AA006 LAND-AA006: Appendix 1.B contains detailed information on land acquisition of Fort Wainwright and Fort Greely. Figures 3.1.a and 3.1.b include all Public Land Orders and Public Laws by their numbers. Appendix 1.B is referenced in Chapter 3.1. Segregation wording in Chapter 3.1 was corrected.

LAND-AA007

LAND-AA007: Added Sikes Act to Chapter 3.1.

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the Integrated Natural Resources Management Plans are completed and approved, joint management of the withdrawal lands will continue under the new plans.	
If the withdrawal is not revewed, the land will continue to be managed under existing plans (without the need for military approval) until the lands are conveyed or a new plan is in place.	
Vol. I, pg. 3-2, Section 3.1.1, Land Acquisition for Military Use/Submerged Lands We believe the nature of the desired cleanup needs to be described or defined in the section that state: "the Alaska Division of Land has requested cleanup of the Delta River."	LAND-AA008: Please refer to responses for POL-A001 and POL-A002. Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23).
 Vol. I, pg. 3-3, Section 3.1.2, Existing Rights-of-Way We believe these paragraphs should refer to the entity granted the rights-of-way, not who manages them, as this can change daily. The discussion should include the BLM serial numbers (TAPS F-12505, ANGTS F-24538, TAGS F-83941) and the Alaska Natural Gas Transportation System was granted to the Alaska Natural Gas Transportation Company. 	LAND-AA009: Removed management companies from discussion on Rights-of- Way on the Withdrawal Lands.
 Vol. I, pg. 3-3, Section 3.1.3, Surrounding Land Use The final sentence of the last paragraph, the BLM record for T.1S., R.4E., Fairbanks Meridian, does not show conveyance of land to Native corporation by Interim Conveyance 783. 	LAND-AA010: Change not necessary.
 Vol. I, pg. 3-3 and 4, Section 3.1.3, Surrounding Land Use We suggest paragraphs 4 and 5 need quantification of use for agriculture and settlement, and should be modified: State lands to the south are managed for fish and wildlife habitat and forestry. About 3,000 acres have been designated for agricultural sale and 200 acres for settlement. 	LAND-AA011: Added acreage amounts into discussion on surrounding land use in Chapter 3.1.
The Chena River Recreation Areais managed for agriculture, public recreation and fish and wildlife habitat. Approximately 490 acres is designated for future recreational settlements or fee simple homesteads.	
State lands to the north of Fort Greely are managed for forestry, fish and wildlife habitat, public recreation & watershed maintenance. Up to 60,000 acres may be designated for agricultural disposal depending on results of soil surveys. An additional 1,000 acres is designated for future settlement.	
 Vol. I, pg. 3-10 to 3-11, Terrain/Glaciers The Draft EIS suggests that "no glaciers exist in the Fort Wainwright Yukon Training Area or the Fort Greely West and East Training Areas," and that "valley glaciers located in this rugged topography included Gilliam, Trident (whose terminus is within Fort Greely West Training)." Section 3.3 should state "that glaciers do exist in the Fort Greely West Training Area (see Map -Figure 3.3.c)." 	GLAC-AA001: No change necessary. Please refer to Chapter 3.3 <i>Terrain</i> and Chapter 3.3.1 <i>Glaciers</i> .

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Vol. I, pg. 3-11, Section 3.4, Geology

It is inaccurate to say the region contains deformed and faulted metamorphic and igneous rocks of Precambrian to Mesozoic age. It is important to differentiate the ages of metamorphic versus igneous rocks. A more accurate statement might begin, "This is a region GEOL-AA001 of deformed and faulted metasedimentary and metaigneous rocks of Paleozoic and possibly Precambrian age that are intruded by plutons of Mesozoic and Cenozoic age, and overlain...."

GEOL-AA002

Vol. I, pg. 3-12, Section 3.4, Geology

The later and more complete version of Foster et al., 1987, should be referenced here:

Foster, H.L., Keith, T.E. C., and Menzie, W.D., 1994, Geology of the Yukon-Tanana area of east-central Alaska, in The Geology of Alaska, George Plafker and H. C. Berg (eds): Geological Society of America, Boulder, Colorado, The Geology of North America, G-1, pp. 1977-217.

A published abstract, Page et al., 1995 (see below), should be referenced here with, or instead of, "Hammond, personal communication."

Page, R.A., Plafker, George, and Pulpan, Hans, 1995, Earthquakes and block rotation in east-central Alaska: GSA Abstracts and programs, v. 27, no. 5, p.70.

The paragraph which begins "There has not been..." omits geologic mapping that has been done in the two areas, which includes Weber, et al., 1978, for the Fort Wainwright military holdings, and Nokleberg et al., 1992 (see bleow), for the Fort Greely holdings, which we suggest be included:

Nokleberg, W. J., Aleinikoff, J.N., Lange, I.M., Silva, S.R., Miyaoka, R.T., Schwab, C.E., and Zehner, R.E. 1992, Preliminary geologic map of the Mount Hayes quadrangle, eastern Alaska Range, Alaska: U.S. Geological Survey Open-File Report 92-594, 1 sheet, scale 1: 250,000, 39 p.

Vol. I, pg. 3-12, Section 3.4, Geology, Fort Wainwright Yukon Training Area References are needed to substantiate the Proterozoic age, which is not an accepted age.

Vol. I, pg. 3-13, Section 3.4, Fort Greely West and East Training Area

The third sentence of the first paragraph should read. "The Fort Greely area is underlain by altered metasedimentary and metavolcanic sedimentary and volcanic rocks..."

Vol. I, pg. 3-14, Section 3.5, Mineral Resources

It is derived from the summary in Section 3.5 of the Draft EIS that mineral exploration surveys are not complete enough to identify or evaluate the potential mineral deposits that may exist in the area of concern. We suggest that mineral resources be evaluated in more detail to better ascertain potential mineral deposits.

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GEOL-AA001: Some geologic terms in the Preliminary Draft LEIS were considered too technical for the general audience, so the language was deliberately simplified. From a geologist's point of view, the result may be perceived as oversimplification or inaccuracy. However, the LEIS must consider non-geologists as well as trained geoscientists. As a compromise, only the most essential geologic terms were used in the Draft LEIS, and a simple glossary and geologic time scale were included in Appendix 3.4.A.

Chapter 3.4 Geology has been modified to include the age of the rocks.

GEOL-AA002: Although Foster et al., 1987 was not cited on this particular page of the Draft LEIS, the 1994 publication is an important work that will be referenced elsewhere and added to the Bibliography.

The abstract by Page et al. has been reviewed, cited as suggested, and added to the Bibliography. Note that B. Hammond was inadvertently omitted from Chapter 7 Agencies and Individuals Contacted. The correct entry reads as follows: "Hammond, Bob. Geophysicist, Alaska Volcano Observatory. Fairbanks, Alaska."

References were not used for this general introductory statement. However, work by Weber and Nokleberg is extremely important and is cited elsewhere in the Draft LEIS.

- **GEOL-AA003 GEOL-AA003:** The Proterozoic age was derived from Foster et al. (1994), pp. 207 and 235. However, the paragraph has been modified to be more consistent with the earlier description of the Yukon-Tanana terrane. Please refer to Chapter 3.4 *Geology*.
- **GEOL-AA004 GEOL-AA004**: As noted in comment GEO-AA001, some terms have been deliberately simplified to accommodate readers who do not have a background in geology.
 - MIN-AA012 MIN-AA012: No change. The Army does not intend to conduct surveys to ascertain potential mineral deposits.

Vol. I. pg. 3-14, para. 2, last line **MIN-AA015**. The reference will be added as indicated; however, the date of this MIN-AA013 "Kiell" should be "Keill " Chapter 6. Vol. I, pg. 3-14, Section 3.5, Saleable Minerals The name should be corrected to "Bundtzen" Chapter 3.5 Locatable Minerals has been rewritten to accurately describe the drilling **MIN-AA014** close to Fort Wainwright. Vol. I. pg. 3-15, Fort Wainwright Yukon Training Area, Locatable Minerals The reference Menzie and Foster, 1979 should be included at the end of the fourth sentence of the third paragraph after "target for sedex-type mineralization." It is inaccurate to attribute the described zinc and lead mineralization to rocks distant (i.e., in **MIN-AA015** aeoloav. the eastern Alaska Range and southeastern Yukon Territory) from the Wainwright training area, whereas drilling shows them to be quite close to Wainwright and in the same unit, Pzq. The inaccuracy may affect the evaluation of locatable mineral potential suggestions. Vol I, pg. 3-16, Section 3.5, Mineral Resources, Fort Wainwright Yukon Training Area. Locatable Minerals The sentence on the top line should read: "... contains metavolcanic and metasedimentary **MIN-AA016** volcanic and sedimentary rocks " Vol. I, pg. 3-26, para. 1 and 2 1.a for a general location map of the withdrawal area. It is not necessarily true that river channels, lakes, wetlands, and other low-lying areas covered WATER-AA007 by water are permafrost free. It is quite common to find permafrost under many of these areas around Fairbanks. We suggest this be corrected in the Final EIS. Alaska Water Quality Standards. Vol. I, pg. 3-26, para. 1 The last sentence of the first paragraph is incorrect. While thaw bulbs exist around sizeable rivers and they can be basically permafrost free, wetlands frequently exist because of poor **WET-AA001** drainage caused by underlying permafrost. We suggest this be corrected in the Final EIS. Vol. I, pg. 3-26, Section 3.8, Surface Water Fort Greely West and East Training Areas WATER-AA008 We suggest including a reference and man that indicates the area's location. Vol. I, pgs. 3-30 and 3-31. Water Ouality further information. It should be noted that criteria within Alaska Water Quality Standards Section 1(C) "Growth and propagation of fish, shellfish, other acquatic life and wildlife" can be more stringent than Prior to this study, water samples were collected from the Delta River above Jarvis section 1(A). In particular, this can occur with dissolved metals. We suggest deleting the WATER-AA009 reference to section 1(A) in the first sentence of the second paragraph of page 3-30. There is little mention of the water quality of the Delta River which is in the interior reaches of the Fort Greely East and West Training Area. This river was mentioned in Section 3.2, as munitions. possibly needing cleanup. We believe that, in the Final EIS, more detail on water-guality characteristics is required for all interior rivers and streams to determine appropriate baseline conditions and possible future changes in water-quality.

MIN AA013: Changes have been made to Chapters 3.5 and 7 regarding your suggestions.

MIN-AA014: Changes have been made to Chapters 3.5 regarding your suggestions.

reference is actually 1978, not 1979. Corrections were made to Chapter 3.5 and

MIN-AA016: As noted in response to GEO-AA001, some terms have been deliberately simplified to accommodate readers who do not have a background in

WATER-AA007: Changes have been made to Chapter 3.7 regarding your

WET-AA001: Changes have been made to Chapter 3.7 regarding your suggestions.

WATER-AA008: No change. Please refer to Figure 3.8.b for surface water bodies on Fort Greely, Figure 3.8, b has been referenced in Chapter 3.8. Please refer to Figure

WATER-AA009: Please see Chapter 3.8.2 Water Quality for changes relating to

Recent surface water guality surveys have not been completed for the withdrawal lands by the military or any State or Federal entity. A limited site-specific water quality investigation of Fort Greely training lands was conducted by the U.S. Environmental Hygiene Agency in 1990 to determine if munitions fired into the Impact Areas were having any adverse effect on water and sediment quality. No explosives were detected during sampling and the data indicated the stream chemistries were not adversely affected by munitions. Please refer to Chapter 4.8.2 and Appendix 3.8.D for

Creek near Fort Greely by the U.S. Geological Survey in 1986. All analyzed munitions values were below detectable limits. Please refer to Appendix 3.8.D for study results. No other water samples collected within the withdrawal areas were analyzed for

Water quality data record of collection proved to be too sporadic to provide a comprehensive assessment of the water quality of the withdrawal areas. Also, current water quality could not be derived from these records. A table in Appendix 3.8.D shows available water quality data for streams within the withdrawal areas.

Please refer to responses for POL-A001 and POL-A002. Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23).

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Vol. I, pg 3-40, Section 3.9.2, Groundwater Quality

The Draft EIS contains the statement that "the source of nitrate is not known." We recommend that further study be conducted to determine if this contaminant is affecting ground-water resources.

Vol. I, pgs. 3-40 and 3-41, Groundwater Quality

We suggest this section address how groundwater quality differs from surface water and why WATER-AA011 there are differences. It should also address the difference in sample results from background samples and (impact area?) other samples, as well as identify sample locations.

Vol. I, pg. 4-39, para. 5, and top of pg. 4-40

We suggest the Final EIS discuss potential impacts of revegetation and invasion of introduced species and how these will be mitigated. Rehabilitation of disturbed areas should be done using native species appropriate to the site. Using grasses as a quick fix for restoring vegetation is more often than not an impediment to the restoration of the approximate natural succession at any given site. We suggest this section include a brief statement that helps the reader establish appropriateness of rehabilitation. The invasion of introduced plant species on disturbed sites, either through incidental seed transfer (vehicle track) or rehabilitation (seed mix), should be guarded against during maneuvers and rehabilitation and maintenance.

Vol. I, pg. 3-53, Section 3.11.2, Timber Management

We believe the responsibility of the BLM on the military withdrawals need to be more adequately described. Although the first paragraph mentions joint managers, there is no recognition that the Secretary of the Interior is given the responsibility to manage (through BLM) nonmilitary use of the withdrawn lands and their resources. Sec. 3 of Public Law 99-606 states in part "During the period of the withdrawal, the Secretary of the Interior shall manage the lands withdrawn under section 1 pursuant to the Federal Land Policy and Management Act of 1976 and other applicable law ... and this Act." Sec. 3(B) states that "The Secretary of the Interior may issue any lease, easement, right-of-way, or other authorization with respect to the nonmilitary use of such land only with the concurrence of the Secretary of the military department concerned."

Vol. I, Figure 3.12.c-g

It is unclear whether changes in wildlife use areas or sensitive habitat boundaries between cooperative agreements, EISs, or reviews negates the past areas and boundaries or adds to them. We suggest this be clarified in the legend or the associated text. Also, some of these figures need additional geographic features labeled. For example, 3.12.d, f. g. and h have no labels.

Vol. I, pg. 4-56, Section 4.14, para, 3

We suggest that the Final EIS be modified to reflect that range extensions of some common or invading species need not be protected, but that rare species or those requiring further study should be protected.

WATER-AA010 WATER-AA010: Please refer to Chapter 3.9.2 for amended text.

> Mitigation has been proposed to review existing groundwater guality and guantity data to determine the scope of a future groundwater monitoring network. Nitrate would be included within the sampling protocol. Please refer to Chapter 4.9.2 and Chapter 4.23.

WATER-AA011: An effective comparison between surface water and groundwater guality cannot be made with the limited data available. This is due to the lack of lengthy, historical surface and groundwater guality records for both Fort Wainwright and Fort Greely. Additionally, surface and groundwater sample locations are not necessarily in the same areas to allow for analyses.

No groundwater monitoring wells have been drilled on the Fort Wainwright Yukon Training Area or the Fort Greely East and West Training Areas. Thus, no groundwater guality data are available for the Impact Areas. An analysis of background water quality samples as related to "other samples" is not possible due to lack of data for the withdrawal areas.

Please refer to Figures 3.9.a and 3.9.b for the locations of groundwater quality sampling stations listed in Chapter 3.9.2 and Appendix 3.9.A.

Mitigation has been proposed to review existing groundwater guality and guantity data to determine the scope of a future groundwater monitoring network. Please refer to Chapter 4.9.2 and Chapter 4.23.

VEG-AA002: Specific vegetation rehabilitation projects and identification of invasive species will be completed through the Land Condition-Trend Analysis and Land Rehabilitation and Maintenance programs. Please review Appendix 2.D for a description of these programs.

WILD-AA004 FOR-AA002: The information has been added.

WILD-AA004: Names of waterways have been added to the maps. The LEIS is not intended to be a management plan. The areas identified are the most recent information available. The Army and Alaska Department of Fish and Game have a cooperative agreement for management of sensitive species and habitats. The Integrated Natural Resources Management Plans replace the cooperative agreement and contain the new information.

TES-AA001: The Army protects Federal or State listed threatened or endangered plant species.

VEG-AA002

FOR-AA002

TES-AA001

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Vol. I, pg. 4-56, Section 4.14, para. 1 As stated in the Draft EIS, trumpeter swans are most vulnerable to aircraft noise during nesting and staging periods. We suggest restricted activity dates on Ft. Greely for trumpeter swan nesting and brooding areas should be described in the text in chapter 3, including a list of these dates (Section 3.14), and a discussion of why no restriction is thought to be necessary and/or future implementation of restricted activity dates (proposed mitigation, Section 4.14.).

Vol. I, pg. 4-59, Section 4.15, para. 2

Smoke impacts (air quality) is, we believe, a concern from incendiary-caused vegetation fires. Both withdrawals, the Ft. Wainwright Yukon Training and the Ft. Greely West and East Training Areas, are adjacent to communities and outlying residential areas. We suggest the Final EIS discuss the impacts to health, aviation visibility, and highway closures due to smoke.

Vol. I, pg. 3-67, para. 3

This is the first of several places where it is stated, in contradiction to other portions of the document, that Breeding Bird Surveys (BBS) have been done on both withdrawals. It is clearly stated in section 3.12.4, paragraph 1, that no BBS have been conducted on Ft. Greely. We suggest this be rectified. Also it is likely that ospreys do occur on Ft. Greely. We suggest that documentation of this species on Ft. Greely be described.

Vol. I, pg. 3-67, para. 4

Migratory birds are offered protection under the Migratory Bird Treaty Act (16 U.S.C. 703-712) (MBTA). This act specifically addresses the "taking" of migratory birds and the exceptions would not include use of the withdrawals for military purposes. All migratory birds, including ospreys, swans, sandhill cranes, and the four passerines listed under the paragraph 4, would be offered protection under the MBTA. Taking can be the result of disturbance as well as habitat destruction. Discussion of the MBTA and potential mitigation to comply with its provisions should be incorporated in the Final EIS.

Vol. I pg. 3-71, top of page, partial para.

"Department" of Forestry should be "Division" of Forestry.

Vol. I, pg. 3-71, para. 2

The second paragraph states "Through the Reciprocal Fire Protection Agreement and the Annual Operating Agreement, the Department of Forestry has agreed to provide detection and initial attack suppression services for Fort Greely West and East Training Areas which lie within the Department of Forestry Protection Area." To clarify this statement, we suggest the Final EIS reference the 1998 Annual Operating Agreement between the BLM-Alaska Fire Service and State of Alaska Division of Forestry, which states under Section VIII. F.3. Suppression on Military Lands the following: "The DOF agrees to provide detection and initial attack suppression services upon request, and subject to available forces, on military lands. 'No Entry Areas' are excluded. (a) The request will be made by the Military Fire Chief or the AFS Military FMO. All requested detection and suppression costs are reimbursable. (b) The Military Fire Chief at each location will operate as the land manager's representative

- WILD-AA005: The U.S. Fish and Wildlife Service has not designated restricted activity dates for trumpeter swan management on Fort Greely.
- FIRE-AA005 FIRE-AA005: Please refer to Chapter 4.15 *Fire Management* under the Preferred Alternative.

WILD-AA006 WILD-AA006: The paragraph does not contain information on Breeding Bird Surveys. Corrections have been made to other sections of the document. Table 3.14.b lists that osprey have been sighted on Fort Wainwright and Fort Greely. No nests have been confirmed. See Chapter 4.14 under the Preferred Alternative for a discussion of osprey.

- WILD-AA007: The Migratory Bird Treaty Act has been incorporated into Chapter 3.14 and Chapter 4.14.
- FIRE-AA006 FIRE-AA006: Change completed.
- FIRE-AA007 FIRE-AA007: The changes have been completed. Please review response to FIRE-NN027.

for the military land on their base garrison/cantonment areas. (c) The BLM is responsible for supplying a land manager's representative for military lands outside of the garrison/cantonment areas."		
Vol. I, pg. 3-71, para. 4 Changes to the fire management (protection) options can be made between September 30 and March 31, as established in the Alaska Interagency Fire Management Plan, not September 30	FIRE-AA008	FIRE-AA008: Change completed.
and March 1 as stated here. We suggest this be corrected in the Final EIS.		FIRE-AA009: Change completed.
Vol. I, pg. 3-72, Limited Protection First word of second line should be "of", not "or".	FIRE-AA009	FIRE-AA010: Change completed.
Vol. I, pg. 3-72		FIRE-AA011: Change completed.
The last paragraph, third sentence is incorrect. We believe the statement must read "The Alaska Fire Service <u>does have</u> responsibility for initial response in these areas" (<u>Delete may or may not have</u> .)	FIRE-AA010	ACC-AA018: The Lakes Impact Area includes Kansas, Nevada, Arizona, Oregon, and Michigan Lakes which are shown as Dedicated Impact Areas in Figure
Vol. I, pg. 3-73, para. 2 The 1998 fire #A188 point of origin was on Ft. Greely West Training Area and spread to state managed lands	FIRE-AA011	3.16.b. The Texas and Washington Ranges are not part of the Lakes Impact Area but are designated as Dedicated Impact Areas.
 Vol. I, pg. 3-78, Section 3.16.1, Applicable Regulations Last paragraph before the table states that sections of the Lakes Impact Area are closed during military training. We recommend a description of this area be included. Is this the area on the map 3.16.b as dedicated impact area? Does it include Texas and Washington Ranges? 	ACC-AA018	ACC-AA019: The Fort Greely West Training Area is not closed to public access. An area between Meadows Road and the Mississippi Impact Area is closed to the public for safety. The Meadows Road Area was closed in approximately 1990 because the Department of Environmental Hygiene from Aberdeen Proving Ground, Maryland, surveyed the area and identified it as a Laser Range. The military fires lasers from that area into the Mississippi Impact Area. The Laser
Vol. I, pg. 3-79, Section 3.16.2, Other Closed Lands, para. 3 We suggest including a justification for the closure of the Fort Greely West Training areas.	ACC-AA019	Range has also been identified as a "No Notice Exercise Area". Troops on call can immediately be deployed to the area for training.
Vol. I, pg. 3-87, Section 3.18, Cultural Resources, para. 2 It should be noted that the military installations of Ft. Egbert at Eagle, AK (1899-1911) and Ft. Gibbon at Tanana, AK (1899-1923) were established in interior Alaska prior to March 31, 1937.	CULT-AA003	CULT-AA003: This information has been included in Chapter 3.18.
Vol. I, pg. 3-103, Section 3.19.5, Mineral Resources We suggest that coal also be mentioned as one of Alaska's important resources.	MIN-AA017	MIN-AA017: No change.
Vol. I, pg. 3-107, para. 5 The first sentence should read "of two lower Tanana banks bands."	SUB-AA007	SUB-AA007: Corrected in Final LEIS.
Vol. I, pg. 3-108, para. 1 The Yukon Training Area is within the Fairbanks North Star Borough, but this does not make it exempt from subsistence preference under ANILCA Section VIII. Residents of the Fairbanks North Star Borough are not rural residents and therefore are not qualified Federal	SUB-AA008	SUB-AA008: Chapter 3.20 and 4.20 have been updated to include this information.

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subsistence users. However, Game Management Unit 20B, within which this withdrawal lays, has several seasons and bag limits for Federal subsistence hunters (these overlap entirely with the current state bag limits and seasons). For example, residents of Nenana and Tanana are qualified subsistence hunters for moose on Federal lands in GMU 20B. In practice, residents of Nenana and Tanana probably do not travel to the withdrawal to harvest subsistence resources. We suggest this be clarified in the Final EIS.

Vol. I, pg. 3-108, para. 3

ANILCA Section VIII defines qualified subsistence users as all rural residents. Customary and Traditional determinations further refine who is qualified where, if resources are limited. We suggest deleting the reference to <u>non-native</u> in the last phrase of the final sentence in this paragraph. All residents of the Delta communities are qualified subsistence hunters. There is subsistence use of Ft. Greely lands under the intent of ANILCA Section VIII. We believe that the withdrawal of these lands for military purposes causes a reduction in the availability of or access to subsistence resources, and that triggers the need for an 810 subsistence hearing in the affected communities. (See comments on Section 4.20.1, page 4-71.)

Vol. I, pgs. 3-112 and 3-114, Figures 3.1.a and 3.1.b

We suggest that the reference on legends that withdrawal for Army and Air Force comes "from BLM" be deleted. The BLM processes the paperwork associated with withdrawals and the land remains Federal land.

Vol. I, pg. 3-120, Figure 3.4.a; Geology Map, Fort Wainwright

More detailed information about the age of the units is given in this legend than is in Weber et al., 1978. This discrepancy should be clarified.

We believe the text for the unit Pzs should say the rocks are metamorphosed to amphibolite facies not greenschist facies. A reference is needed to substantiate the differentiation between units Pzs and Pzg on figure 3.4.a. These were both shown as Pzs on Weber et al., 1978, and it is unclear why the former unit is shown to be schistose and the latter unit to be gneissic. A reference is needed for the age of unit Pzg.

We suggest that faults be added to this figure, specifically the one which is shown by the linear or termination of the medium grain and rust units along the eastern margin of the training area.

Vol. I, pg. 3-121, Figure 3.4.b, Geology Map, Fort Greeley, legend

We suggest the reference to Foster et al., 1987, should be replaced with Foster et al., 1994, the most recent work. The reference Nokleberg et al., 1990, is not in the references in the back, but should nevertheless be replaced by Nokleberg et al., 1992, shown above.

Vol. I, pg. 3-123

We recommend that a narrow area along Buchanan Creek from the green-colored area to the confluence with the Little Delta River should be circled and stippled as an "area with favorable Geology for Placer Gold."

SUB-AA009 SUB-AA009: The term "non-native" has been removed and changes made to Chapter 4.20.

LAND-AA012: Please refer to Figure 3.1.a and Figure 3.1.b. Changes to the figures have been made regarding your suggestions.

GEOL-AA005: The descriptions were reviewed and found to be consistent with Weber et al. (1978) and the other references cited on Figure 3.4.a. Note, however, that the USGS (1998) reference should be cited as Wilson et al. (1998). Appropriate corrections have been made on the drawings and in Chapter 6.

The Legend for Figure 3.4.a. has been changed to indicate amphibolite facies for the Pzs unit. The boundaries of the Pzs and Pzg units have been corrected on Figure 3.4.a and are now consistent with Weber et al. (1978). However, the schistose and gneissic descriptions of Pzs and Pzg, respectively, are consistent with the map sources. Finally, Weber et al. (1978) observe that the Pzsg unit may be stratigraphically equivalent to the Totatlanika Schist, which is Middle Devonian to Early Mississippian (Wilson et al. 1998).

Faults have been added to Figure 3.4.a as suggested.

GEOL-AA005

GEOL-AA006

GEOL-AA006: The geologic map in Foster et al. (1987) was the source used for Figure 3.4.b. The 1994 reference is primarily text and does not contain a comparable map. The reference to Nokleberg et al. (1990) is correct, but the citation in the Bibliography was erroneously labeled 1996. The suggested Nokleberg et al. (1992) reference was not used in preparing this figure.

MIN-AA018: Without documentation to support this request, changes to Figure 3.4.b have not been incorporated.

 Vol. I, pg. 4-1, Section 4.1, Land Use The third paragraph should have the following sentence added for clarification: " the State. Until conveyed to the State, BLM will manage the natural resources in accordance with the existing Resource Management Plans (but not the MOU)," This is also true for the fourth paragraph which would benefit from the addition of the following: "(1991) management area. After conveyance to the State (if any), management and use of the withdrawal"	LAND-AA013	LAND-AA013: Added sentence on management of the withdrawal lands by the BLM under the existing Resource Management Plans if the No Action Alternative is implemented.
Vol. I, pg. 4-7, para. 5 Third line states that ice fog is a unique type of atmospheric <u>pollution</u> . It is not pollution - it is an atmospheric condition-this should be corrected. In the seventh line it says fog is formed by particulate by-products. It is also formed by dust (the reason larger particles of sand are used on the roads - not ash). We suggest this be corrected in the Final EIS.	AIR-AA002	AIR-AA002: Please refer to Chapter 3.2.2 <i>Ice Fog</i> and Chapter 4.2.2 <i>Ice Fog.</i> Amendments to the text have been made regarding your suggestions.
Vol. I, pg. 4-8, para. 2 This section indicates military activities will remain the same. A more accurate statement might be: "As long as military activities remain at the same level, following the land withdrawal renewal"	AIR-AA003	AIR-AA003: Please refer to Chapter 4.2.2 <i>Ice Fog.</i> Amendments to the text have been made regarding your suggestions.
Vol. I, pgs. 4-8 and 4-9, Sections 4.3, Terrain, and Section 4.4, Geology We believe these topics should be placed in the affected environment section, not in the environmental consequences section, unless the proposed withdrawals will adversely impact terrain and geology.	OTH-AA027	OTH-AA027: Please refer to Chapter 3.3 <i>Terrain</i> and Chapter 3.4 <i>Geology</i> for a discussion of the affected environment of these resources. NEPA requires the disclosure of environmental consequences even if they are
Vol. I, pg. 4-9, Section 4.5, Mineral Resources We suggest this information be quantified, for example, how many acres and where?	MIN-AA019	MIN-AA019: It is not clear which "areas" the commentor is discussing. It is premature at this point to designate specific areas for mineral sale or location.
Vol. I, pg. 4-10, Section 4.6 Soils This section notes that there is no information is available for Fort Wainwright and little is available for Fort Greely. We suggest that the Final EIS discuss plans for additional studies, such as those identified on pages 4-16 and 4-18, especially for Fort Wainwright.	SOIL-AA005	SOIL-AA005: A series of baseline and long-term monitoring programs have been proposed in this LEIS to determine the location, extent, and potential migration of contamination in soils (see Chapter 4.23).
Vol. I, pg. 4-12, Table 4.6a		Please refer to Appendix 2.D for a description of the current natural resources management programs for the withdrawal areas.
If the information is available, it would be helpful to provide in the Final EIS the amount of ground pressure exerted by each type of vehicle in terms of pounds per square inch.	SOIL-AA006	SOIL-AA006: Information regarding vehicle ground pressure in pounds per square inch was unavailable. Please refer to Table 4.6.a for additional information
Vol. I, pg. 4-15, para. 5 "Brush or forest fires ignited by munitions released during training operations, although considered rare events, could occur and would result in some loss of vegetative cover." This statement conflicts with the data provided on page 3-76 "Table 3.15d Total Number of Fires by Cause on Fort Greely (1954-1997)." Incendiary fires are listed as 58 total, for an 86 percent of total acres burned.	FIRE-AA012	FIRE-AA012: "Although considered rare events" has been deleted.

Vol. I, pg. 4-17, para. 6 AA We believe the statement "Brush or forest fires ignited by flares released during training operations although considered rare events, could occur and would result in some loss of vegetative cover" conflicts with the data provided on page 3-76 Table 3.15d, and should be corrected.	FIRE-AA013	road maneuvering would be expected to occur during the summer months when the ground is not frozen. However, due to Army regulations which restrict off-road maneuvering during spring thaw (1 April to 15 May) and summer months (usually May to September in designated creek bottoms, wetlands, and alpine areas above 2,000 feet in elevation), impacts would not be expected to reach the highest severity level. Personnel are also instructed to operate vehicles on marked trails and designated routes until directed otherwise during tactical deployment.
 Vol. I, pg. 4-20, Section 4.6 Soils The No Action Alternative section on page 4-20 talks about farming and new settlements. We believe that, after examining the percentage currently planned for these uses on adjoining lands, the scenario for future farm settlement is unrealistic and should be revised to a more realistic scenario. Vol. L. pgs. 4-10 through 4-21. Section 4.6 Soils 	SOIL-AA007	Quantitative data representing the damage caused by munitions use within Stuart Creek and Oklahoma/ Delta Creek Impact Areas are not available. In general, projectiles contain high explosive compounds that detonate upon impact with the ground, creating a crater and distributing steel fragments across the local landscape. Over time, large areas of bare ground result. This could lead to localized episodes of wind and water erosion similar to the disturbance caused by off-road maneuvering. The soil profile may contain embedded shrapnel making removal of the foreign material difficult. Evidence of long-term use of the Impact Areas include thousands of craters, debris from used tarretry, pieces of shrapnel, and occasional
This section discusses the types of impacts that may occur to the soils of the area. However, neither this section nor chapter 3 makes any attempt to discuss the current level of effects that have occurred or what will occur under the preferred alternative. For example, no reference is made to the acres of soil disturbance that currently exist or will be disturbed through use or construction of roads and trails, acres of impact area, or acres of maneuver area(s), etc. We suggest this type of information be presented, at least in part, to properly outline direct effects. Section 3.6.1 discussed soil limitation ratings for various soil types. However, no attempt was made to quantify the impacts to various soil types within chapter 4. We suggest this be	SOIL-AA008	Please refer to Chapter 4.6 <i>Soils</i> for a complete discussion of this topic. The Soil Limitation Ratings as described in Chapter 3.6.1 were not used as an analysis tool because they provide only a general description of the soils in the area. The ratings were not developed specifically for military activities, but rather for general land use categories. Also, some soils within any mapped area may have properties and limitations that differ from those described for the unit as a whole, which makes the evaluation of a specific, localized land use difficult.
 corrected in the Final EIS. Vol. I, pg. 4-31, Section 4.9, Groundwater Resources Groundwater is a major drinking-water supply for the area residents. We believe that the Final EIS should have more information is necessary to protect this resource and that information is needed on the quality of water, subsurface aquifer conditions, and the interaction of surface and ground waters in the area (see also pg. 4-33, Proposed Mitigation). The groundwater quality data for the Draft EIS are not consistent in time of sampling, and hence, outdated. The groundwater data cannot be compared for trends because the sampling dates are 40 to 50 years old and sparse. One sample per site is taken and this is not sufficient 	TER-AA012	Military activities conducted on the withdrawal renewal lands would be consistent with those conducted during the past 15 years (see Chapter 2.1.3). The Army is proposing to renew the withdrawal areas with the existing military land uses. The Army is not proposing to expand or add Impact Areas on the withdrawal lands. A planning-level soil survey is scheduled to be completed for the withdrawal areas. This project includes the identification and mapping of soils, the correlation of soils to permafrost areas, and the establishment of relationships between terrain components. While describing, classifying, and quantifying soil properties, relationships among geomorphology and vegetation will be established.
 to characterize present day water quality. We believe that the Final EIS should contain the results of many more samples and sites, which are necessary to best ascertain current trends in water quality. The sampling interval in the well must also be identified. Vol. I, pg. 4-38, para. 1 We suggest that this paragraph more appropriately belongs in Section 4.14 		developed the Integrated Training Area Management (ITAM) program. The goals of ITAM are to evaluate, repair, maintain, and enhance training lands at Army training installations. Please refer to Appendix 2.D for a detailed description of the ITAM program. WATER-AA012: Please refer to Chapter 3.9.1 <i>Groundwater Occurrence</i> for a description of location, recharge, discharge, and surface water interactions of groundwater of the withdrawal areas.
 Vol. I, pg. 4-40, para. 1 The statements: "Fire from military activities impacts vegetation. Vegetation in these areas is kept in varying successional stages, maintaining diversity of vegetation composition. A greater number of fires occur on the withdrawn lands due to incendiary devices" appear to conflict 	VEG-AA003 FIRE-AA014	An effective comparison between surface water and groundwater quality cannot be made with the limited data available. This is due to the lack of lengthy, historical surface and groundwater quality records for both Fort Wainwright and Fort Greely. Additionally, surface and groundwater sample locations are not necessarily in the same areas to allow for analyses.

FIRE-AA013: "Although considered rare events" has been deleted.

SOIL-AA007: Changes have been made to Chapter 4.6 regarding your suggestions.

SOIL AA008: Quantitative data is not available on the extent of damage occurring from military vehicle maneuvering on Fort Wainwright Training Area and Fort Greely. Training area 4 on the Fort Wainwright Yukon Training Area (Figure 2.b) was used most frequently during 1995 and 1996 (Table 2.f). Training Area 22 on Fort Greely (Figure 2.c) was used most often during 1988 to 1995 (Table 2.g). The most severe terrain damage from off-

No groundwater monitoring wells have been drilled on the Fort Wainwright Yukon Training Area or the Fort Greely East and West Training Areas. Thus, no groundwater quality data are available for the Impact Areas. An analysis of background water quality samples as related to "other samples" is not possible due to lack of data for the withdrawal areas.

Mitigation has been proposed to review existing groundwater quality and quantity data to determine the scope of a future groundwater monitoring network. Please refer to Chapter 4.9.2 and Chapter 4.23.

VEG-AA003: The paragraph has been added to Chapter 4.14.

FIRE-AA014: "Although considered rare events" has been deleted.

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 with pages 4-15 and 4-17, where brush and forest fires ignited by munitions are considered "rare events." We suggest this be clarified in the Final EIS. Vol. I, pgs. 4-34 to 4-41, Sections 4.10, Wetlands, and 4.11, Vegetation See above comments to Section 4.6. We suggest, to adequately define direct impacts, that the acres of disturbance, present or future, be quantified. Vol. I, pg. 4-41, Cumulative Effects The cumulative effects of negative impacts on vegetation and other resources is an important consideration in the length of time for which the withdrawal is renewed. A 15 or 20 year renewal period would be more reasonable (than 50 years) and would allow better assessment of cumulative effects. We suggest this be considered in the Final EIS. Vol. I, pg. 4-42, para. 5 We believe it would be more appropriate to cite studies on Alaskan wildlife species, rather than mule deer and penguins, which are not found in interior Alaska. 	WET-AA002 VEG-AA004 OTH-AA028 WILD-AA008	 WET-AA002: The distribution of wetlands within the withdrawal areas is presented in Chapter 3.10 and Appendix 3.10.A. Knowledge of the areal extent of wetlands in the withdrawal areas is limited. From the data that are available, it is apparent that wetlands exist within Impact Areas, Training Areas, and along floodplains and stream corridors (Figures 3.10.a and 3.10.b). Typically, the density and inundation with water of wetland areas prevent maneuvering during much of the time. Even though off-road military exercises are regulated, some disturbance may occur. The military may maneuver or conduct foot traffic in wetland areas as long as the wetlands are not disturbed. If wetland areas are disturbed, Clean Water Act Section 404 requirements must be satisfied. Current knowledge regarding the status of wetlands located within the withdrawal boundaries is based upon the U.S. Army Corps of Engineers permitting system. According to Section 404, wetland modification will occur only in designated areas with the acceptance of a permit application. A total of 114.86 acres, based on U.S. Army Corps of Engineers permitting records, have been disturbed by military activities since 1989 as shown in Table 4.10.a. These permits usually contain special provisions which require the permittee to correct any damage to the wetland system. A wetlands management scheme is currently being developed for the withdrawal areas, which includes a wetlands management plan, Section 404 Consultations, and remediation of wetlands
Vol. I, pg. 4-42, para. 5 Studies of Adelie penguin reactions to sight and sound of aicraft demonstrate that the type of disturbance anticipated on these withdrawals can cause mortality to birds that is additive to other mortality factors. However, we believe that studies which are more pertinent to the potential disturbance(s) to birds present on these withdrawals would be more appropriate and need to be added.	WILD-AA009	An increase in impacts to wetlands are not expected to occur, since proposed military activities would be consistent with those conducted during the past 15 years, the Army is not proposing to expand or add Impact Areas, and various wetland damage mitigation measures are planned.
 Vol. I, pg. 4-48, Section 4.12, para. 1 We suggest including birds (trumpeter swans, raptors) to the noise reduction study in sentence 4 of mitigation. Vol. I, pg. 4-48, Section 4.12, para, 2 	WILD-AA010	VEG-AA004: At the present time, the total number of acres directly impacted by military activity has not been quantified. Little disturbance has occurred on the Fort Greely West Training Area. Army Regulations and applicable State and Federal laws decrease impacts to vegetation. Based on the U.S Corps of Engineers wetland permit application system, a total of 114.86 acres have been recorded as disturbed by military activities since 1989 (Table 4.10.a).
Breeding Bird Surveys are not the appropriate tool for identifying habitats or high use areas for birds since the BBS monitors trends in populations. We suggest using intensive off-road point counts designed to identify habitat use. Studies designed to identify high use areas include several nest searching techniques, habitat mapping, and other methods for characterizing the interactions of birds and habitat.	WILD-AA011	OTH-AA028: Noted. WILD-AA008: The reference to mule deer and penguins has been deleted.
Vol. I, pg. 4-49, para. 2 It is speculative to assume that disturbance to wildlife from public activities, including recreation, commercial use, and development, would increase over present disturbance from military activity. We suggest the Final EIS substantiate these statements.	REC-AA006	WILD-AA009: The reference has been deleted. Please review the information in Chapter 4.12 on sandhill crane and migratory birds, and Chapter 4.14.WILD-AA010: These species are covered in the Proposed Mitigation for Chapter 4.14.
Vol. I, pg. 4-49, Section 4.12, para. 1, last sentence We suggest relating this sentence to the study conclusions about Off Road Vehicles use and wildlife.	REC-AA007	WILD-AA011: The intent of the statement was to have the military use existing data. All baseline studies begin with the analysis of existing information. The Breeding Bird Surveys could prove useful. Chapter 4.14 also lists Proposed Mitigation that requires the Army to identify habitat. Your recommendations for specific studies should be presented in the review of the Integrated Natural Resources Management Plans.
18		REC-AA006: The statement is justified. It is not stating that recreational activities would cause greater disturbance to wildlife than military activities. The statement says that when military presence is absent there could be an increase in recreational activities. This is documented by the input on access and recreation given during the scoping process. The increase in recreational activities would include a higher probability that there

REC-AA007: Noted.

would be an increase in recreational-caused disturbance to wildlife on the withdrawal lands than at the present

time because military activity restricts recreational activities in some areas.

Vol. I, Chapter 4.13.2, Wild Fisheries

There is an insufficient database to adequately assess impacts to fisheries resources in the Stuart Creek Impact Area. It is a well known fact among fisheries scientists that explosives discharged in or near water bodies can kill fish directly by the explosion and shrapnel and indirectly by the shock waves that are propagated. Incubating eggs can also be destroyed by the effects of shock waves. The BLM routinely mitigates for the use of explosive charges used FISH-AA005 in seismic oil exploration activities by using buffer setbacks adjacent to fish-bearing water bodies. The use of munitions is described on page 2-22 and elsewhere. Direct impact of munitions is mentioned in several sections, including page 4-15, which discusses the creation of craters in the soil. There is no acknowledgment in this document of the kinds of shock impacts just mentioned nor mitigation for these impacts on fishery resources. We recommend that this be added to the Final EIS.

One of the impacts mentioned in the Draft EIS is explosives damaging stream banks in the riparian zone of the upper Chena drainage. Site-specific fishery surveys have not been conducted in this area and this fact is acknowledged in page 4-54. Because it is generally known that the South Fork Chena River supports populations of both resident and anadromous species, and because of the acknowledged heavy use of the area as a bombing range, it is reasonable to analyze a worst case scenario and conclude that significant impacts to fish populations may occur, but are not currently documented. Correspondingly, mitigation for these impacts is not discussed either. We suggest mitigation include the establishment of buffer areas of one-quarter mile on either side of major water bodies such as the South Fork, Beaver Creek, and Stuart Creek. Stream and waterbody buffers would also provide additional protection to many other species, especially moose that make intensive use of riparian zones for feeding and other activities.

Vol. I, pg. 4-53, para. 6

There are currently no BBS routes conducted on Ft. Greely (see page 3-60), this should be corrected.

Vol. I, pg. 4-54, para. 2

No BBS are conducted on Ft. Greely, so detection of ospreys on this withdrawal must be by some other method. We suggest this be explained in the Final EIS.

Vol. I, pg. 4-54, para. 5

According to the Draft EIS, trumpeter swans have not been identified on the Ft. Wainwright Yukon Training Area; however, it is not clear to the reader whether or not surveys of trumpeter swans have been conducted on Ft. Greely East and West Training Areas. If swan surveys have not been conducted, we believe they are needed, and should be discussed in the Final EIS.

Vol. I, pg. 4-57, Section 4.15, Fire Management

We suggest it should be made clear that fire management and suppression on withdrawn lands FIRE-AA015 by the Alaska Fire Service refers only to wildland fires.

WILD-AA013

WILD-AA014

FISH-AA005: Yes, there is insufficient data to assess impacts to fisheries within the Stuart Creek Impact Area. The military does not intentionally shoot into water bodies. It is not feasible to create Buffer Zones along waterways within the Impact Areas. The Air Force Environmental Assessment for Target Arrays states that targets cannot be placed within 50 feet of flowing water. Army Regulation 350-2 states that the military cannot fire into or over navigable waterways.

- WILD-AA012 WILD-AA012: Change completed.
 - WILD-AA013: Noted.
 - WILD-AA014: The U.S. Fish and Wildlife Service conducts swan surveys on Fort Greely every five years. Chapter 4.14 Proposed Mitigation identifies that surveys are needed for sensitive species.
 - FIRE-AA015: All fires on the withdrawal lands are the responsibility of the Alaska Fire Service. This is stated in the first sentence of Chapter 4.15. If you are referring to other military land such as the cantonment areas, they are not part of this withdrawal.

Vol. I, pg. 4-57, para. 6

The statement: "Of the seven known causes of fire on Fort Wainwright Yukon Training Area and Fort Greely, incendiary devices are the major cause of fire on withdrawn lands with lightning being second" appears to conflict with pages 4-15 and 4-17 where fires are considered "rare events." This should be resolved in the Final EIS.

Vol. I, pg. 4-58, para. 2

The second paragraph states: "It is possible that fires started on withdrawn lands could cross protection status boundaries into areas managed by the State, which could have different protection status. However, fire information for the withdrawn lands shows that out of 95 incendiary device fires, only one has crossed onto State lands indicating that the probability of this occurrence is low." While this statement may be true, such occurrences can be very costly. For example, the 1998 Carla Lake Fire started on Military Lands (modified protection) and crossed over onto State lands (full protection). This fire was caused by lightning; however, unexploded munitions in the area hampered ground based suppression activities during the first days of fire suppression efforts. After crossing over onto State of Alaska lands, the cost of the fire was over \$15 million dollars. We suggest this be further discussed in the Final EIS.

Vol. I, pg. 4-58, 4.15, para. 3

This paragraph is unclear. The fire management options (protection) would not alter the lands from their intended military use. The fire management options were developed jointly by BLM-Northern Field Office and the U.S. Army-Alaksa to best accommodate natural resource values and the military mission. Modified lands may, on a case by case basis, be treated with different levels of attack but Critical (and Full) would be initially attacked aggressively. This paragraph should be clarified in the Final EIS.

Vol. I, pg. 4-59, para. 4

The Final EIS should clarify that the Ft. Wainwright Tanana Flats withdrawal is unaffected by this Draft EIS and will continue to be available for military use even under the No Action Alternative. This withdrawal currently receives wildland fire detection and initial attack response from BLM-Alaska Fire Service (AFS) as part of the Interservice Support Agreements (ISSA), which allows the use of the buildings and services on Ft. Wainwright. Use of buildings and services by BLM-AFS may be altered if less land is protected by BLM-AFS, but the potential need for the ISSAs will not evaporate.

Vol. I, pg. 4-59, para. 5

The withdrawals addressed by the Draft EIS are south of a line that delineates Department of Natural Resources (DNR)-DOF areas of protection responsibility to the south from BLM-AFS areas of protection responsibility to the north. Therefore, the No Action Alternative should clarify that DNR-DOF would have responsibility for protecting the former withdrawals.

Vol. I, pg. 4-60, Section 4.16, Public Access

We believe the Preferred Alternative needs clarification on this issue. The Draft EIS states that ACC-AA020

FIRE-AA016 FIRE-AA016: "Although considered rare events" has been deleted.

FIRE-AA017 FIRE-AA017: Noted. Please review Appendix 3.19.D.

FIRE-AA018 FIRE-AA018: The paragraph does not indicate an alteration of the lands from their intended military use. It states that fires could cross military boundaries onto State lands. The following sentence has been added to the paragraph: "If fires begin in Impact Areas, the cost of suppression could increase because on-the-ground fire suppression in these areas is prohibited."

FIRE-AA019 FIRE-AA019: The lands involved in the withdrawal renewal for this LEIS are defined throughout the document. Please refer to figure ES.a.

FIRE-AA020: Please review the first paragraph under the No Action Alternative.

ACC-AA020: The statement has been corrected to state "The Lakes Impact Area and Buffer Zone would be temporarily closed when necessary for military activities. The High Hazard Impact Areas, and the Texas and Washington Ranges would remain off-limits to the public." the High Hazard and Dedicated Impact areas would be off-limits to the public. While the high hazard area sounds reasonable, the justification for the Dedicated Impact areas, if the military activities are remaining at the same level, is unclear. For example, if all the Dedicated Impact areas are off-limits, where are the Lakes Impact Areas that would only be closed temporarily?

Vol. I, pg. 4-60, para. 3

The Final EIS should discuss other objectives which are met by prescribed fire besides fire hazard reduction, as mentioned in Section 3.15.2, where creating and maintaining maneuver areas is discussed.

Vol. I, pg. 4-60, para. 4

It is unlikely that fuel load would be significantly increased on the withdrawal lands under the No Action Alternative. The fire management options for most of these areas are such that fire will be allowed naturally on the landscape. Fuel loading that results in "hotter burning and crown fires" usually occurs in areas where fire is deferred, such as in Full or Critical areas, not where natural wildland fire is allowed to burn. In the absence of the withdrawals, some Full or Modified areas may be changed to lower suppression levels, allowing more natural fire on the landscape. We suggest the Final EIS further address this fact.

Vol. I, pg. 4-61, para. 6

We suggest adding to general access procedures the normal checking with flight service.

Vol. I, pg. 4-61, Section 4.16, Public Access, para. 7

We suggest that military use be quantified in the Final EIS, including how much it has increased in the last 10, 20, or 50 years of restricted public access. That would be an indicator of how much the public would be impacted in the future. We also suggest identifying any planned studies.

The same comments apply to the following section: <u>4.17 Recreation</u> page 4-63.

Vol. I, pg. 4-64, para. 5

We suggest including the location of the Valdez winter trail. It should be labeled on Figure 3.13.b and a map reference included at the end of the paragraph.

Vol. I, pg. 4-65, Cultural Resources, para. 3

Lands cannot be transferred as State-selected property to the State, they are **conveyed** to the State. This should be corrected.

Vol. I, pg. 4-66, Socioeconomics, No Action Alternative

Paragraph 3 should read: "Under the No Action Alternative, non-renewal of the **land** withdrawal would occur..."

Vol. I, pg. 4-66, Section 4.19, Socioeconomic, para. 3

The No Action Alternative states "extremely limited aspects" of Army and Air Force missions 21

FIRE-AA021

ACC-AA021

ACC-AA022

REC-AA008

FIRE-AA021: Chapter 3.15.2 states that prescribed fire is used to improve wildlife habitat, decrease potential for ignitions and fire escape from live firing, and to increase military training areas. This is stated again in Chapter 4.15.1.

FIRE-AA022 FIRE-AA022: The statement on fuel load has been taken out.

ACC-AA021: The following statement has been added. "All policies and procedures for civilian airspace access would continue. Civilian pilots should call the Special Use Airspace Information Service (SUAIS), a 24-hour service (1-800-758-8723 or 907-372-6913) provided by Eielson Air Force Base Range Control to civilian pilots planning flights through or around Military Operations Areas and Restricted Areas in interior Alaska. The SUAIS provides information on which MOAs are active, Army artillery firing, and known helicopter operations (USAF 1995)."

ACC-AA022 and REC-AA008: Adequate historical data is not available to quantify an increase or decrease in public access over the past 50 years.

- **REC-AA009 REC-AA009:** Change completed.
- CULT-AA004 CULT-AA004: Corrected in Final LEIS.
- SOC-AA012 SOC-AA012: Corrected in Final LEIS.
- **SOC-AA013 SOC-AA013:** To factor costs would be speculative due to economic and technological conditions.

AA

could continue. We suggest the Final EIS discuss these limitations and how much can be transferred to Tanana Flats, what percentage is conducted on Tanana Flats now, and what types would be eliminated.

Page 4-67, paragraph 2 discusses decontamination expenditures. If it costs \$248.9 million to clean up today, we suggest future costs (e.g., 10 and 20 years from now) and planned studies be discussed in the Final EIS.

Vol. I, pg. 4-71, No Action Alternative

We suggest the Final EIS include a more realistic analysis of possible conveyances to the State. We believe it is unlikely that there would be negative consequences in the foreseeable future to subsistence users of the withdrawals if they were conveyed to the State. Seasons and bag limits are aligned between the State and Federal regulations on these withdrawals. Where no Federal subsistence season exists, State regulations provide opportunity for the qualified subsistence user (see comment on Section 3.20, page 3-108, paragraph 1). Opening access to subsistence hunters under either State or Federal management would benefit subsistence users.

Vol. I, pg. 4-71, Section 4.20.1, para. 1

An ANILCA Section 810(a) Evaluation and Finding should be attached to the Record of Decision or as an appendix to the EIS. The evaluation and finding helps make a decision on whether or not the preferred alternative has significant impacts on subsistence use. This section does not adequately meet this requirement and, we believe, should be more fully addressed in the Final EIS.

Vol. I, pg. 4-71, Section 4.20.1, para. 2

Based on ANILCA, continued use of the Ft. Greely withdrawals for military activities does significantly impact subsistence use and may require a Section 810 hearing. Use by the military restricts access to some parts of the withdrawal that might otherwise be used by subsistence hunters. Military activity may also affect wildlife movements, making them unavailable to harvesters. (See comments on Section 3.20, page 3-108.) We believe that the 810 discussion should be revised in the Final EIS.

Vol. I, pg. 4-71, No Action Alternative

In sentence four, we suggest deleting "intensive management" and substituting "management activity." Intensive management has a specific connotation in the context of wildlife and fisheries management. Under Alaska Statutes, the Board of Game is required to adopt regulations to provide for intensive management programs to restore the abundance or productivity of big game prey populations important for human consumptive use. Without the support of the Army on these withdrawals, some programs, such as grouse enhancement on the Yukon Training Area and hunter check stations for moose, may be discontinued.

22

Vol. I, pg. 6-16

"Kiell" is misspelled; it should be "Keill."

SUB-AA010

- SUB-AA010: You are correct with regard to access, which is important to subsistence use. Thus, the No Action Alternative in Chapter 4.20 has been changed.
- **SUB-AA011** SUB-AA011: Chapter 4.20 has been updated to indicate that neither alternative would likely significantly affect subsistence practices on withdrawal renewal areas of Fort Wainwright since subsistence taking of fish and wildlife is minimal or does not occur on the Yukon Training Area. Increased access opportunities that could result from the No Action Alternative are not likely to significantly increase subsistence use of these lands.
 - **SUB-AA012:** The following changes have been incorporated into the Chapter 4.20. The Preferred Alternative does not change access to these lands for subsistence use over what has occurred during almost 50 years of military use. Approximately 9% of the withdrawn lands are permanently closed to subsistence use due to Impact Area hazards. Compared to use before the military withdrawals, the Preferred Alternative may affect subsistence use of portions of the withdrawal lands at Fort Greely. Some lands are less accessible than would be the case under the No Action Alternative. Military activities may affect some game species behavior to make them less or more available to subsistence users.
- **SUB-AA013 SUB-AA013:** We have removed the term" intensive". The sentence now includes the phrase "...decreased funding and less management of fish and wildlife...".

OTH-AA029 OTH-AA029: Corrected spelling.

Northern Alaska Environmental Center 218 DRIVEWAY STREET, FAIRBANKS, ALASKA 99701-2804 PHONE: (907)452-5021 FAX: (907)452-3100 http://www.mosquitonet.com/~neec maco@mosquitonet.com

BB

February 6, 1999

Ms. Cindy Herdrich Center for Ecological Management of Military Lands Vocational Education Building Colorado State University Fort Collins, CO 80523 Dear Ma, Herdrich:

Thesk you for this opportunity to comment on the Draft Logislative Environmental Impact Statement (DEIS) for the Alaska Army Lands Withdrawal Renewal. The Northern Alaska Environmental Center is a nonprofit conservation organization with 1,300 members and has been based in Pairbanks since its founding in 1971. We are dedicated to preserving wilderness and natural habitats in interior and northern Alaska.

The Northern Center recognizes the vested interest the U.S. Army has in these training lands. Yet, we would also hope that both the Anny and the CEMML in turn recognize the interest we have in preserving the land, water, and natural hebitats of interior Alaska. That said, we would like to comment strictly on matters of environmental concern and not necessarily on the larger issue of whether or not this renewal should be granted.

Chapter 4 of the LEIS addresses the "Environmental Consequences" of this lands withdrawal. An assessment of the No Action Alternative on page 4-20 states, "The first evaluation of the returned lands would be an assessment of the extent the lands are contaminated with explosive, toxic, or other hazardous materials." We believe that this should be performed regardless of the chosen alternative. Why is this option listed only if the No Action Alternative is chosen? Furthermore, we believe that this "evaluation" of contaminated lands should be only the first step, and that those identified sites should be cleaned up to the greatest extent possible. For example, the LEIS notes that contamination studies do not exist for TNT and RDX. (4-16) These studies should be performed and the contaminated sites cleaned up.

The LEIS notes that some cleanup is "limited by funding and technology." (4-20) If that is indeed the case then the army should not contaminate any sites in the first place. Why should we allow our land, air, and water to be polluted when the army readily admits that cleanup is limited by funding and technology?

It is our understanding that there may be depleted uranium munitions in the Fort Wainwright area. If so, does the army or CEMML have documented evidence of these sites and the extent to which they may be contaminated? It appears that any additional munitions training could

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RESPONSES TO COMMENT BB

MIT-BB014: Please refer to responses for POL-A001 and POL-A002. Proposed mitigation would implement a program to gather baseline data to **MIT-BB014** develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23). The Military Lands Withdrawal Act states the decontamination process to follow in order for the military to relinquish the lands to the BLM. Please refer to Chapter 2.1.2.

> MIT-BB015: Unfortunately, events that occurred in the past cannot be taken back or erased. However, these actions can be remediated.

MIT-BB015 Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23). Current decontamination efforts are described including an ordnance cleanup history by the Air Force (response to POL-A002 and Appendix 2.C).

> POL-BB012: Presently, Fort Greely ranges do not allow depleted uranium use. The Cold Regions Test Center has no depleted uranium testing program scheduled for the future and is not aware of any programs in the past. Depleted uranium testing would require completion of an Environmental Assessment or Environmental Impact Statement under NEPA.

POL-BB012

BB

conceivably strike these deposits of depleted aranium and thus scatter them into the air and ground water supply. We request that this issue be adequately addressed and if found to be a legitimate problem that the sites be cleaned up.

Simply put, the military has a rather dubious reputation in Alaska for pollution, contamination, and worse yet, failure to clean up their messes. We believe that this issue should be at the forefront of *any* debate as to whether or not the lands withdrawal should be renewed. This is a very complicated issue, to be sure, but it can be simply stated as such: the army should be required to identify all polluted sites – regardless of the pollutant – and then be required to clean them up. If the "funding and technology" do not allow such a cleanup procedure, then a strict moratorium should be placed on any additional activities which might contribute to that pollution problem.

We also believe that the preferred alternative of a 50-year renewal represents too long a time period. This is an unprecedented length for such a renewal. The DEIS states: "The scope of actions would remain virtually the same in comparing renewals for 15, 25, 50, or 100 year increments. Management and use of these withdrawal lands by the military would remain the same under each time period. The 50-year withdrawal is the preferred selection." (ES-6, emphasis added) Why exactly is the 50-year withdrawal is the preferred selection." The DEIS gives no rationale for this decision and indeed it seems all the more incongruous when the DEIS admits that the scope of actions would be the same and the management and use of the lands would be the same under any of the considered time periods. So what makes the 50-year renewal so attractive?

There are many reasons why the 50-year renewal is *unattractive* however. Data from fish and wildlife studies change every 10 years. By granting the 50-year renewal you are effectively locking out the public from issues of resource management on these lands. No one knows what the needs will be for fish and wildlife management 50 years from now, or even 10 years from now. Suppose that 10 years from pow there is a significant crisis regarding salmon in rivers within the army training lands. If the renewal is granted for only 10 years there will be sufficient opportunity for public involvement in that crisis. But if the lands are locked up for 50 years, what recourse exists for proper management of those rivers?

Furthermore, what evaluations of the pollution status of the lands will be undertaken during those 50 years? Any? If the renewal is granted for 10 years there will conceivably be a thorough study before the next 10-year renewal. It is indicious to give the military carte blanche for 50 years, turn our heads for that length of time, and *then* figure out how much air, tand, and water they have contaminants may be performed. If the DEIS admits that actions, management, and use by the military would remain the same over any of the time periods, then we believe that a series of shorter renewals are favorable to a lengthy single renewal.

Another initiated which we believe was not adequately addressed in the DEIS is the socioeconomic effects. The DEIS states: "No adverse impacts are expected if the withdrawals site renewed." (4-66) This is a terribly optimistic, sanguine, and wishful assessment on the part of CEMMI. Without documenting specifics, the local newspaper reports on a fairly regular

MIT-BB016

MIT-BB016: Please refer to responses for POL-A001 and POL-A002. Proposed mitigation would implement a research program to gather baseline data to develop a long-term monitoring and remediation program for all physical resources (see Chapter 4.23). Current decontamination efforts are described including an ordnance cleanup history by the Air Force (Appendix 2.C).

ALT-BB056: The Army's selection of a 50-year renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A credible operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources to protect resource values and implement natural resource management measures.

ALT-BB057: Army management of the withdrawal lands will be conducted under Integrated Natural Resources Management Plans (INRMP) developed in accordance with the Sikes Act. INRMPs are reviewed every five years with public, and State and Federal agency participation in the development and review process.

ALT-BB058: See Proposed and Existing Mitigation in Chapter 4.23.

SOC-BB014: There are no statistics to show that military personnel contribute significantly to crime. Military personnel should not be characterized as prone to drunken driving, larceny, and theft, any more than persons in mining, forestry, fishing, or the tourist service industries (whichever occupations are employed in alternative uses of the withdrawal lands). Fairbanks compares favorably with the rest of the United States as far as crime is concerned.

9-101

. P.

Sincerely, basis initiancies of robbery, vendalism, and even rape committed by soldiers who are stationed at one of the local bases. It seems interesting - and upsetting - that the DEIS goes into great detail about the positive effects of our military presence, including jobs and revenue, yet the DEIS Again, thank you for the opportunity to comment. dismisses all negative impacts with this one brief scatence quoted above. We strongly request that CEMMI, undertake a more thorough examination of these impacts in the Final EIS. . ۰,

Wilderness Campaign Coordinator

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Army
Land
Withdrawal
Comment/Conserns
Submittals

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Monday, 8 February 1999

Name: Mark A Wartes

Orginization: Self

Address: 1713 Central Ave.

Fairbanks, AK 99709

Comment: compelete review. in the next few years. I am against this withdrawal if it ties up the land for over 20 years without a needs might be 50 years from now. They really do a very poor job of figuring out what they want to do befor they ever have a chance to again review this land usage. The military has no idea what its' infavor of this type of land withdrawal which will not be reviewed for 50 years. I won't be on earth 50 importance of the militaries continued use of the selected land. What I do not agree with is, I am not Being an Alaskan resident for the greater part of my life and also be a U.S A.F veteran I can see the years from now and my 25 year old son will be 75 years old and how old will my grand children be Thanks ALT-CC059

RESPONSES TO COMMENT CC

every 10 to 15 years. Moreover, the resource planning horizon is limited by withdrawai renewals preparedness. A credible operational military in Arctic and Subarctic environments which will ALT-CC059: Noted. The Army's selection of a 50withdrawal period and utilize resources to protect U.S. Army Alaska is proposing to lengthen the prepare this LEIS to continue existing operations, burden on the Army. Considering the large costs to for renewal every 10 to 15 years places a substantial commitment, both dollars and personnel, required continue in the future to be critical to national defense substantial land mass to support training of soldiers year renewal period is based on the need for management measures. resource values and implement natural resource

Name: Judy Hicks DD

Address: P.O. Box 1417

Orginization:

Deita Jct., AK 99737

Comment: Judy G. Olson Hicks PO Box 1417 Delta Junction, AK 99737 Checkpoint@knix.net 4 Feb 99

> Ms. Cindy Herdrich Center for Ecological Management of Military Lands Colorado State University Fort Collins, CO 80523-1500 http://www.cemml.colostate.edu/alaskaeis

Dear Ms. Herdrich.

I cannot support the proposed fifty year Alaska Army Lands Withdrawal Renewal of the Training and Impact Areas of Fort Greely. Fifty years is too long of a period. The realignment of Fort Greely to Fort Wainwright yanks the Delta area economic base along with it. The proposed land withdrawal renewal further restricts the regions efforts to develop other economic potentials such as mining and tourism. In addition, it is clear from the Draft Legislative Environmental Impact Statement (LEIS) that environmental, resource and economic studies are lacking. More data is needed for the army, state and federal agencies and area residents to form informed plans and decisions on the army's impact. restoration and restitution efforts. I do believe however, that an effective fifteen year agreement could be drafted.

The BRAC realignment of Fort Greely cannot be separated from the renewal of land withdrawal. The military may plan to use the training and impact areas at Fort Greely in the same manner as they have been used since 1986 (the last renewal of lands withdrawal). During this period of time the Army and Delta Junction have enjoyed a positive relationship. However, even though the military's land use may remain unchanged, without the support of the staff stationed at Fort Greely the risks to the community are greater. Following are three examples. (1) Fire management- The same number of incendiary munitions may be fired on withdrawn lands but there will be a smaller fire crew to monitor and deal with fires. Incendiary devices start a majority of the fires in the area. (2) Off site range control-Suggested off site range control will prove ineffective. Currently, as required ,my husband and I call the MP desk on post to "call in" when we use the trail network in the Delta East Training Area for dog mushing, hiking, snow machining, hunting, etc. The MP's are always aware of training activities and current weather conditions and would be alerted to respond in case of an emergency. It is difficult to believe that civilian compliance with the "call in" protocol will be maintained if it involves a long distance phone call or that safety and knowledge of the local terrain can be provided long distance from Fort Wainwright. (3) Mobilization of troops from Fort Wainwright- Moving troops from Fort Wainwright to Fort Greely Training Areas to conduct training exercises is likely to increase following the completion of realignment. The military convoys on the highway pose a safety hazard. Impatient drivers execute risky passes and safe drivers must make many passes on a rough highway or arrive late. In addition, convoys can deter tourist traffic from traveling to Delta. These and other issues of BRAC realignment,

RESPONSES TO COMMENT DD

ALT-DD060: Noted. Refer to Chapters 1.2 and 2.1.3 for a discussion of the military's continuing need for the withdrawal lands.

ALT-DD060

FIRE-DD023

USE-DD039

OTH-DD030

FIRE-DD023: The Bureau of Land Management, Alaska Fire Service is responsible for wildland fire suppression on the withdrawal lands. When fires on the withdrawal lands are called in, the Fire Department records coordinates, and contacts the Bureau of Land Management, Alaska Fire Service (AFS). The ability of the Fire Department to report locations of wildland fires will not change after the realignment.

USE-DD039: No decision has been made on retaining Range Control and Explosive Ordnance Disposal personnel at Fort Greely after the realignment becomes final in 2001. The current proposal after BRAC action is completed, is for local Range management personnel to remain at Fort Greely to continue to provide these services. Also see Access Chapters 3.16 and 4.16.

OTH-DD030: Movement of troops and vehicles occur between Fort Wainwright and Fort Greely. Large convoys occur primarily during the military's major training exercises. Military use of Fort Greely will continue under the Preferred Alternative. Affects on convoys as a result of the BRAC action at Fort Greely are outside the scope of this withdrawal renewal action. Those affects should be addressed in the NEPA documents being prepared in accordance with BRAC.

that did not exist in 1986 for example, affect decisions concerning current renewal. As a local resident it is difficult to be told by the Department of Defense that Fort Greely's mission is no longer important enough to be cost effective and therefore the base was selected for realignment; while on the other hand the Department of Defense and U.S. Army Alaska cite the necessity of Fort Greely's for cold weather and big training spaces for testing, training, flying and bombing, and that all this is vital to prepare our national defense. If the Army believes their arouments for a 50 vear land withdrawal for Fort Greely are so strong, than why are they not also strong enough to maintain the small supporting Army post? If Fort Greely's cold weather mission and big open spaces are critical to the Army, then why was Fort Greely realigned rather than Fort Richardson? It cannot work both ways.

□Fifty years is too long for a land withdrawal. The Draft LEIS offered no explanation why 15 and 25 (or 100) year withdrawal renewals were eliminated as alternatives. The argument for the 50 year renewal as the preferred alternative is that the military has been in the region already for about 50 years. Does it follow then that the next renewal request will be for 100 years and then 200, 400 etc.? This is no justification for a 50 year renewal. Who can predict the local economy much less the technology of defense systems for 50 years into the future. How can I condone 50 years of land withdrawal when I have no concept of what type of impact military testing will have on my grandchildren and when no guarantee of public access to traditional hunting grounds or mushing trails are being offered in return?

□ Too little information exists to make an informed decision for a 50 year land withdrawal. Information about to what extent economically viable resources are being withdrawn from the state and public sector is poor. How can the Army and local governments feel assured that the Army is adequately compensating the local economy for this potential economic development, when no on really knows what exists? According to the LEIS, "The economic impact of continued closure is difficult to estimate. Withdrawal areas have high potential for placer gold, and some potential for lode gold and other mineralization associated with intrusive rocks." With the recent substantial gold discoveries just north of the Fort Greely Training Areas the mineral potential should not be overlooked. In addition, the LEIS reports, "Exploratory work for oil and gas has not been done on the military lands." Yet the Mid Tanana Basin holds a high potential for natural gas and oil. Companies have expressed interest in and explored this same geologic formation near Lake Louise outside of Glenallen. If DoD withdraws these lands, then studies should be done to determine what is there. An effort should be made to compensate the community for the lost opportunity for economic mineral development, or the Army should work out an agreement in writing allowing for mineral exploration and mine development.

There is not even enough data to determine if the Army has been environmentally responsible thus far. The LEIS states that the Army is required to protect the environment to the best of their abilities. "All actions taken by the Army are required to consider their impact to the surrounding environment and to take certain precautions to avoid impact." Yet on the topic of wild fisheries the LEIS comments, "No fish population surveys have been conducted on Fort Wainwright Yukon Training Area and Fort Greely West and East Training Areas. No studies have been conducted to analyze impacts from military operations." How can the Army claim to be protecting a resource when the resource itself has not been clearly defined? Inadequate baseline data exists in the area of wetlands as well. The LEIS reports that "Knowledge of the area! extent of wetlands in the withdrawal areas is limited." Apparently in 1992 the National Fish and Wildlife Service surveyed most of Fort Wainwright Yukon Training Area but failed to survey the majority (54%) of Fort Greely's lands. Because wetlands are important habitat for many species and serve a critical role in water quality the Army has a policy to work towards a "no net loss" of existing wetlands on Army lands. How can the Army achieve this at Fort Greety when there is no baseline data of wetland types and acreage? Local Delta pilots report damaging vehicular WATER-DD013 traffic in the Delta West Training Area, especially in the area of Little Delta River, causing sediment runoff and major vegetation disturbance. Sediment runoff to streams and creeks and a decrease in streamside vegetation can affect both water quality and temperature critical for benthic invertebrate and fish populations. State timber sales just downstream from the Delta West Training Area have been put off due to potential threats to fish populations. Perhaps the Army should pause and evaluate their impacts too.

OTH-DD031

ALT-DD062

OTH-DD031: Congress determines military base closures and realignments with the President's approval.

ALT-DD062: The Army's selection of a 50-year renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A credible operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources to protect resource values and implement natural resource management measures. Also see Chapter 2.3.

MIN-DD020: Please refer to Chapter 3.5 *Mineral Resources* for information on the mineral potential of the withdrawal lands.

MIN-D0020 Conducting an evaluation of the mineral potential, including airborne geophysical surveys is not a requirement for the military use of these withdrawal lands.

Mineral development compatibility with Army uses has been evaluated by the military and the BLM on a case-by-case basis whether it is appropriate to open the withdrawal lands to the mining laws that do not conflict with the military mission.

FISH-DD006: Proposed mitigation for wild fisheries (Chapter 4.13.2) and the proposed mitigation (POL-A001) for pollution should ensure that the Army identifies fisheries resources and implements management guidelines.

FISH-DD006
 WET-DD003: A wetland planning-level survey was recently completed at Fort Wainwright Yukon Training Area, and a similar study is in progress at Fort Greely. A wetlands management and revegetation plan is funded and in progress for the withdrawal lands. Fort Wainwright and Fort Greely Integrated Natural Resources Management Plans are under final review by the Army and BLM which will include specific actions for management of wetland areas. Please refer to Chapter 4.10 *Proposed Mitigation* and Chapter 4.23 *Existing and Proposed Mitigation* for additional information.

WATER-DD013: Noted. Please refer to the response to comment SOIL-A001.
9-106

DD

There is little socioeconomic incentive for a Delta resident to support a 50 year land withdrawal since the realignment of Fort Greely. The realignment of for Greely erases the economic base of the town. A 50 year land withdrawal takes away potential resource development from area residents and offers nothing in return. 750 jobs existed at Fort Greely at the time that BRAC announced Fort Greely would be realigned. All but 50 - 60 of these jobs will be gone entirely by 2001. Renewal of the land withdrawal will not bring 700 jobs back. The LEIS would like to convince Delta residents that renewal of the withdrawal will have a very positive effect of the economy of the area by assuring the retention of 50 jobs. "There are approximately 50 to 60 Department of Defense jobs planned for Fort Greely after BRAC95. These positions are contingent upon withdrawat renewal. Thus, these positions would be eliminated without renewal and other area jobs would be lost in the trade and service sectors as a consequence." I do not believe that these 50 jobs that the Army may keep on post will do much to buoy the economy. Will those 50 jobs still be here 50 years from now? Increased military training and reduced land and air access may hinder local efforts to develop the tourism industry. Tourism is a resource that area residents have rallied behind as part of an effort to boost the economy. Note the recent formation of the Delta Visitors' and Convention Bureau, the continued support for the Festival of Lights winter carnival, the presence of new flight-seeing and wildlife viewing tour businesses. Even the LEIS admits that military use of the lands could inhibit the growth of the tourism industry. The land renewal offers no new jobs for Delta, restricts mineral exploration, may or may not being harming fishing resources, and does nothing to promote the tourism industry. At a time when Delta is struggling to maintain economic viability, I can find no socioeconomic advantage for supporting a 50 vear land withdrawal.

□ I do believe in one overriding reason why anyone should support this land withdrawal, military training. Our armed forces must practice low elevation flying and dropping bombs, play war games, and test equipment. These activities are best conducted in rural areas far from population centers. Delta Junction is such a site. I am not opposed to the military. As a child I grew up next to the Naval Ordinance Laboratory (NOL) in Silver Spring, MD. The tradeoff for having nearby explosions rattle my window late at night was the large expanse of big oak trees that extended beyond my backyard which provided habitat for wildlife and protected the local watershed from the suburban sprawl that engulfed most of the nearby area. The presence of Fort Greely has been beneficial for Delta community. However, with the realignment of Fort Greely, little is being offered back to the community in return for putting up with the noise, air, and water pollution; limitations on the development of natural resources, the hindrances to tourism. The Army is asking us to condone all this for 50 years. Instead, I suggest a 15 year withdrawal renewal with some provisions guaranteeing fire management support, public access to most heavily used recreation trails, baseline and impact studies for wetlands and wild fish populations, local range control, military convoy considerations and safety precautions, and allowances for mining exploration. I hope to pass on to my grandchildren a Delta tradition of a positive relationship with the military.

ODDDDDDDSincerely,

DDD DDDDDDD**Judy G. Olson Hicks** SOC-DD015

SOC-DD015: The effects of the Base Realignment and Closure on the town of Delta Junction is not within the scope of this LEIS. See Chapter 1, *Purpose of and Need for Action*. NEPA documents, including Environmental Assessments are being prepared to analyze the impacts of the realignment on Fort Wainwright and Fort Greely. The Environmental Assessment for Realignment of Personnel and Military Functions to Fort Wainwright was published in June 1997. It is anticipated the Environmental Assessment for Realignment of Personnel and Military Functions from Fort Greely will be published in October 1999.

ALT-DD061 ALT-DD061: Noted. Thank you for your comment.

Name: Randy Bealer

Orginization:

Address: P.O. Box 796

Delta Junction, AK 99737

Comment: DDDDDDRandy Bealer DDDDDDP.O. Box 796 DDDDDDEta Junction, Alaska 99737

> Ms. Cindy Herdrich Center for Ecological Management of Military Lands Colorado State University Fort Collins, CO 80523-1500

I have three items I would like to comment on. First, I want to express my thanks for the canned, blanket, and generic responses to the specific concerns addressed in my two letters that appeared in the scoping summary section of the draft L.E.I.S. In general the referenced responses that were given did not apply at all to my concerns.

EΕ

Secondly, in our local news, I have noticed that a barrage of high ranking military officials have been coming to Fairbanks to talk about the bright future of the military in Alaska. They indicate that this bright future will translate to an economic boom for interior Alaska. They do not foresee any military cutbacks but they expect military growth (""to take advantage of our perfect training areas""). None of them even mentioned the BRAC realignment of Fort Greely. It is obvious they are only here campaigning for the 50 year Army lands renewal. They termed ""all Alaska" are being a wonderful battlefield.

My last item of comment has to do with the socioeconomic section (3.19). I do not feel it was made clear enough in that section that Fort Greely is on the BRAC list and is scheduled to all but close. How about including some charts and graphs showing results **SOC-EE016** of the BRAC impact on the local Detta economy. Why was Fort Greely lumped in with the Fairbanks economy? Fort Greely is 100 miles from Fairbanks. If the army does not want to maintain an economic presence in the Detta area then their physical battlefield presence will no longer be welcome. Give us back our land.

DDDDDDDDSincerely,

RESPONSES TO COMMENT EE

OTH-EE032: The scoping process gathers concerns from the public to define significant issues and develop possible alternatives.

OTH-EE033 OTH-EE033: Noted. Thank you for your comments.

SOC-EE016: The Base Realignment and Closure (BRAC) is not within the scope of this LEIS. NEPA documents, including Environmental Assessments are being prepared to analyze the impacts of the realignment on Fort Wainwright and Fort Greely. The Environmental Assessment for Realignment of Personnel and Military Functions to Fort Wainwright was published in June 1997. It is anticipated the Environmental Assessment for Realignment of Personnel and Military Functions from Fort Greely will be published in October 1999.

Name:

GG (FF was not used)

Pamela K. Miller Orginization: Alaska Community Action on Toxics

Address: 135 Christensen Drive

Anchorage, AK 99501

Comment: Alaska Community Action on Toxics 135 Christensen Drive, Suite 100 Anchorage, Alaska 99501 (907) 222-7714 (phone); (907) 222-7715 (fax)

> Ms. Cindy Herdrich Center for Ecological Management of Military Lands Vocational Education Building Colorado State University Fort Collins, Colorado 80523

February 7, 1999

Comments on the Draft Legislative Environmental Impact Statement: Alaska Army Lands Withdrawal Renewal-Transmitted Electronically Via Internet and Fax

Dear Ms. Herdrich:

I present my comments on behalf of Alaska Community Action on Toxics, a program of the Alaska Conservation Foundation, Alaska Community Action on Toxics is a non-profit organization that works to protect human health and the environment from the toxic effects of contaminants. We are dedicated to achieving environmental justice through our collaborative work with tribes and other affected communities. Similar comments as those that follow were also presented before the Defense Environmental Response Task Force (DERTF) at their public hearing in San Francisco on February 3, 1999

Within Alaska, massive areas of land, including sensitive riparian and wetlands, have been used by the military as weapons testing ranges. According to a public affairs officer with the Air Force, these OTH-GG034 testing ranges encompass an area within Alaska equivalent to the size of the state of Kansas. The military has not been accountable for the untold past, present and future damage to lands, wildlife habitat, human health and safety. This must change. We now have some opportunities before us to reverse the Department of Defense's disturbing trend of destruction in Alaska

The Department of the Army released a Draft Legislative Environmental Impact Statement (DLEIS) that proposes to continue use of 1,300 square miles of Interior Alaska lands as bombing ranges for another 50 years on Fort Wainwright and Fort Greely. In the last 5 years alone, the military has shot 3,500 rockets packed with high explosives, 4,300 bombs-some weighing up to a ton, and about 50,000 additional high explosives into the Chena River watershed. Similar guantities of bombs, rockets, and missiles have been shot onto the lands along the Delta River adjacent to Fort Greely. In addition, the area has been subjected to chemical agents including nerve gas VX and VG, mustard gas, and biological warfare agents.

The Army admits it has virtually no baseline of information on the ecological damage from the physical and toxicological effects of the explosive and chemical munitions testing. Our efforts to secure information through the Freedom of Information Act on the nature and extent of Army/Air Force POL-GG013 weapons ranges and testing areas have been met with secrecy and lack of cooperation. The LEIS exhibits a poor understanding of the hydrology of the region and potential exposure pathways via ground- and surface waters. Bombing continues in sensitive riparian and other important habitats without regard for erosional impacts, contamination problems and transport pathways of contaminants. In light of recent studies at other military bases that demonstrate contamination of ground- and surface water with toxic and carcinogenic propellants and heavy metals, we demand completion of an

RESPONSES TO COMMENT GG

OTH-GG034: Noted. Thank you for your comments.

USE-GG040: Unfortunately, events that occurred in the past cannot be taken back or erased. However, these actions can be remediated.

Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23). Current decontamination efforts are described including an ordnance cleanup history by the Air Force (response to POL-A002 and Appendix 2.C).

POL-GG013: Please refer to responses for POL-A001 and POL-A002. Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23). Current decontamination efforts are described including an ordnance cleanup history by the Air Force (Appendix 2.C).

To guide and regulate the actions of Army personnel using and managing training lands, the Army has developed the Integrated Training Area Management (ITAM) program, The goals of ITAM are to evaluate, repair, maintain, and enhance training lands at Army training installations. Please refer to Appendix 2.D for a detailed description of the ITAM program.

USE-GG040

GG

Alaska Army Land Withdrawal Comment/Conserns Submittals

Monday, 8 February 1999

independent and complete characterization of potential exposure pathways including air, ground- and surface waters, fish and wildlife on- and off-site the ranges and testing areas. Ed Sheehan, a retired Lt. Colonel who had indirect control over bombing range activities at Fort Greety objected in the public meeting that the proposal would enlarge the impact areas beyond even the expansive former ranges. The LEIS failed to fully characterize the testing areas, quantities, impacts, and types of weapons to be tested over the next 50 years. The LEIS also failed to analyze impacts from previous weapons testing, uncluding the potential use of depleted uranium weapons within the weapons ranges. "Green" or dummy munitions that do not present toxic or physical hazards must be considered as options if certain weapons testing areas remain open. These must also be recovered and impact damage repaired.

We urge that the Army not be granted any extension of the land withdrawal. The 50 year time period is excessive given that most land withdrawals are considered on a 10 to 15 year time period. The DoD must fully characterize and remediate the severely damaged lands and waters within the weapons ranges proposed for continued withdrawal. The LEIS must consider that military munitions spent or deposited on or off firing ranges are classified as hazardous waste under the Resource Conservation and Recovery Act (RCRA). The Federal Facilities Compliance Act requires that the Army comply with environmental laws just as businesses are required. "Conventional" munitions are a threat to public health and safety, the environment, subsistence use, recreational and other uses. The testing and disposal of munitions exposes wildlife and humans to explosive and toxic hazards. These exposures and further erosional and other physical damage must be avoided by remediating and restoring lands damaged by munitions testing.

Sincerely,

Pamela K. Miller Program Director

Cc Senator Ted Stevens Senator Frank Murkowski Representative Don Young Governor Tony Knowles AK Department of Environmental Conservation Commissioner Michelle Brown Secretary of Interior Bruce Babbitt Department of Interior Special Assistant for Alaska, Marilyn Heiman **iG041 USE-GG041:** The primary type of training munition expended by the Air Force on the withdrawal lands is the BDU-33, which is a "dummy" bomb. The Army has completed initial testing of 5.56mm "green" (non-lead) bullets. Development plans continue for lead-free 9mm and 50cal ammunition.

Chapter 2.1.3.5 describes Air Force decontamination efforts on the withdrawal lands. Chapter 4.23 describes proposed decontamination mitigation by the Army on its Ranges and Impact Areas.

Army range policy does not allow depleted uranium for general use on Impact Areas. It is only authorized under a special use permit.

MIT-GG017 ALT-GG063: Noted.

MIT-GG017: Please refer to responses for POL-A001 and POL-A002. Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23). Current decontamination efforts are described including an ordnance cleanup history by the Air Force (Appendix 2.C).

To guide and regulate the actions of Army personnel using and managing training lands, the Army has developed the Integrated Training Area Management (ITAM) program. The goals of ITAM are to evaluate, repair, maintain, and enhance training lands at Army training installations. Please refer to Appendix 2.D for a detailed description of the ITAM program.



HH UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION 10 1200 Sixth Avenue Seattle, Washington 98101

FEB 5 1999

Ref: 98-063-DOA

Reply To Attn Of: ECO-088

Ms. Cindy Herdrich Center for Ecological Management of Military Lands Vocational Education Building Colorado State University Fort Collins, Colorado 80523

Dear Ms. Herdrich:

The Environmental Protection Agency (EPA) has completed its review of the Draft Legislative Environmental Impact Statement (DLEIS) for the proposed Alaska Army Lands Withdrawal Renewal in accordance with its authorities and responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. The DLEIS has been prepared by the Department of the Army in response to the Military lands Withdrawal Act and evaluates the continuing military need for lands withdrawn from public use at Fort Greely and Fort Wainwright Yukon Training Area in Alaska. The DLEIS evaluates two alternatives and identifies continued renewal of the withdrawn lands for 50 years as the Army's preferred alternative.

Based on our review and evaluation of the DLEIS, we have assigned a rating of EO-2 (Environmental Objections -Insufficient Information) to the draft EIS. This rating, and a summary of our comments, will be published in the *Federal Register*. A copy of the rating system used in conducting our review is enclosed for your reference.

Our objections are based primarily on the evaluation of a restricted range of alternatives, and potentially significant direct, indirect, and cumulative environmental impacts associated with current and proposed activities on the lands proposed for renewed withdrawal. We believe that the EIS needs a significant amount of additional information in order for it to meet its fundamental role as a disclosure document. A significant amount of information defining the current environmental conditions on both facilities is needed to define the affected environment and evaluate future cumulative effects. We also believe that more site-specific evaluation of impacts from military activities on the withdrawn lands is needed to clearly define the consequences of renewed withdrawal and allow for the identification of options for minimizing or avoiding impacts, per NEPA (40 CFR 1500.2(f)). We also recommend that the cumulative impacts analyses be expanded and suggest the Council on Environmental Quality's handbook on cumulative effects analysis be consulted.

These issues, along with others that we believe need to be addressed in the EIS, are

discussed in greater detail in the enclosure to this letter.

Thank you for the opportunity to provide comments on the DLEIS. I urge you to contact Bill Ryan of my staff at (206) 553-8561 at your earliest opportunity to discuss our comments and how they might best be addressed for the project.

Sincere

Richard B. Parkin, Manager Geographic Implementation Unit

Enclosure

cc: Lieutenant Colonel Mark C. Nelson, USARAK

ΗH

EPA Region 10 Comments on the Draft Legislative Environmental Impact Statement for the Alaska Army Lands Withdrawal Renewal

Range of Alternatives

We are very concerned with the extremely limited range of alternatives considered and evaluated in the Draft Legislative Environmental Impact Statement (DLEIS). As currently written, the EIS evaluates a single action alternative (a proposed 50 year withdrawal period) and the No Action alternative (no withdrawal beyond 2001). Given that the No Action alternative must be included for analysis by the implementing regulations for the National Environmental Policy Act (NEPA) and the additional 50-year withdrawal represents the Army's proposed action, we are concerned that the EIS has not presented the public or the decision makers with an evaluation of a range of reasonable alternatives which provide a clear basis for choice, as required by NEPA itself (see Section 102 of NEPA) and its implementing regulations (40 CFR 1502.14). Pages ES-6 and 2-32 of the DLEIS indicate that alternatives consisting of various lengths of renewal periods were not considered in detail because they "would offer little effective impact analysis" and that the "scope of actions" and "management and use of these withdrawal lands" would remain the same under each time period. While we do not dispute the claim that the scope of actions and management and use would remain the same for each time period, we believe that these actions and uses are likely to result in differing levels of environmental effects. Impacts to the environment from continued military activities over a 50 year period are very likely to be different from those that would result from the same activities conducted over a 10, 20, or 100 vear period. The EIS is the vehicle to evaluate and disclose these differences so as to provide the public and the decision makers (in this case, Congress) an understanding of reasonable alternatives to the presently proposed 50 year withdrawal renewal. We recommend that the Army seriously evaluate additional renewal periods along with the proposed action and the No Action alternative, consistent with NEPA. Such alternatives do not appear to pose discernible conflicts with the ability of the Army to achieve its operational and training objectives in Alaska.

Environmental Effects

Current and proposed future activities on the Fort Wainwright Yukon Training Area and Fort Greely have the potential to cause significant environmental impacts. Off-road maneuvering and activities can result in severe damage to soils and vegetation and contribute to water quality degradation through increased input of sediments. The use of munitions also damage soils and vegetation, as well as lead to potentially significant contamination of soils, surface waters, and/or ground water. Spilled fuels and lubricants could result in potentially significant soil, surface water, and/or groundwater contamination. We believe that the DLEIS should provide sufficient information and analyses to allow the public and the decision makers to understand 1) whether the

RESPONSES TO COMMENT HH

ALT-HH064 ALT-HH064: The Council on Environmental Quality implementation guidelines for NEPA does not specify a required number of alternatives to satisfy a range. Chapter 2.3 identifies those alternatives considered but eliminated from further analysis, with the reasons for their elimination.

POL-HH014 POL-HH014: The DLEIS cannot supply information and analyses if the studies have not been conducted, and data are not available. Mitigation for the withdrawal renewal identifies the lack of information and the necessity to conduct studies in order to determine effects of military activities on the environment. Please refer to Chapter 4.23 for Existing and Proposed Mitigation. HH

withdrawn lands have been significantly impacted by past and current activities, and 2) whether the renewal of the withdrawn lands would result in potentially significant impacts, when considered cumulatively with current conditions. We do not believe that the DLEIS provides this type of information. Comments related to the characterization of current and future impacts are presented below.

Affected Environment/Baseline Information

The meaningful assessment of environmental impacts from proposed activities in an EIS requires a good characterization of current (baseline) conditions and a reasonable projection of future direct, indirect and/or cumulative impacts (see 40 CFR 1502.16). We find it extremely difficult to determine the potential impacts of the preferred alternative due, in large part, to the lack of baseline environmental information. Chapter 4 of the DLEIS indicates that a large amount of baseline information is not available, has not been collected, or does not exist. We believe that this lack of information results in incomplete characterizations of impacts and is inconsistent with one of the main purposes of NEPA; to "insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken" (see 40 CFR 1500.2(b)). To ensure that the EIS contains sufficient information to allow reviewers and Congress to understand the implications of selecting the proposed action in the context of the impacts from past and ongoing activities, we recommend that the EIS be revised to include the following information:

Data on damage to soils from military activities Data on damage to soils, vegetation, and water quality caused by munitions Contamination studies of the Impact Areas Contamination studies assessing impacts of TNT and RDX Baseline munitions study for Fort Wainwright Data on damage from BDU-33 Comprehensive fuel spill information Vegetation loss from military activities Total wetland impacts from military activities Disturbance of wildlife species by military activities Impacts to wild fish populations from military activities Violations of applicable Alaska State Water Quality Standards

Direct Impacts of the Proposed Action

The DLEIS provides generalized descriptions of potential impacts associated with activities that would take place under the proposed action. We were unable, in most cases, to find a translation of those descriptions to meaningful, site-specific characterizations of impacts associated with the proposed action. As an example, Section 4.10 presents a good general discussion of activities that would result in impacts to wetlands and the associated environmental consequences of those impacts. The EIS, however, fails to discuss the projected levels of those impacting activities, the spatial distribution of such activities, and projected amount of wetlands (and associated functions) that would be lost with the implementation of the proposed action. We

POL-HH015 POL-HH015: The DLEIS cannot be revised to include data which has not been collected by either the Army or other agencies. Although the Army does not have the data, the Army never the less believes that adequate data have been evaluated to support the implementation of the proposed action through the preferred alternative. Please refer to Chapter 4.23, Proposed Mitigation.

OTH-HH035: The DLEIS cannot supply information and analyses if the studies have not been conducted, and data are not available. No baseline studies to assess the effects of munitions on soils, surface water, groundwater, wetlands, vegetation, or wildlife have been completed for the withdrawal lands or surrounding areas by the military or State and Federal agencies. Where data was available, site specific references are included throughout the LEIS. The Army's proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23).

OTH-HH035

recommend that the EIS be revised to include information that translates the general descriptions of activities and impacts of the proposed action to impact characterizations that allow the public and the decision makers an understanding of the site-specific consequences of implementing the proposed action.

We believe that the collection and analysis of baseline information identified above would aid in the evaluation of projected direct impacts from the proposed action. By evaluating current environmental conditions along with historical activities on the withdrawn lands, relationships/correlations could be developed as a means of projecting potential impacts from future activities. We recommend that this approach be explored in the further development of the EIS.

Cumulative Effects

We are concerned with the rather cursory treatment of cumulative effects in the DLEIS. The NEPA regulations define a cumulative impact 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" (40 CFR 1508.7). A meaningful cumulative impact analysis cannot be developed without information about past, present and reasonably foreseeable actions (and their associated impacts). We recommend that information related to current environmental conditions (reflecting past and current activities), along with site-specific characterizations of impacts from the proposed action, be developed in order ensure that meaningful cumulative effects analyses can be completed and presented in the EIS. We also recommend that the Army consult *Considering Cumulative Effects under the National Environmental Policy Act* developed by the Council on Environmental Quality (CEQ), as it provides a good framework for developing cumulative effects analyses in the context of NEPA. This publication can be downloaded from the CEQ's web site, and is located at http://ceq.eh.doe.gov/nepa/nepanet.htm.

Mitigation Measures

The DLEIS identifies the USARAK Range Regulation 350-2 and the Integrated Training Area Management (ITAM) program as currently being used to mitigate environmental impacts on the lands proposed to be withdrawn for the next 50 years. While the EIS presents general descriptions of Regulation 350-2 and the ITAM program, it does not indicate the degree to which they have been complied with/implemented, or the effectiveness of their implementation in achieving necessary environmental protection goals. We believe that it is critically important that the EIS disclose to the public and the decision makers the effectiveness of the current approaches being taken to mitigate environmental impacts, particularly since the very same measures are being proposed for continued use should the proposed renewal be selected. Because Congress will determine the mitigation measures to be applied with renewal of the withdrawn lands, we believe that they must clearly understand the effectiveness of the current approach before they can determine whether continued use of Regulation 350-2 and ITAM provide an effective means of **OTH-HH036:** This LEIS was prepared in accordance with NEPA, CEQ Regulations, and Army Regulations. Cumulative impacts are described throughout Chapter 4.

MIT-HH018: Training exercises conducted on Alaska military lands are regulated by USARAK Range Regulation 350-2. All actions undertaken by the U.S. Army are required to consider their impact to the surrounding environment and to take certain precautions to avoid impact. These include the refilling and leveling of any foxholes, trench systems, tank traps, hulldown positions, or explosive excavations; conducting vehicular stream crossings in designated areas only; limiting cross-country vehicular travel to established roads and dry trails during spring thaw; and avoiding cross-country movement in creek bottoms, marshes, and moist tundra areas during summer months. By limiting these activities, the chance of erosion occurring and subsequent sedimentation leading to poor water quality will be lessened. There have been isolated instances where Range Regulation 350-2 has not been satisfied. However, remediation has been implemented as mandated.

OTH-HH036

In addition to these environmental considerations, damage control steps are also included within individual training plans to minimize natural resources damage. These steps include the protection of known sensitive areas, repair of unavoidable maneuver damage, coordination and permitting of any ground disturbing activities, and scheduling of natural resources and hazardous material inspections of training areas to ensure regulation compliance. Fort Greely and Fort Wainwright Integrated Natural Resources Management Plans are being developed to ensure land stewardship and environmental protection.

MIT-HH018 To guide and regulate the actions of Army personnel using and managing training lands, the Army has developed the Integrated Training Area Management (ITAM) program. The goals of ITAM are to evaluate, repair, maintain, and enhance training lands at Army training installations. Please refer to Appendix 2.D for a detailed description of the ITAM program.

Please refer to Chapter 4.23 Proposed Mitigation.

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the achieving necessary levels of environmental protection. Consequently, we recommend that the EIS be revised to include 1) a more thorough description of Regulation 350-2 and the ITAM program (and any other relevant regulations or programs), 2) information related to the level of implementation of the regulation and ITAM (is there 100 percent compliance/implementation, or some lower rate?), and 3) a discussion of the effectiveness of these approaches in mitigating environmental impacts.

The DLEIS identifies numerous information/data gathering efforts as mitigation measures. The information that is identified as being needed appears to be, for the most part, baseline information required to define current conditions on both Fort Greely and Fort Wainwright and should be integrated into analyses of impacts of the proposed action. We recommend that this information be collected and incorporated into the EIS. We also recommend that mitigation measures presented in the EIS be consistent with the definition of mitigation presented in the NEPA regulations (40 CFR 1508.20).

Evaluation of Significant Issues

Page 1-9 of the DLEIS identifies <u>Submerged Lands</u> as a significant issue raised during the scoping process and indicates that it, along with other significant issues, are analyzed in the EIS. In reviewing the DLEIS, we found very little discussion, and virtually no analysis, of this issue. **LAND-HH014** We suggest that this issue be analyzed and discussed in the evaluation of the proposed action, as it has implications on potential future uses of the lands proposed for renewal. We recommend that the DLEIS evaluate the potential consequences of the State of Alaska's claim to the submerged lands in question being valid in combination with the renewal of the withdrawn lands to ensure that significant issues have been analyzed in the EIS.

MIT-HH019 MIT-HH019: The Army's proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23).

LAND-HH014: Please refer to Executive Summary and Chapter 1.8. Additional information regarding water quality and the jurisdiction of submerged lands has been added to these sections. Chapter 3.1.1 and Chapter 4.1 describes submerged lands and their relation to land use. Chapter 4.8.2 describe the issue of water quality, monitoring, and decontamination of submerged lands. ΗН

SUMMARY OF THE EPA RATING SYSTEM FOR DRAFT ENVIRONMENTAL IMPACT STATEMENTS: DEFINITIONS AND FOLLOW-UP ACTION *

Environmental Impact of the Action

LO--Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities with no more than minor changes to the proposal.

EC--Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EO--Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category I--Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information

The draft EIS does not contain sufficient information for EPA fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the MEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEO.

9-115

*From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment

Fairbanks Area Alaska State Parks Citizen Advisory Board

100.000

3700 Airport Way Fairbanks, Alaska 99709-4613 (907) 451-2695

February 2, 1999

USE-11042

Ms. Cindy Herdrich Center for Ecological Management of Military Lands Colorado State University Fort Collins, CO 80523-1500

Dear Ms. Herdrich:

Subject: Military Land Withdrawals

I am most concerned about the military seeking a 50-year extension of land withdrawals which cover 871,537 acres of Interior Alaska. This is three times longer than the current withdrawal terms. There are three withdrawals involved: Fort Wainwright Yukon Training Area, which covers 247,952 acres east of Eielson Air Force Base in the uplands between the Chena and Salcha rivers; and the Fort Greely East and West training areas that straddle the Richardson Highway in the Donnelly Dome area south of Fort Greely, and together cover another 623,585 acres. Congress last renewed the military use of the Interior blocks in 1986, granting U.S. Army Alaska 15 more years of possession but tying any future extension to completion of an environmental impact statement.

The land grant expires November 6th, 2001, and the citizens of Northern Interior Alaska want the land back! There are a lot of potential public concerns about the continuing withdrawals that the Army and Air Force hope do not come up. The state has requested acreage bordering the Chena River State Recreation Area to expand access to timber, mineral, hunting and fishing resources, and additional wildlife protection measures.

Now much of the land is covered with hazardous material and "unspent ordnance." These unexploded live ordnance and munitions residue ("duds," "warheads," the *Fairbanks Daily News Miner* Fred Pratt article calls them), have polluted and contaminated our land and wildlife, and environmental hazards have emerged, such as the old shells and other munitions that lurk under the surface of the Delta River and other glacial-fed waterways within Fort Greely's old bombing range.

The Stuart Creek area is also cluttered with other contaminants. For example, old cars, oil drums, motors, and transmissions, and other so called "targets" that sink into the mud during "Break Up" each year where the oil floats to the surface, then the target area turns into a huge mud hole 5' to 6' deep with oil floating on top. This lingering problem leads to potential threats to local wildlife populations. The military has not been good stewards of their land occupation during the previous tenancy because their "dud" picking-up business has faltered and they do not demonstrate that they are meeting environmental impact requirements for clean up and probably will not until they are legally required to do so at the time of withdrawal.

RESPONSES TO COMMENT II

ALT-II065: Military use of the Yukon Training Area started in 1956. In 1975 the Alaska State Legislature designated the boundaries of the Chena River State Recreation Area, which includes a portion of Yukon Training Area land referred to as the Beaver Creek-South Fork Area. This State action did not transfer title of the land nor was it supported by Federal agencies. At this time, the State has not designated these lands as high priority for conveyance.

The Army and Air Force considered an alternative to relinquish this portion of the Yukon Training Area (see Chapter 2.3.3) to Alaska State Parks, but eliminated it from further study due to the excessive impacts to military training and the importance of this area's training infrastructure in achieving combat readiness.

Also see the letter from the State of Alaska dated February 4, 1999 received during the comment period on this LEIS.

POL-II016: Please refer to response POL-A002. Current decontamination efforts are described including an ordnance cleanup history by the Air Force (Appendix 2.C).

USE-II042: Since the early 1970's, all vehicles placed within Impact Areas to be used as targets have been purged of all oils, antifreeze, lubricants, batteries and other fluids. Also, all glass has been removed to prevent despecularization (reflection of laser light) (Reidsma, pers. com. 1999).

- ALT-II065 The Air Force's decontamination efforts conducted at Stuart Creek and Oklahoma/Delta Creek Impact Areas are discussed in Chapter 2.1.3.5. Targetry used at these areas are also cleared on an "as needed" basis which includes scrap metal, target practice bombs, and other debris.
- **POL-II016** Impacts to wildlife are discussed in Chapter 4.12. Proposed mitigation listed in 4.23 *Pollution*, would address this concern.

To guide and regulate the actions of Army personnel using and managing training lands, the Army has developed the Integrated Training Area Management (ITAM) program. The goals of ITAM are to evaluate, repair, maintain, and enhance training lands at Army training installations. Please refer to Appendix 2.D for a detailed description of the ITAM program.

USE-II043: Decontamination efforts conducted by the military are described in Chapter 2.1.3.5. An ordnance cleanup history by the Air Force is also included in Appendix 2.C.

Jefferies to Herdrich February 3, 1999 Page 2

In 1975, the Alaska State Legislature designated the boundaries of the Chena River State Recreation Area, including a portion of military land that the state placed as one of its highest priorities for topfiling, should the military relinquish the land. Some of that military land was relinquished in the early 1990's, but not all of it. The Beaver Creek drainage is the southern-most creek in the State Park Recreation Area, still under federal ownership and designated as PTTA (Prohibited Tactical Training Area) by the military.

Why would anyone go into the Beaver Creek drainage? It is the only cross-country link between the eastern side and the western side of the recreation area south of the Chena Hot Springs Road. Trail users, hunters, trappers and other adventure-seekers travelling the Chena River's South Fork or East Fork Rivers logically want to continue their travel and return in a large loop, rather than retracing their steps. More than 20 years ago, the Alaska Legislature envisioned, and we continue to want to include, the Beaver Creek drainage as a functional part of the Chena River Recreation Area. The 13,440 acre slice of the Yukon Maneuver Area's buffer zone should be available to continue safe and hazard-free access for all park user groups.

The "draft" Environmental Impact Statement says the Beaver Creek drainage is very essential to the military's training mission. Even if this is assumed as true, who can say how long it will remain true? No one can predict a 50-year need for these lands with any certainty. With the Base Reallignment Closure of Fort Greely, Alaska within the next few years WHY does the military ask for a 50 year extension of this land withdrawal? Most of us and most of our children will not see its use again for public access, if this requested extension is approved. There should be frequent reviews of the military land needs. When withdrawal of land can no longer be justified, it should be returned to the owners.

Another issue is that the military says these areas are environmentally safe. Then, why can we not obtain permits for access to the buffer area (PTTA) when not in use for training. Why is it closed for public recreation use? For some military land, they allow hunters or trappers to get a permit from the MPs (and be presented a safety briefing and provided a map layout of the area, at the same time, if required) before entering the land. Why is this buffer land (Beaver Creek drainage) not treated the same way for users? After all, the military controlled land within the Chena River State Recreation Area boundaries is not the bombing range -- it is a buffer area, presumably safe to use when military exercises are not being conducted. And why is there only a permit for consumptive uses (hunting, fishing, and trapping) and not for general recreation? The land could be well signed so no one would knowingly wander astray of the boundaries, and opened between training maneuvers for casual users, such as cross-country travelers (dog mushers, snow machiners, etc.), especially those who access the land from the state park rather than using the military roads. Can we set up a cooperative agreement to allow this?

Our Senior Ranger asks: "Did you read that new Recreational Access Act? Did it say that the public needs a *permit* to access anything other than sensitive or dangerous areas? Is the PTTA (Beaver Creek) dangerous all the time, or only during air operations? Isn't the area now open to unpermitted access?" He further states, "It's not up to us to monitor or control public access to military lands. If we publish a new flyer, we can indicate the "closed" impact area, and give the MP phone number for info."

ACC-II023: This area is part of the Yukon Training Area and subject to the same access and use restrictions as other lands not permanently closed. This area is open to the public according to military training and scheduling.

ALT-11066

ALT-II066: The Army's selection of a 50-year renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A credible operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources to protect resource values and implement natural resource management measures.

Periodic review of the Army's use and management of the withdrawal lands would occur. In accordance with the Sikes Act, U.S. Army Alaska is preparing Integrated Natural Resources Management Plans for Fort Wainwright and Fort Greely. These plans are written for a five year period with public, and Federal and State agency participation in the development and review process.

ACC-II024 The Army allows public access to its lands when areas are not being used for training and when there is no danger to public safety (see Chapters 3.16 and 4.16 for access requirements to the withdrawal renewal lands).

Also see the letter from the State of Alaska (comment letter X in this section) dated February 4, 1999 received during the comment period on this LEIS.

ACC-II024: This area is part of the Yukon Training Area and subject to the same access and use restrictions as other lands not permanently closed. This area is open to the public according to military training and scheduling.

ACC-II025: The Sikes Act (16 USC 670a et seq.) is not a recreational access act. The Army's Natural Resources office is working with the Alaska Division of Parks to identify the trail route currently being used by the public within the Beaver Creek-South Fork drainage area.

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Our recommendations are:

- a. make the withdrawal a 10 year maximum term, OR disapprove any/all extensions, and return this military occupied land back to the State after appropriate clean-up,
- b. if the withdrawal is continued, move the buffer area of Stuart Creek to allow access to the Beaver Creek drainage in the Chena River State Recreation Area land
- c. verify access restrictions/requirements for the public to the PTTA (Beaver Creek) and the Impact Area and make that information widely dispersed/available,
- d. cooperatively work to find a suitable trail route in the Beaver Creek to connect to the East Fork valley,
- e. work on a cooperative management agreement for that trail, and
- f. let the Military and the State patrol and manage their own respective lands

Sincerely yours,

Jack L. Jefferie

Chairman Fairbanks Area Alaska State Parks Citizen Advisory Board

Enclosures (4) Fred Pratt article

Dan O'Neill article Brian O'Donoghue, Staff Writer, Fairbanks News-Miner Newspaper New Recreational Access Act Public Law 99-561 99th Congress

An Act

To enhance the carrying out of fish and wildlife conservation and natural resource management programs on military reservations, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. AUTHORIZATION OF APPROPRIATIONS.—(a) Subsections (b) and (c) of section 106 of the Sikes Act (16 U.S.C. 670f (b) and (c)) are each amended by striking out "and 1985," and inserting in lieu thereof "1985, 1986, 1987, and 1988,".

(b) Subsections (a) and (b) of section 209 of the Sikes Act (16 U.S.C. 6700 (a) and (b)) are each amended by striking out "and 1985," and 16 USC 6700. inserting in lieu thereof "1985, 1986, 1987, and 1988,".

SEC. 2. NATURAL RESOURCES AND FISH AND WILDLIFE MANAGEMENT 16 USC 670a-1. ON MILITARY RESERVATIONS; REPORT ON MILITARY EXPENDI-TURES FOR FISH AND WILDLIFE MANAGEMENT.

(a) NATURAL RESOURCES MANAGEMENT.—The Secretary of each military department shall manage the natural resources of each military reservation within the United States that is under the jurisdiction of the Secretary—

(1) so as to provide for sustained multipurpose uses of those resources; and

(2) to provide the public access that is necessary or appropriate for those uses;

to the extent that those uses and that access are not inconsistent with the military mission of the reservation.

(b) FISH AND WILDLIFE MANAGEMENT SERVICES.—The Secretary of each military department shall ensure, to the extent feasible, that the services necessary for the development, implementation, and enforcement of fish and wildlife management on each military reservation within the United States under the jurisdiction of the Secretary are provided by the Department of Defense personnel who have professional training in those services.

(c) FISH AND WILDLIFE MANAGEMENT REPORT.—The Secretary of each military department shall submit to each House of the Congress, before the close of the 180-day period occurring after the close of fiscal year 1986, a detailed report setting forth the amount and purpose of all expenditures made during fiscal year 1986 for fish and wildlife management on each military reservation in the United States under the jurisdiction of the Secretary.

(d) DEFINITIONS.-As used in this section-

(1) The term "military department" means the Department of the Army, the Department of the Navy, and the Department of the Air Force.

(2) The term "United States" means the States, the District of Columbia, the Commonwealth of Puerto Rico, and the territories and possessions of the United States.

State and local

governments.

.- SEC. 3. SIKES ACT AMENDMENTS.

(a) COOPERATIVE PLANS.—(1) Section 101 of the Act of September 15, 1960 (commonly referred to as the "Sikes Act"; 16 U.S.C. 670a) is amended to read as follows:

"SEC. 101. (a) The Secretary of Defense is authorized to carry out a program of planning for, and the development, maintenance, and coordination of, wildlife, fish, and game conservation and rehabilitation in each military reservation in accordance with a cooperative plan mutually agreed upon by the Secretary of Defense, the Secretary of the Interior, and the appropriate State agency designated by the State in which the reservation is located.

"(A) fish and wildlife habitat improvements or modifications.

"(B) range rehabilitation where necessary for support of wildlife.

"(C) control of off-road vehicle traffic, and

"(D) specific habitat improvement projects and related activities and adequate protection for species of fish, wildlife, and plants considered threatened or endangered;

"(2) must be reviewed as to operation and effect by the parties thereto on a regular basis, but not less often than every 5 years;

"(3) shall, if a multiuse natural resources management plan is applicable to the military reservation, be treated as the exclusive component of that management plan with respect to wildlife, fish, and game conservation and rehabilitation; and

"(4) may stipulate the issuance of special State hunting and fishing permits to individuals and require payment of nominal fees therefor, which fees shall be utilized for the protection, conservation, and management of fish and wildlife, including habitat improvement and related activities in accordance with the cooperative plan; except that—

"(A) the Commanding Officer of the reservation or persons designated by that Officer are authorized to enforce such special hunting and fishing permits and to collect the fees therefor, acting as agent or agents for the State if the cooperative plan so provides, and

"(B) the fees collected under this paragraph may not be expended with respect to other than the military reservation on which collected.

"(c) After a cooperative plan is agreed to under subsection (a)— "(1) no sale of land, or forest products from land, that is within a military reservation covered by that plan may be made under section 2665 (a) or (b) of title 10, United States Code; and "(2) no leasing of land that is within the reservation may be

made under section 2667 of such title 10;

unless the effects of that sale or leasing are compatible with the purposes of the plan.

"(d) With regard to the implementation and enforcement of cooperative plans agreed to under subsection (a)--

"(1) neither Office of Management and Budget Circular A-76 nor any successor circular thereto applies to the procurement of services that are necessary for that implementation and enforcement; and

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"(2) priority shall be given to the entering into of contracts for Contracts. the procurement of such implementation and enforcement services with Federal and State agencies having responsibility for the conservation or management of fish or wildlife.

"(e) -Cooperative plans agreed to under the authority of this section and section 102 shall not be deemed to be, nor treated as, 16 USC 670b. cooperative agreements to which the Federal Grant and Cooperative Agreement Act of 1977 (41 U.S.C. 501 et seq.) applies.".

(2) Subsection (d)(1) of such section 101 (as added by paragraph (1)) Contracts. shall not affect any contract entered into before the date of the enactment of this Act for the provision of services to implement or enforce a cooperative plan under this Act on any military installation; but shall apply to the renewal, after such date of enactment, of any such contract.

(b) FUNDS COLLECTED UNDER PLANS.—Subsection (a) of section 106 of the Sikes Act (16 U.S.C. 670f(a)) is amended by adding at the end thereof the following new sentence: "All funds that are so collected shall remain available until excended.".

SEC. 4. FOREST PRODUCTS ON MILITARY RESERVATIONS.

Section 2665 of title 10, United States Code, is amended as follows: (1) Subsection (d) is amended—

(A) by striking out "available for operation and maintenance during a fiscal year":

(B) by striking out "expenses" and inserting in lieu thereof "costs"; and

(C) by striking out "during such fiscal year".

(2) Subsection (e)(1) is amended by striking out "for all expenses of production of forest products".

(3) Subsection (f) is amended-

(A) by striking out "expenses" in the matter preceding subparagraph (A) in paragraph (1) and inserting in lieu thereof "costs",

(B) by amending paragraph (1)(C) to read as follows: "(C) for natural resources management that implements approved plans and agreements.", and

(C) by amending paragraphs (2) and (3) to read as follows: "(2) There shall be deposited into the reserve account the total amount received by the United States as proceeds from the sale of forest products sold under subsections (a) and (b) less—

 ii (A) reimbursements of appropriations made under subsection (d), and

"(B) payments made to States under subsection (e).

"(3) The reserve account may not exceed \$4,000,000 on December 31 of any calendar year. Unobligated balances exceeding \$4,000,000 on that date shall be deposited into the United States Treasury.".

Approved October 27, 1986.

HOUSE REPORTS: No. 99–129, Pt. 1 (Comm. on Merchant Marine and Fisheries) and Pt. 2 (Comm. on Armed Services), both accompanying H.R. 1202. CONGRESSIONAL RECORD:

Vol. 132 (1986): Oct. 3, S. 1352 considered and passed Senate.

Oct. 14, considered and passed House.

Vol. 131 (1985): July 29, H.R. 1202 considered and passed House.

Public Law 99-561 99th Congress

An Act

To enhance the carrying out of fish and wildlife conservation and natural resource management programs on military reservations, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. AUTHORIZATION OF APPROPRIATIONS.—(a) Subsections (b) and (c) of section 106 of the Sikes Act (16 U.S.C. 670f (b) and (c)) are each amended by striking out "and 1985," and inserting in lieu thereof "1985, 1986, 1987, and 1988,".

(b) Subsections (a) and (b) of section 209 of the Sikes Act (16 U.S.C. 6700 (a) and (b)) are each amended by striking out "and 1985," and 16 USC 6700. inserting in lieu thereof "1985, 1986, 1987, and 1988."

SEC. 2. NATURAL RESOURCES AND FISH AND WILDLIFE MANAGEMENT 16 USC 670a-1. ON MILITARY RESERVATIONS; REPORT ON MILITARY EXPENDI-TURES FOR FISH AND WILDLIFE MANAGEMENT.

(a) NATURAL RESOURCES MANAGEMENT.—The Secretary of each military department shall manage the natural resources of each military reservation within the United States that is under the jurisdiction of the Secretary—

(1) so as to provide for sustained multipurpose uses of those resources; and

(2) to provide the public access that is necessary or appropriate for those uses;

to the extent that those uses and that access are not inconsistent with the military mission of the reservation.

(b) FISH AND WILDLIFE MANAGEMENT SERVICES.—The Secretary of each military department shall ensure, to the extent feasible, that the services necessary for the development, implementation, and enforcement of fish and wildlife management on each military reservation within the United States under the jurisdiction of the Secretary are provided by the Department of Defense personnel who have professional training in those services.

(c) FISH AND WILDLIFE MANAGEMENT REPORT.—The Secretary of each military department shall submit to each House of the Congress, before the close of the 180-day period occurring after the close of fiscal year 1986, a detailed report setting forth the amount and purpose of all expenditures made during fiscal year 1986 for fish and wildlife management on each military reservation in the United States under the jurisdiction of the Secretary.

(d) DEFINITIONS.—As used in this section—

(1) The term "military department" means the Department of the Army, the Department of the Navy, and the Department of the Air Force.

(2) The term "United States" means the States, the District of Columbia, the Commonwealth of Puerto Rico, and the territories and possessions of the United States. State and local

governments.

SEC. 3. SIKES ACT AMENDMENTS.

(a) COOPERATIVE PLANS.—(1) Section 101 of the Act of September 15, 1960 (commonly referred to as the "Sikes Act"; 16 U.S.C. 670a) is amended to read as follows:

"SEC. 101. (a) The Secretary of Defense is authorized to carry out a program of planning for, and the development, maintenance, and coordination of, wildlife, fish, and game conservation and rehabilitation in each military reservation in accordance with a cooperative plan mutually agreed upon by the Secretary of Defense, the Secretary of the Interior, and the appropriate State agency designated by the State in which the reservation is located.

"(b) Each cooperative plan entered into under subsection (a)— "(1) shall provide for—

"(A) fish and wildlife habitat improvements or modifications,

"(B) range rehabilitation where necessary for support of wildlife.

"(C) control of off-road vehicle traffic, and

"(D) specific habitat improvement projects and related activities and adequate protection for species of fish, wildlife, and plants considered threatened or endangered;

"(2) must be reviewed as to operation and effect by the parties thereto on a regular basis, but not less often than every 5 years;

"(3) shall, if a multiuse natural resources management plan is applicable to the military reservation, be treated as the exclusive component of that management plan with respect to wildlife, fish, and game conservation and rehabilitation; and

"(4) may stipulate the issuance of special State hunting and fishing permits to individuals and require payment of nominal fees therefor, which fees shall be utilized for the protection, conservation, and management of fish and wildlife, including habitat improvement and related activities in accordance with the cooperative plan; except that—

⁽⁴(A) the Commanding Officer of the reservation or persons designated by that Officer are authorized to enforce such special hunting and fishing permits and to collect the fees therefor, acting as agent or agents for the State if the cooperative plan so provides, and

"(B) the fees collected under this paragraph may not be expended with respect to other than the military reservation on which collected.

"(c) After a cooperative plan is agreed to under subsection (a)— "(1) no sale of land, or forest products from land, that is within a military reservation covered by that plan may be made under section 2665 (a) or (b) of title 10, United States Code; and "(2) no leasing of land that is within the reservation may be made under section 2667 of such title 10;

unless the effects of that sale or leasing are compatible with the purposes of the plan.

"(d) With regard to the implementation and enforcement of cooperative plans agreed to under subsection (a)—

"(1) neither Office of Management and Budget Circular A-76 nor any successor circular thereto applies to the procurement of services that are necessary for that implementation and enforcement; and

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"(2) priority shall be given to the entering into of contracts for Contracts. the procurement of such implementation and enforcement services with Federal and State agencies having responsibility for the conservation or management of fish or wildlife.

"(e) -Cooperative plans agreed to under the authority of this section and section 102 shall not be deemed to be, nor treated as, 16 USC 670b. cooperative agreements to which the Federal Grant and Cooperative Agreement Act of 1977 (41 U.S.C. 501 et seq.) applies.".

(2) Subsection (d)(1) of such section 101 (as added by paragraph (1)) shall not affect any contract entered into before the date of the enactment of this Act for the provision of services to implement or enforce a cooperative plan under this Act on any military installation; but shall apply to the renewal, after such date of enactment, of any such contract.

(b) FUNDS COLLECTED UNDER PLANS.—Subsection (a) of section 106 of the Sikes Act (16 U.S.C. 670f(a)) is amended by adding at the end thereof the following new sentence: "All funds that are so collected shall remain available until expended.".

SEC. 4. FOREST PRODUCTS ON MILITARY RESERVATIONS.

Section 2665 of title 10, United States Code, is amended as follows: (1) Subsection (d) is amended—

 (A) by striking out "available for operation and maintenance during a fiscal year";

(B) by striking out "expenses" and inserting in lieu thereof "costs"; and

(C) by striking out "during such fiscal year".

(2) Subsection (e)(1) is amended by striking out "for all expenses of production of forest products".

(3) Subsection (f) is amended-

(A) by striking out "expenses" in the matter preceding subparagraph (A) in paragraph (1) and inserting in lieu thereof "costs",

(B) by amending paragraph (1)(C) to read as follows: "(C) for natural resources management that implements approved plans and agreements.", and

(C) by amending paragraphs (2) and (3) to read as follows: "(2) There shall be deposited into the reserve account the total amount received by the United States as proceeds from the sale of forest products sold under subsections (a) and (b) less—

⁴"(A) reimbursements of appropriations made under subsection (d), and

"(B) payments made to States under subsection (e).

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"(3) The reserve account may not exceed \$4,000,000 on December 31 of any calendar year. Unobligated balances exceeding \$4,000,000 on that date shall be deposited into the United States Treasury.".

Approved October 27, 1986.

HOUSE REPORTS: No. 99-129, Pt. 1 (Comm. on Merchant Marine and Fisheries) and Pt. 2 (Comm. on Armed Services), both accompanying H.R. 1202. CONGRESSIONAL RECORD: Vol. 131 (1985): July 29, H.R. 1202 considered and passed House.

Vol. 131 (1905): July 25, H.K. 1202 considered and passed House. Vol. 132 (1986): Oct. 3, S. 1352 considered and passed Senate.

Oct. 14, considered and passed House.

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one or more military departments or Defense Agencies, the Secretary of Defense shall provide for the installation of fiber-optics based telecommunications technology to link as many of the installations in the area as practicable in a telecommunications network. The Secretary shall use a full and open competitive process, consistent with section 2304 of title 10, United States Code, to provide for the installation of the telecommunications network through one or more new contracts.

(b) FEATURES OF NETWORK.-The telecommunications network shall provide direct access to local and long distance telephone carriers, allow for transmission of both classified and unclassified information, and take advantage of the various capabilities of fiberoptics based telecommunications technology.

(c) TIME FOR REQUEST FOR BIDS OR PROPOSALS .- Not later than March 30, 1998, the Secretary of Defense shall release a final request for bids or proposals to provide the telecommunications network or networks described in subsection (a).

(d) REPORT ON IMPLEMENTATION .- Not later than December 31, 1998, the Secretary of Defense shall submit to the congressional defense committees a report on the implementation of subsection (c), including the metropolitan area or areas selected for the installation of a fiber-optics based telecommunications network, the current telecommunication costs for the Department of Defense in the selected area or areas, the estimated cost of the fiber-optics based network, and potential areas for the future use of fiber-optics based networks.

TITLE XXIX-SIKES ACT IMPROVEMENT

Sikes Act Improvement Act of 1997. Natural resources

- Sec. 2902. Definition of Sikes Act for purposes of amendments. Sec. 2903. Codification of short title of Act.
- Fish and wildlife.
- Sec. 2904. Preparation of integrated natural resources management plans. Sec. 2905. Review for preparation of integrated natural resources management plans. Sec. 2906. Transfer of wildlife conservation fees from closed military installations.

 - Sec. 2907. Annual reviews and reports. Sec. 2908. Cooperative agreements.
 - Sec. 2909. Federal enforcement.

Sec. 2901. Short title.

- Sec. 2910. Natural resources management services.
- Sec. 2911. Definitions.
- Sec. 2912. Repeal of superseded provision.
- Sec. 2913. Technical amendments.
- Sec. 2914. Authorizations of appropriations.

16 USC 670 note. SEC. 2901. SHORT TITLE.

This title may be cited as the "Sikes Act Improvement Act of 1997".

SEC. 2902. DEFINITION OF SIKES ACT FOR PURPOSES OF AMEND-MENTS.

In this title, the term "Sikes Act" means the Act entitled "An Act to promote effectual planning, development, maintenance, and coordination of wildlife, fish, and game conservation and rehabilitation in military reservations", approved September 15, 1960 (16 U.S.C. 670a et seq.), commonly referred to as the "Sikes Act".

SEC. 2903. CODIFICATION OF SHORT TITLE OF ACT.

The Sikes Act (16 U.S.C. 670a et seq.) is amended by inserting before title I the following new section:

"SECTION 1. SHORT TITLE.

"This Act may be cited as the 'Sikes Act'.".

SEC. 2904. PREPARATION OF INTEGRATED NATURAL RESOURCES MANAGEMENT PLANS.

(a) IN GENERAL.-Section 101 of the Sikes Act (16 U.S.C. 670a(a)) is amended by striking out subsection (a) and inserting in lieu thereof the following new subsection:

"(a) AUTHORITY OF SECRETARY OF DEFENSE.—

"(1) Program.—

"(A) IN GENERAL.—The Secretary of Defense shall carry out a program to provide for the conservation and rehabilitation of natural resources on military installations.

"(B) INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN.-To facilitate the program, the Secretary of each military department shall prepare and implement an integrated natural resources management plan for each military installation in the United States under the jurisdiction of the Secretary, unless the Secretary determines that the absence of significant natural resources on a particular installation makes preparation of such a plan inappropriate.

"(2) COOPERATIVE PREPARATION.—The Secretary of a military department shall prepare each integrated natural resources management plan for which the Secretary is responsible in cooperation with the Secretary of the Interior, acting through the Director of the United States Fish and Wildlife Service, and the head of each appropriate State fish and wildlife agency for the State in which the military installation concerned is located. Consistent with paragraph (4), the resulting plan for the military installation shall reflect the mutual agreement of the parties concerning conservation, protection, and management of fish and wildlife resources.

"(3) PURPOSES OF PROGRAM.-Consistent with the use of military installations to ensure the preparedness of the Armed Forces, the Secretaries of the military departments shall carry out the program required by this subsection to provide for-

(A) the conservation and rehabilitation of natural resources on military installations:

"(B) the sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping, and nonconsumptive uses; and

"(C) subject to safety requirements and military security, public access to military installations to facilitate the use.

"(4) EFFECT ON OTHER LAW.-Nothing in this title-

"(A)(i) affects any provision of a Federal law governing the conservation or protection of fish and wildlife resources; or

"(ii) enlarges or diminishes the responsibility and authority of any State for the protection and management of fish and resident wildlife; or

"(B) except as specifically provided in the other provisions of this section and in section 102, authorizes the Secretary of a military department to require a Federal license or permit to hunt, fish, or trap on a military installation.".

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(b) CONFORMING AMENDMENTS .- Title I of the Sikes Act is amended-

(1) in section 101(b)(4) (16 U.S.C. 670a(b)(4)), by striking out "cooperative plan" each place it appears and inserting in lieu thereof "integrated natural resources management plan";

(2) in section 101(c) (16 U.S.C. 670a(c)), in the matter preceding paragraph (1), by striking out "a cooperative plan" and inserting in lieu thereof "an integrated natural resources management plan";

(3) in section 101(d) (16 U.S.C. 670a(d)), in the matter preceding paragraph (1), by striking out "cooperative plans" and inserting in lieu thereof "integrated natural resources management plans";

(4) in section 101(e) (16 U.S.C. 670a(e)), by striking out "Cooperative plans" and inserting in lieu thereof "Integrated natural resources management plans";

(5) in section 102 (16 U.S.C. 670b), by striking out "a cooperative plan" and inserting in lieu thereof "an integrated natural resources management plan";

(6) in section 103 (16 U.S.C. 670c), by striking out "a cooperative plan" and inserting in lieu thereof "an integrated natural resources management plan";

(7) in section 106(a) (16 U.S.C. 670f(a)), by striking out "cooperative plans" and inserting in lieu thereof "integrated natural resources management plans"; and

(8) in section 106(c) (16 U.S.C. 670f(c)), by striking out "cooperative plans" and inserting in lieu thereof "integrated natural resources management plans".

(c) REQUIRED ELEMENTS OF PLANS.—Section 101(b) of the Sikes Act (16 U.S.C. 670a(b)) is amended--

(1) by striking out "(b) Each cooperative" and all that follows through the end of paragraph (1) and inserting in lieu thereof the following:

"(b) REQUIRED ELEMENTS OF PLANS.—Consistent with the use of military installations to ensure the preparedness of the Armed Forces, each integrated natural resources management plan prepared under subsection (a)-

"(1) shall, to the extent appropriate and applicable, provide for-

"(A) fish and wildlife management, land management, forest management, and fish- and wildlife-oriented recreation;

(B) fish and wildlife habitat enhancement or modifications;

"(C) wetland protection, enhancement, and restoration, where necessary for support of fish, wildlife, or plants;

"(D) integration of, and consistency among, the various activities conducted under the plan;

"(E) establishment of specific natural resource management goals and objectives and time frames for proposed action;

"(F) sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources;

"(G) public access to the military installation that is necessary or appropriate for the use described in subparagraph (F), subject to requirements necessary to ensure safety and military security;

"(H) enforcement of applicable natural resource laws (including regulations);

"(I) no net loss in the capability of military installation lands to support the military mission of the installation; and

"(J) such other activities as the Secretary of the military department determines appropriate;";

(2) in paragraph (2), by adding "and" at the end;

(3) by striking out paragraph (3);

(4) by redesignating paragraph (4) as paragraph (3); and
(5) in paragraph (3)(A) (as so redesignated), by striking out "collect the fees therefor," and inserting in lieu thereof "collect, spend, administer, and account for fees for the permits.".

SEC. 2905. REVIEW FOR PREPARATION OF INTEGRATED NATURAL 16 USC 670a RESOURCES MANAGEMENT PLANS. note.

(a) DEFINITIONS .- In this section, the terms "military installation" and "United States" have the meanings provided in section 100 of the Sikes Act (as added by section 2911).

(b) REVIEW OF MILITARY INSTALLATIONS .--

(1) REVIEW.-Not later than 270 days after the date of enactment of this Act, the Secretary of each military department shall-

(A) review each military installation in the United States that is under the jurisdiction of that Secretary to determine the military installations for which the preparation of an integrated natural resources management plan under section 101 of the Sikes Act (as amended by this title) is appropriate; and

(B) submit to the Secretary of Defense a report on Reports. the determinations.

(2) REPORT TO CONGRESS .- Not later than one year after the date of enactment of this Act, the Secretary of Defense shall submit to Congress a report on the reviews conducted under paragraph (1). The report shall include-

(A) a list of the military installations reviewed under paragraph (1) for which the Secretary of the appropriate military department determines that the preparation of an integrated natural resources management plan is not appropriate; and

(B) for each of the military installations listed under subparagraph (A), an explanation of each reason such a plan is not appropriate.

(c) DEADLINE FOR INTEGRATED NATURAL RESOURCES MANAGE-MENT PLANS.-Not later than three years after the date of the submission of the report required under subsection (b)(2), the Secretary of each military department shall, for each military installation with respect to which the Secretary has not determined under subsection (b)(2)(A) that preparation of an integrated natural resources management plan is not appropriate-

(1) prepare and begin implementing such a plan in accordance with section 101(a) of the Sikes Act (as amended by this title); or

(2) in the case of a military installation for which there is in effect a cooperative plan under section 101(a) of the Sikes Act on the day before the date of enactment of this Act, complete negotiations with the Secretary of the Interior and the heads of the appropriate State agencies regarding changes to the plan that are necessary for the plan to constitute an integrated natural resources management plan that complies with that section, as amended by this title.

(d) PUBLIC COMMENT.-The Secretary of each military department shall provide an opportunity for the submission of public comments on-

(1) integrated natural resources management plans proposed under subsection (c)(1); and

(2) changes to cooperative plans proposed under subsection (c)(2).

SEC. 2906. TRANSFER OF WILDLIFE CONSERVATION FEES FROM CLOSED MILITARY INSTALLATIONS.

Section 101(b)(3)(B) of the Sikes Act (16 U.S.C. 670a(b)) (as redesignated by section 2904(c)(4)) is amended by inserting before the period at the end the following: ", unless the military installation is subsequently closed, in which case the fees may be transferred to another military installation to be used for the same purposes".

SEC. 2907, ANNUAL REVIEWS AND REPORTS.

Section 101 of the Sikes Act (16 U.S.C. 670a) is amended by adding at the end the following new subsection:

"(f) Reviews and Reports.---

"(1) SECRETARY OF DEFENSE.-Not later than March 1 of each year, the Secretary of Defense shall review the extent to which integrated natural resources management plans were prepared or were in effect and implemented in accordance with this title in the preceding year, and submit a report on the findings of the review to the committees. Each report shall include-

"(A) the number of integrated natural resources management plans in effect in the year covered by the report, including the date on which each plan was issued in final form or most recently revised;

"(B) the amounts expended on conservation activities conducted pursuant to the plans in the year covered by the report; and

"(C) an assessment of the extent to which the plans comply with this title.

"(2) SECRETARY OF THE INTERIOR.—Not later than March 1 of each year and in consultation with the heads of State fish and wildlife agencies, the Secretary of the Interior shall submit a report to the committees on the amounts expended by the Department of the Interior and the State fish and wildlife agencies in the year covered by the report on conservation activities conducted pursuant to integrated natural resources management plans.

"(3) DEFINITION OF COMMITTEES.—In this subsection, the term 'committees' means-

"(A) the Committee on Resources and the Committee on National Security of the House of Representatives; and

"(B) the Committee on Armed Services and the Committee on Environment and Public Works of the Senate.".

SEC. 2908 COOPERATIVE AGREEMENTS.

Section 103a of the Sikes Act (16 U.S.C. 670c-1) is amended-(1) in subsection (a), by striking out "Secretary of Defense" and inserting in lieu thereof "Secretary of a military department";

(2) by striking out subsection (b) and inserting in lieu thereof the following new subsection:

"(b) MULTIYEAR AGREEMENTS .- Funds appropriated to the Department of Defense for a fiscal year may be obligated to cover the cost of goods and services provided under a cooperative agreement entered into under subsection (a) or through an agency agreement under section 1535 of title 31, United States Code, during any 18-month period beginning in that fiscal year, without regard to whether the agreement crosses fiscal years.".

SEC. 2909. FEDERAL ENFORCEMENT.

Title I of the Sikes Act is amended—

(1) by redesignating section 106 (16 U.S.C. 670f) as section 108; and

(2) by inserting after section 105 (16 U.S.C. 670e) the following new section:

"SEC. 106. FEDERAL ENFORCEMENT OF OTHER LAWS.

16 USC 670e-1.

"All Federal laws relating to the management of natural resources on Federal land may be enforced by the Secretary of Defense with respect to violations of the laws that occur on military installations within the United States.".

SEC. 2910. NATURAL RESOURCES MANAGEMENT SERVICES.

Title I of the Sikes Act is amended by inserting after section 106 (as added by section 2909) the following new section:

"SEC. 107. NATURAL RESOURCES MANAGEMENT SERVICES.

16 USC 670e-2.

16 USC 670.

"To the extent practicable using available resources, the Secretary of each military department shall ensure that sufficient numbers of professionally trained natural resources management personnel and natural resources law enforcement personnel are available and assigned responsibility to perform tasks necessary to carry out this title, including the preparation and implementation of integrated natural resources management plans.".

SEC. 2911. DEFINITIONS.

Title I of the Sikes Act is amended by inserting before section 101 (16 U.S.C. 670a) the following new section:

"SEC. 100. DEFINITIONS.

tion'-

"In this title:

"(1) MILITARY INSTALLATION.—The term 'military installa-

"(A) means any land or interest in land owned by the United States and administered by the Secretary of Defense or the Secretary of a military department, except

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"(B) includes all public lands withdrawn from all forms of appropriation under public land laws and reserved for use by the Secretary of Defense or the Secretary of a military department; and

"(C) does not include any land described in subparagraph (A) or (B) that is subject to an approved recommenda-tion for closure under the Defense Base Closure and Realignment Act of 1990 (part A of title XXIX of Public Law 101-510; 10 U.S.C. 2687 note).

"(2) STATE FISH AND WILDLIFE AGENCY.—The term 'State fish and wildlife agency' means the one or more agencies of State government that are responsible under State law for managing fish or wildlife resources.

"(3) UNITED STATES.—The term 'United States' means the States, the District of Columbia, and the territories and possessions of the United States.".

SEC. 2912. REPEAL OF SUPERSEDED PROVISION.

Section 2 of the Act of October 27, 1986 (Public Law 99-561; 16 U.S.C. 670a-1), is repealed.

SEC. 2913. TECHNICAL AMENDMENTS.

Title I of the Sikes Act, as amended by this title, is amended-(1) in the heading for the title, by striking out "MILITARY RESERVATIONS" and inserting in lieu thereof "MILITARY INSTALLATIONS";

(2) in section 101(b)(3) (16 U.S.C. 670a(b)(3)), as redesignated by section 2904(c)(4)-

(A) in subparagraph (A), by striking out "the reservation" and inserting in lieu thereof "the installation"; and

(B) in subparagraph (B), by striking out "the military reservation" and inserting in lieu thereof "the military installation";

(3) in section 101(c) (16 U.S.C. 670a(c))-

(A) in paragraph (1), by striking out "a military reservation" and inserting in lieu thereof "a military installation"; and

(B) in paragraph (2), by striking out "the reservation" and inserting in lieu thereof "the installation";

(4) in section 101(e) (16 U.S.C. 670a(e)), by striking "the Federal Grant and Cooperative Agreement Act of 1977 (41 U.S.C. 501 et seq.)" and inserting "chapter 63 of title 31, United States Code":

(5) in section 102 (16 U.S.C. 670b), by striking out "military reservations" and inserting in lieu thereof "military installations"; and

(6) in section 103 (16 U.S.C. 670c)-

(A) by striking out "military reservations" and inserting in lieu thereof "military installations"; and

(B) by striking out "such reservations" and inserting in lieu thereof "the installations".

SEC. 2914. AUTHORIZATIONS OF APPROPRIATIONS.

Subsections (b) and (c) of section 108 of the Sikes Act (as redesignated by section 2909(1)) are each amended by striking out "1983"

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111 STAT. 2023

and all that follows through "1993," and inserting in lieu thereof "1998 through 2003,".

(b) CONSERVATION PROGRAMS ON PUBLIC LANDS.-Section 209 of the Sikes Act (16 U.S.C. 6700) is amended-

(1) in subsection (a), by striking out "the sum of \$10,000,000" and all that follows through "to enable the Secretary of the Interior" and inserting in lieu thereof "\$4,000,000 for each of fiscal years 1998 through 2003, to enable the Secretary of the Interior"; and

(2) in subsection (b), by striking out "the sum of \$12,000,000" and all that follows through "to enable the Secretary of Agriculture" and inserting in lieu thereof "\$5,000,000 for each of fiscal years 1998 through 2003, to enable the Secretary of Agriculture".

DIVISION C-DEPARTMENT OF ENERGY NATIONAL SECURITY AUTHORIZA-TIONS AND OTHER AUTHORIZATIONS

TITLE XXXI—DEPARTMENT OF ENERGY NATIONAL SECURITY PROGRAMS

Subtitle A-National Security Programs Authorizations

Sec. 3101. Weapons activities.

Sec. 3102. Environmental restoration and waste management. Sec. 3103. Other defense activities

Sec. 3104. Defense nuclear waste disposal.

Subtitle B-Recurring General Provisions

Sec. 3121. Reprogramming. Sec. 3122. Limits on general plant projects.

Sec. 3123. Limits on construction projects.

Sec. 3124. Fund transfer authority. Sec. 3125. Authority for conceptual and construction design.

Sec. 3126. Authority for emergency planning, design, and construction activities. Sec. 3127. Funds available for all national security programs of the Department of

- Energy. Sec. 3128. Availability of funds.

Sec. 3129. Transfers of defense environmental management funds.

Subtitle C-Program Authorizations, Restrictions, and Limitations

Sec. 3131. Memorandum of understanding for use of national laboratories for ballistic missile defense programs.

Sec. 3132. Defense environmental management privatization projects.

Sec. 3133. International cooperative stockpile stewardship. Sec. 3134. Modernization of enduring nuclear weapons complex

- Sec. 3135. Tritium production. Sec. 3136. Processing, treatment, and disposition of spent nuclear fuel rods and other legacy nuclear materials at the Savannah River Site. Sec. 3137. Limitations on use of funds for laboratory directed research and develop-
- Sec. 3138. Pilot program relating to use of proceeds of disposal or utilization of certain Department of Energy assets. Sec. 3139. Modification and extension of authority relating to appointment of

certain scientific, engineering, and technical personnel. Sec. 3140. Limitation on use of funds for subcritical nuclear weapons tests.

- Sec. 3141. Limitation on use of certain funds until future use plans are submitted.

Subtitle D-Other Matters

Sec. 3151. Plan for stewardship, management, and certification of warheads in the nuclear weapons stockpile.

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Fairbanks Daily versailiner Thurs, December 31, 1998

Alaska: the great bombing range

Military proposal needs closer look

What would you say if the military proposed to shoot 3,500 rockets packed with high explosives into a drainage of the Chena River upstream from the state recreation area? What would you say if, at the same location, they also wanted to drop 4,300 bombs each weighing up to a ton? And, on top of all that, shoot off 50,000 additional high explosives?

Would you wonder if these munitions can contaminate the soil? (They can). Would you ask if the contamination can spread to surface and ground water? (It can). Would you be concerned about unexploded rockets and bombs lying out in the brush or burrowed into the soil? (You should)

The fact is, the bombing statistics quoted above are not what the military is proposing to do. It is what the military already has done in just five years at the Stuart Creek Impact Area which includes the South Fork of the Chena River. A similar list of hombs and rockets and missiles have been sot into the countryside along the Delta River adiacent to Ft. Greely in the last few years, according to a Draft Legislative Environmental Impact Statement (LEIS) just released by the Army.

The document was produced in support of the Army's proposal to continue using the two areas. totaling 1,300 square miles of Alaska land, as bombing ranges. Another million or so acres of the Tanana Flats is also used as a bombing range, but it is not part of this application. In the past, these renewals have been for 5-15 years, but now the Army wants to be permitted to continue bombing for 50 years.

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Dan O'Neill

dressed.

duds

likely to have on soil and water quality in the Chena basin or the Delta River? The military doesn't know. They haven't conducted bombing range activities there. soil contamination studies there. He spoke at two public meetings What is known is this. TNT and on this issue a year ago and his RDX, the dominant explosives comments are part of the public used, are mobile in the soil, and record. Concerning removing all "residues of these chemicals in the duds from the Delta River. the soils can be a source of polwhich is routinely bombed dilution both on Army installations rectly, he said, "I would say you and beyond installation boundacan never clean up the Delta ries." Presumably the more-River, which is one of the big imthan-residual contents of a pact areas, and you can never cracked open dud can be a source clean up the Little Delta Creek." of pollution as well. Streams crossing the bombing zone are "There are more duds in the likely to be the transport mechanism to carry contamination off-

Delta River than there are in the Oklahoma Range (part of the Ft. site. The possible risk to people, Greely complex). And I'm telling animals and plants is not adyou that in all of the '60's and early '70s the Air Force used Ok-Very likely, chemical contamilahoma as much as they are using nation of soil and water is a nonit right now. It was a steady issue compared to the effect of thing. And they didn't pick up dud munitions. It is virtually imthe duds before they left. This possible to find all the duds, and dud picking up business started the military estimates it would about '82. Before that, they used cost \$250 billion to clean up these to send statements, certificates two bombing ranges. Besides that said there were no duds, or risks to people and animals, wildall the duds were cleaned up.' fires are a frequent result of these duds or flares or pyro-Sheehan, who has served as technic ordnance. Even if dropped in the winter, they can

acting post commander at Greely. also made very plain his objection reignite themselves when the that this renewal application ensnow melts. Often, these fires larges the impact areas. He was cannot be fought because of the. mainly concerned about the fire risk to firefighters of exploding danger to residents around the town of Delta. But he says the Army is labeling all of the

At another point he said.

Obviously, the military has to train somewhere. But there is a country between the Delta River lot to question here. Why, for exand the Oklahoma Range an "imample, is it necessary to drop live pact area," though it had not bombs and rockets when aerodybeen a bombing range in the past. Rather, it had been used as namically-alike dummies-which the military also uses-provide a maneuvering area or a buffer zone. When the current range manager assured him that he did

barren locales so that unexploded not regard the designation as a ones can be removed? Instead, a change, that "it's already a tremendous quantity of live ordbombing area now. I mean it can nance lies hidden in the brush. be bombed," the Lt. Colonel remaking thousands of square plied: "It is not now and has miles of Alaska countryside a nonever been a bombing area... I man's land. Permanently. Consider the testimony of Ed

ran range control for 17 years I drew those boundaries. I know what's supposed to be done Sheehan, a retired Lt. Colonel there... if you're going to use it, who has been associated with Ft. tell us you're going to use it. If Greely for 38 years and has had you're not going to use it, tell indirect authority over the them they can't use it.'

The Army's LEIS is not particularly forthcoming in its history section, either, Unmentioned is the fact that at Ft. Greely's Gerstle River Test Site the army once experimented with some of the most deadly chemical agents known to man. Several authors have tracked military use of the lethal nerve gases VX and VG, as well as mustard gas being packed into rockets and artillery shells and fired into the Gerstle River area. At Delta Creek the army also released germ-warfare organisms into the environment. including strains of the tularemia bacteria. The point is, if we intend to learn from history, we will be more than a little circumspect when we review military proposals that request to bomb our public lands for the next half a century

Do the people of Alaska agree with Sen. Stevens when he says he wants to make Alaska the military training capital of the world, with foreign air forces invited to bomb our landscapes? Are we so dependent on military subsidy that we would sell our birthright for it? Wouldn't federal money be better spent cleaning up the mess the military has already made?

The advertised "public hearing." which is really an "open house," on the proposed 50-year extension of bombing ranges will be Jan. 5 at the Diamond Willow Club in Delta Junction from 2-8 p.m., a second takes place Jan. 6 at the Carlson Center from 2-6 p.m.

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FAIRBANKS 7

Army seeks 50-year extension of land withdrawals

Military land withdrawals covering 871,537 acres of Interior Alaska expire in less than three years, and the U.S. Army is guietly asking Congress to renew them for 50 years, three times longer than the current withdrawal terms.

There are three withdrawals involved. The Fort Wainwright Yukon Training Area covers 247,-952 acres east of Eielson Air Force Base in the uplands between the Chena and Salcha rivers. The Fort Greely East and West training areas straddle the Richardson Highway in the Donnelly Dome area south of Fort Greely, and together cover another 623,585 acres.

The land was dedicated for military training maneuvers during the 1950s in a flurry of federal land grabs that preceded Alaska becoming a state.

After 1958 Congress required that it approve any withdrawal of more than 5,000 acres. In 1961 Congress authorized the Yukon Training Area withdrawal for only a 10-year term. That was extended by a public land order for an additional five years in 1971, and by a bureaucratic shuffle for another 10 years after that expired.



Congress renewed the withdrawal in 1986 for only a 15-year term. At that time the Army turned loose 1,600 acres that is now part of the Chena River State Recreation Area.

Now the Army wants the land for a 50-year term, and its contractor just finished the draft of an environmental impact statement advising Congress and the public of the issues surrounding the decision.

A public hearing is scheduled on the EIS in Fairbanks Jan. 6. from 2 to 8 p.m. at the Carlson Center, Other hearings are set for Delta Junction on Jan. 5 (same hours, at the Diamond Willow Club) and in Anchorage Jan. 7.

There are a lot of potential public concerns about the continuing withdrawals that the Army hopes don't come up.

The Yukon Training Area

banks with an enormous potential for mineral development. recreational use and timber sales. It's covered with roads and trails. it adjoins Chena River State Recreation Area and even includes 13,440 acres of the park that the Army refuses to transfer to the state. The trans-Alaska pipeline right of way crosses one corner.

The military training areas are open to hunting, fishing, trapping and other recreational uses now. but are often closed during maneuvers and some "impact zones" used for artillery and aerial bombardments and surrounding "buffer zones" are permanently closed. The airspace over the training areas is also closed to an altitude of 20,000 feet during maneuvers.

The state of Alaska has filed land selections on parts of the Yukon Training Area, hoping to acquire the land if the withdrawals should ever expire.

Of course much of the land is covered with hazardous materials and unexploded "dud" warheads. The U.S. Army Corps of Engineers estimates that it would cost \$47.4 million to clean up the Stuart Creek Impact Area in the Yukon Training Area. The total

training areas is estimated at \$249.9 million.

The EIS warns that federal agencies might just declare the land too polluted to release and it might not be declared available for state selection even if the withdrawals expire. The key state selections avoid these heavily polluted impact areas, however.

The EIS considers only two options: Letting the withdrawals expire or extending them for 50 years. The EIS team in Colorado rejected any shorter term, as well as the request from the state that the tiny portion on the northeast border be transferred to the Chena River Recreation Area.

The EIS is prepared by the Center for Ecological Management of Military Lands at Colorado State University. This organization acts like it or its clients in U.S. Army Alaska should never have to commit to anything on paper when dealing with the public until and unless it is legally required to do so.

The EIS and the required public hearings were announced in small display advertisements run in the Daily News-Miner this month. The ad gives no physical location for places to get a copy of server of Alaska politics.

covers a huge region near Fair- bill for cleaning up all three the document, but simply states that for further information one should call a Steve Reidsma at Fort Wainwright, and it lists what turns out to be a bogus phone number.

Section

I called the Fort Wainwright information operator and was told Mr. Reidsma wasn't on their list of personnel. I was transferred to the base personnel office, where I was told that there was no civilian employee on Fort Wainwright with that name either.

After transposing one number listed in the ad I got Mr. Reidsma's phone answering machine. We connected a few days later and I finally got a copy of the EIS in the mail two weeks after my initial attempt. Even though I informed them about the incorrect contact phone number in the newspaper advertisement, it continued to be published. The correct phone number is 353-9685.

Any operation that goes to these lengths to stall and divert the public can't be doing an honest job on the EIS.

Fred Pratt, a free-lance journalist in Fairbanks, is a longtime reporter and ob-



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Army seeks lease extension

Two vast Interior military training ranges under scrutiny

By BRIAN O'DONOGHUE Staff Writer

The tenant hasn't been the easiest.

After decades of bombing and burning what was once magnificent Interior Alaska real estate, those properties are so littered with dangerous live rounds that few believe a complete cleanup is feasible.

Now that same tenant wants a 50-year extension on its free lease in the name of national security.

"This is the largest and best training area the Army has," said Lt. Gen. William Steele, commander of the U.S. Army Pacific, during last year's Northern Edge exercise.

The lands under discussion are two vast Interior training ranges-Fort Wainwright's 248,000-acre Yukon Training Range and a two-piece 660,000-acre training area at Fort Greely-portions of which are veritable noman's lands.

Congress last renewed the military use of the Interior blocks in 1986, granting U.S.

tving any future extension to completion of an environmental impact study.

The land grant expires Nov. 6, 2001, opening the door to the state's request for acreage bordering the Chena River State Recreation Area; expanded access to timber, mineral, hunting and fishing resources; and additional wildlife protection measures.

A lengthy draft environmental study examines just two choices: reopening the lands to public use, and granting the Defense Department's request for an additional 50 years possession. Shorter alternatives weren't considered, according to the study, because it was unlikely to result in any change in the military's stewardship.

The study, open to public comment through Feb. 7, lists military control as the best option.

Jim Messer, longtime chairman of the Greater Fairbanks Chamber of Commerce's military affairs committee, believes Fort

Army Alaska 15 more years of possession but Wainwright and Eielson Air Force Base have survived recent military cutbacks because of the maneuvering room represented by the lands up for renewal.

"They aren't here to defend Fairbanks," Messer said. "They're here to train."

Loss of those installations would savage the local economy, directly eliminating onethird of the paychecks drawn in the Fairbanks North Star Borough, according to Bob Logan, an economics professor and former borough assemblyman hired by the federal government to study socioeconomic effects of the lands withdrawal.

"I'm shocked," Logan told the News-Miner during a recent Carlson Center meeting on the draft study. "I had no idea how important the military was here."

A range of concerns

Delta resident Ed Sheehan, a retired lieutenant colonel, former head of the Army's See RANGE, Page A-6

RANGE: Army leases

Continued from Page A-1 Northern Warfare Training Center and longtime Fort Greely range manager, has used the platform offered by the draft study to raise serious questions about the military's activities in

the Fort Greely range. Sheehan's allegations, pre-sented at public meetings and as written comments entered into the study's record, include com-plaints about undocumented conplaints about undocumentea con-tamination, mapping errors of the high-impact areas, safety threats from the use of aircraft equipped with targeting lasers and the loss of Fort Greely's hehcopter rescue unit.

The study directly addresses many of Sheehan's concerns; others it simply transcribed and ignored, including arguably the most serious charge leveled by

"This dud-picking up business started in "82," Sheehan stated at a Dec. 2, 1997, study meeting in Delta. "Before that, they used to send statements, certificates that said there were no duds or all duds were cleaned up. So you know, l wouldn't pray out in the (Fort Greely) Oklahoma bombing

range." Sheehan, in a recent interview with the News-Miner, said the re-ference to false reports was based on second-hand information con cerning paperwork associated with the post's range control of-fice. "I know we used to get papers back saying activity had been done when it wasn't done."

Sheehan maintains his concerns about the impact areas are

being addressed. "I've been trying to get them to own up to where it's bad and not to make any more (high-im-pact areas) if you can help it. They say they're going to do that from here on out," he said. "I'm satisfied they're going to do that

that." Others argue the draft study lacks credibility unless the former range manager's com-plaints receive full investigation. "If Sheehan's comments are

"If Sheehan's comments are accurate, it seems unwise to ex-tend the military's occupation of this land for the next century," wrote Dan O'Neill, author of "The Firecracker Boys," an ex-pose of Cold War-era plans for ex-ploding nuclear devices in Bush Alaska.

Alaska. Ross Coen, wilderness coordi-nator for the Northern Alaska Environmental Center, said his group wants to see the lands withdrawal tied to a commitment on identifying and removing all contamination including old

on identifying and removing all contamination, including old shrapnel and fuel spills. "That's a pretty logical thing to ask for," Coen said, adding that any long-term withdrawal agreement should be subject to review if new wildlife or environ-wordal barged amorgan mental hazards emerge. Sheehan, meanwhile, says his

goal remains confinement of the hazardous activity, not perfection in the form of a sky-is-the-limit removal of old shells and other munitions that may lurk under the surface of the Delta River and other glacial-fed waterways within Fort Greely's old bombing

"The way that silt piles up, I would guess you'd have to stop the flow of water through the Delta and dig down 25 feet all the way from Jarvis Creek to Donnelly Creek. Then you'd have to sift it. And when you're all done would you sign your name to the paper saying it was clean? "It would be absurd to do it."

Jim Bruen, a civilian serving as the Army's range manager in Alaska, said the swift-moving Delta River, in a sense, takes care of itself. "The rolling boulders in there grind stuff up like a ball mill."

Expensive duds

Defense Department apprecia-tion for Alaska's spacious training room is only part of the rationale offered for extending the Interior lands withdrawal. The draft study also cites a fiscal argument for leaving lands bombed beyond redemption under military control

"Since military training and testing has occurred on these lands for nearly 50 years, with portions dedicated as high hazard impact areas," the draft notes, "it is likely that a complete deto is likely that a complete de-contamination would be ex-tremely expensive and technologically challenging." The study pegged the starting cost of a full cleanup at \$250 mil-

That estimate was derived from the nulltary's experience re-habilitating other training areas, habilitating other training areas, including a Yakima, Wash., in-stallation where the cleanup cost \$1 million an acre, said Cal Bagley, project manager for the Interior study, which is being conducted under a \$1.2 million Defense Department contract with the Center for Ecological Management of Military Lands, a military of anning roum based at

military planning group based at Colorado State University. The Air Force periodically clears unspent ordnance from portions of each bombing range so airmen can repair the cars, drums and other targets used in the annual Cope Thunder air-to-ground live-fire exercises.

"On average, one-fifth of the impact areas are cleared each year of live ordnance and munitions residue," the study states.

But no one is pretending the cleanup program will remove all threats in a set period of time.

threats in a set period of time. "The Air Force has an easier job cleaning up," observed Bruen, the Army's range man-ager in Alaska. "The things they're hunting are big enough to be seen, found and destroyed. "Looking for artillery shells that have dudded—it's not as easy to do that. What that should mean to the average mu is stay.

mean to the average guy is stay the hell out of there."

Body counts

In 1980, mass duck deaths were reported at a range used for training near Anchorage live-fire training near Anchorage. It took 10 years and a multi-agency task force to identify the culprit: eraser-size phosphorus pellets used in artillery sighting rounds. The pellets, which usually flare on contact with air, were sinking in the area wet-lands, where they lurked until Iands, where they lurked until ducks gobbled them up. All told, \$20 million has been spent cleaning up Eagle River Flats, and the job isn't finished, according to Army Alaska spokesman Chuck Canterbury. The case has led the military to here such bolds for the new news ban such shells from use near wetlands nationwide.

No comparable threat to a



am Harrel/News-Mine

LAND HEARING-U. S. Air Force Maj. David Ennis, right, points to a map as he explains the Air Force use of the Stuart Creek impact area during a public hearing at the Carlson Center on Jan. 6. The public hearing offered information on the military land withdrawals that expire in 2001. The U.S. Army is asking Congress to renew them for 50 years.

local wildlife population has ever been detected at the military's Interior training ranges, according to Bruen, Sheehan and others familiar with withdrawa lands.

Steve Dubois, the state's area biologist, confirmed there has been no widespread wildlife damage associated with the Fort Greely range, but he recalled one notorious case.

notorious case. "A group of bison were mor-tared," said Dubois, citing an in-cident he believes took place in the mid-1970s. "Several were hit in the artillery barrage and killed."

For years, Fort Greely's range has been popularly linked with a mass caribou kill reported in June 1972. The circumstances were suspicious; more than 50 caribou found dead in a relatively small glacial basin located north of the range. State biologists' initial inspection was in-conclusive, and no toxins were detected in samples collected from what were by then partially consumed carcasses.

The cause wasn't apparen until investigators flew out aboard a helicopter on a day clear enough to see a radiant pattern

connecting the carcasses. "Lightning hit that wet ground and zapped all the car-ibou," Sheehan recalled.

A paper state biologists pub-lished in the October 1973 issue of the Journal of Wildlife Diseases reported the entire herd was electrocuted by a single lightning bolt, which fanned out through the tundra's surface in what was described as a classic "Lichtenberg pattern" of trenches, roughly 3 inches deep, 7 inches wide and up to 180 feet of

ng. Pat Valkenberg, a state car-

ibou biologist, said Delta's herd occasionally calves within one of Fort Greely's designated high-impact areas.

"It doesn't happen every year, and the Army's always been very good about stopping the bombing," observed the biologist, who admits to occasionally flouting the range rules by landing amid craters to change radio collars. "It's probably foolish on my part."

Years of monitoring caribou activity on the range has reduced the state's concern about the ef-fects of live-fire exercises, according to Valkenberg. "The Delta Herd has more or less adapted to the levels of artillery activity."

Each subject area of the draft study recaps mitigation measures now in effect. The study also contains recommendations for new monitoring plans, soil and water sampling, and operational curbs to be attached to the military's continued use of the land.

Control of the lands themselves, however, is generally characterized as best left in the military's hands. For example, the state's pitch to expand Chena River State Recreation Area with a 13,440 acre slice of the Yukon range's Stuart Creek buffer zone was neatly shot down.

"Loss of the Beaver Creek-Loss of the Beaver Creek-South Fork area would severely hamper the use of northern target formations ... Due to the excessive impacts to military training and the importance of training and the importance of this area's training infrastruc-ture in achieving combat read-iness, the Army and Air Force eliminated this alternative from further study."

NORTHRIDGE EXPLORATION EXPLORING ALASKA

David H. Johnson P.O. Box 84330 Fairbanks, AK 99708

February 4, 1999

Ms. Cindy Herdrich Center for Ecological Management of Military Lands Vocational Education Building Colorado State University Fort Collins, CO 80523

RE: Alaska Army Lands Withdrawal Renewal, Draft Legislative Environmental Impact Statement (LEIS)

Dear Ms. Herdrich:

Upon review of the proposal to extend existing withdrawal of public land in Alaska for military purposes as in the LEIS, there are concerns to comment on.

The mineralized land that are outside the "High Hazard Impact Area" and the "Impact Area Buffer Zone" as shown in Figures 2b thru 2e when compared to geology and minerals shown in Figures 3.4a and b and 3.5a thru 3.5c.

Another approach would be for the withdrawal period not to exceed a period of ten (10) years, or no longer than November 6, 2011. This then would obligate the federal government to reevaluate the role of the Military in Alaska and how these withdrawals fit. It will also allow the State of Alaska to reevaluate its outstanding land entitlements to see if it still desires to get title to all or parts of the existing withdrawal.

The LEIS also argues that "mining activities" (page ES-7) "if not done carefully can destroy habitat and affect water quality, a reason why the existing military withdrawals should be extended for 50 years." As a miner, I strongly object to the inference that mining under federal and state law and regulation would be done other than "carefully" when under the full requirements of both the Secretary of Defense and the State of Alaska. The Alaska State reclamation law is specifically to all lands in the state and this includes military lands. The statement should be deleted from the final LEIS.

Thank you for the opportunity to review and comment on these issues.

Sincerely,

Doid N Jahra

David H. Johnson Northridge Exploration

RESPONSES TO COMMENT JJ

MIN-JJ027 MIN-JJ027: These observations are correct, although the nature and extent of mineralization is not known. Presumably, the commentor is suggesting that these areas could be opened to mineral entry.

ALT-JJ067 ALT-JJ067: Noted. Thank you for your comments.

MIN-JJ028 MIN-JJ028: This statement will be modified in the final LEIS. Please refer to Executive Summary.

JJ

Ciperter Start Juncsion Determine Maska 99733 901 - 4656 The North Starks Highway

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February 9, 1999

Ms. Cindy Herdrich Center for Ecological Management of Military Lands Vocational Education Building Colorado State University Fort Collins, Colorado 80523

Dear Ms. Herdrich:

For more than 50 years Fort Greely and the City of Delta Junction have worked together to make a great community and support a strong military. The council for the City of Delta Junction is opposed to a 50-year continuation of withdrawal from public use for over 660,000 acres to continue the mission at Fort Greely. In the past, and before BRAC realignment, the withdrawal had been reviewed more frequently. There is no reason to change this policy.

The action of BRAC has had devastating effects on the community and to not have input by the community for 50 years, yet continue to practice bombing activities in our back yard, falls short of what is considered to be acceptable. The community has lived with bombs going off at all hours knowing that there are jobs for the community at Fort Greely. Now, sadly, it seems to be a different story. The current base realignment indicates there will be very few military personnel located in this area.

In the case of the proposed Missile Defense System, the City Council could see a rationale for supporting any area identified as necessary to the system. If the missile system has a life of 60 years, then a 50-year continuation is acceptable for this identified purpose. This would once again make the Army an economic participant in our community.

The picture on the front cover of the impact statement shows the natural beauty of this area. This is the view all tourists, visitors and local residents have from the Richardson/Alaska Highway. Tourists finding the tranquil, pristine wilderness they seek missing in this area during the military

RESPONSES TO COMMENT KK

ALT-KK068: The Army's selection of a 50-year renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A credible operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources to protect resource values and implement natural resource management measures.

Army management of the withdrawal lands will be conducted under Integrated Natural Resources Management Plans (INRMP) developed in accordance with the Sikes Act. INRMPs are written for a five year period with public and State and Federal agency participation in the development process.

SOC-KK017: The Base Realignment and Closure and the Ballistic Missile Defense Organization System are outside the scope of this LEIS. Separate National Environmental Policy Act (NEPA) documents are being developed for these actions.

USE-KK044: This LEIS is not proposing to create new Impact Areas on Fort Greely or change the use of existing Impact Areas. The Kansas, Arizona, Nevada, Oregon, and Michigan Lakes Impact Areas (see Figure 2.c) are designated as Impact Areas. All are used for limited periods and are normally used for non-dud producing ammunition or explosives, which are cleared and returned to other training support purposes following termination of firing. This use of the Lakes Impact Areas will continue through the proposed withdrawal renewal.

The Military Lands Withdrawal Act, which authorized the withdrawals at Fort Wainwright and Fort Greely in 1986, reserved the withdrawal lands for military maneuvering, training, equipment development and testing, and training for artillery firing, aerial gunnery, infantry tactics, and other defense-related purposes. The Act did not restrict the amount of military activity permitted. Proposed military activities on the withdrawal lands for the renewal period will be consistent with those conducted during the past 15 years. Any changes in the military's mission in Alaska will require appropriate NEPA documentation be completed.

MIT-KK020: Please refer to responses for POL-A001. Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23). To guide and regulate the actions of Army personnel using and managing training lands, the Army has developed the Integrated Training Area Management (ITAM) program. The goals of ITAM are to evaluate, repair, maintain, and enhance training lands at Army training installations. Please refer to Appendix 2.D for a detailed description of the ITAM program.

ALT-KK068

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exercises, so they frequently decide to look elsewhere in Alaska. Without Fort Greely here in full force, we will be looking for tourist dollars to help support our economy.

There are many issues that the City has determined that need to be addressed. They are as follows:

- Expansion of impact areas and testing activity. The Army's draft LEIS provides unorganized statistical data regarding testing activities and simply does not address the real concern of increased testing activity to the Fort Greely training areas. Military use data compiled for years 1989 through 1994 indicates an increase in high explosive use over the same five-year period. Draft LEIS at Appendix 2.B. For example, in 1989, the military used explosives for 20 days at site 22. In 1994, high explosives were employed for 250 days at the same site. Draft LEIS at APP-35. The Army provides no information regarding the magnitude of testing activity and whether the testing will occur on unspoiled lands.
- Insufficient decontamination operations. Decontamination operations are apparently conducted on a yearly basis, with only one-fifth of the impact areas cleared each year of live ordnance ammunition residue. Draft LEIS at 2-25. The military's use of these lands for target practice has resulted in permanent contamination of the withdrawal lands. The Army accepts the contamination since a "complete decontamination would be extremely expensive and technologically challenging." Draft LEIS at 2-26. Local residents should be concerned that unexploded bombs may have traveled by water, wind or poor aim outside of the designated areas and into areas used by the public for recreation and hunting. In order to prevent a complete despoliation of all withdrawal lands and to protect nearby residents from unexploded munitions, the Army should expand decontamination operations outside of high impact areas.
- 3. No contamination studies. Munitions are stored and deployed on Fort Greely for military training. The Army recognizes that the impact areas are contaminated with "exploded ordnance such as fragments of steel, filler material, munitions residue, and unexploded ordnance." Draft LEIS at 4-15. Yet, the draft LEIS fails to quantify the effect of ammunitions and hazardous waste contamination to the withdrawal parcels and nearby areas. Draft LEIS at 4-16. The Army recognizes the need for detailed soil contamination surveys and now proposes for the first time to conduct studies in the unspecified future. Draft LEIS at 4-19.
- Fuel spills. Since 1986, there have been seventeen fuel spills on Fort Greely ranging from 15 to 1500 gallons in magnitude that is, over one fuel spill every year. Draft LEIS at 2-21, 2-22. The Army confidently reports that it followed U.S. Army regulations for clean up, however, without any contamination study such a conclusion is without basis. Draft LEIS at 2-21.
- Protection of wildlife. The Army recognizes the existence of sensitive habitats for wildlife species on the withdrawn lands, but fails to provide information/studies regarding the effects of military training on the wildlife. Draft LEIS at 3-55, 4-43. And while the Army apparently "consults" with outside agencies such as the U.S. Forest

POL-KK017: Noted. Baseline studies have not been conducted for all resources at Fort Wainwright and Fort Greely. All existing baseline studies for those resources that have been studied at both installations are included in the LEIS. Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23).

POL-KK018: Spill Prevention Control and Countermeasure (SPCC) Plans exist for Fort Wainwright and Fort Greely. These plans were required because these installations each have a total underground fuel storage capacity exceeding 42,000 gallons and a total aboveground fuel storage capacity exceeding 1,320 gallons (or has an aboveground tak with a capacity exceeding 660 gallons). These plans document methods implemented at the installations to prevent oil spills from reaching navigable waters. They include spill prevention, discovery, and emergency notification procedures. These plans require the documentation of equipment inspections, tests, and repairs; personnel fuel handling and spill response training; reportable spills; corrective actions to prevent recurring spills; and investigations including soil, surface water and/or groundwater.

Both aboveground and underground storage tanks have monitoring systems which include statistical and interstitial leak detection and overfill alarms. Large fuel tanks also have secondary containment structures.

State of Alaska regulations 18 AAC 75, Oil and Hazardous Substances Pollution Control and 18 AAC 78, Underground Storage Tanks, require all oil spills, regardless of size, to be reported to the Alaska Department of Environmental Conservation (ADEC). Spiils will also be reported as soon as possible to the commander of the military unit or the immediate civilian supervisor. All oil spills require documentation and are distributed to appropriate State, Federal, and local agencies.

The spill report will include the following information: date and time of discharge; location of discharge; name of facility; person or persons causing or responsible for discharge; type of material spilled; estimated quantity of material spilled; cause and source of spill; potential impacts to environmentally sensitive areas (groundwater, surface water, soils, or wildlife); cleanup actions undertaken; estimated amount of spilled oil cleaned up; estimated amount of hazardous waste generated; date, location, and method of ultimate disposal of the hazardous substance and any contaminated materials; and actions being taken to prevent the recurrence of the discharge.

Releases of more than 55 gallons outside of secondary containment, or any discharge of oil into water, will be reported immediately to ADEC upon discovery. Releases of more than 10 gallons or more than 55 gallons within secondary containment will be reported to the ADEC within 48 hours of discovery. Releases of less than 10 gallons do not need to be reported to the ADEC, but a record of the release will be maintained.

WILD-KK020: Chapter 4.12, 4.13, 4.14 discuss the effects of military activities on wildlife. The Existing and Proposed Mitigation within of these sections discuss current military management to reduce impacts, the need for further studies of impacts to wildlife, and mitigation to reduce impacts. Service and the State of Alaska, conservation advice is not followed. For instance, the Army does not protect either the trumpeter swan or the osprey, both found to be sensitive species by the U.S. Forest Service. Draft LEIS at 3-67. Several types of passerines found to be species of concern by the State of Alaska are similarly unprotected. Draft LEIS at 3-67.

- 6. Air quality. Perhaps the most glaring problem with the Army's draft LEIS is the complete lack of scientific analysis regarding the environmental effects on the withdrawal parcels. 43 C.F.R. § 157(7) requires the Army specify to what extent the proposed use will affect federal laws relating to conservation and water resources of withdrawal lands. There is no specific air quality data collected at Fort Greely. Draft AIR-KK004 LEIS at 4-2. As a result, the contribution of pollutants resulting from military activities conducted on the withdrawal lands is unknown. Draft LEIS at 4-2. Yet, the Army presumes, without basis, that the air quality is "good." Draft LEIS at 3-8. The Army reports that Fairbanks is designated as non-attainment for carbon monoxide and has a relatively high suspended particulate concentration, apparently for the proposition and any military-related pollution at Fort Greely may be safely disregarded. Draft LEIS at 3-8. However, Delta Junction residents complain that military vehicles contribute to the ice fog/poor visibility and poor air quality in the area. Draft LEIS at SCP-101. If the air quality in the outlying areas is so poor, then it should be even more incumbent upon the military to minimize further pollution at Fort Greelv.
- Water guality. Several large streams flow through Fort Greely, such as the Delta 7. River, Little Delta River, Jarvis Creek, 100-Mile Creek and Delta Creek. 43 U.S.C. § 157(8) requires the Army comply with State laws affecting any of the waters within the withdrawn lands. The Army reports that streams within Fort Greely are in compliance with State of Alaska standards set for primary contaminants and noncompliance with standards set for secondary contaminants. Draft LEIS at 3-34, 3-41, App-123. The measurements were taken over eight years ago and failed to test for many of the required organic chemical materials. See 18 AAC 80.070. The Army's testing methodology would certainly fail by today's standards for water quality. And while the secondary contaminants mainly affect the aesthetic gualities of drinking water, the Department of Environmental Conservation warns that health problems might result from higher levels of secondary contaminants alone. 18 AAC 80.070. Within the withdrawal lands, levels of secondary contaminants were found to significantly increase downstream. Draft LEIS at App-126. For example, the maximum contaminant level for aluminum is 0.2 mg/l. In the Delta River alone, aluminum levels increased downstream from 3.9 mg/l to 7.9 mg/l. Draft LEIS at App-123, App-126. Without a current test of water quality, there is no way of knowing how much of the chemical residues reach the nearby rivers and streams.
- Public access for hunting, fishing and recreational activities. Several local citizens 8. ACC-KK026 report that their public access to these areas have significantly decreased over the past few years. (LEIS at SCP-33, SCP-98) There is absolutely no reassurance from the Army that public access will improve or remain.

AIR-KK004: Areas given a designation of "attainment" (local air quality meets or exceeds the established air quality standards) can be considered to have good air quality. However, areas of "attainment" may still experience brief episodes of poor air quality due to forest fires and motor vehicles. In addition, non-point sources of air pollution may combine with emissions from other point and non-point sources, including civilian populations located outside the withdrawal boundaries and military activities at the Main Post, and influence air quality further. Various mitigation measures have been developed by the military to lessen the impacts of poor air quality episodes on the withdrawal areas.

Unnecessary vehicle idling is restricted on Fort Wainwright and Fort Greeiv. Head bolt electrical outlets (HBOs) have been installed in most parking lots on Fort Wainwright, HBOs allow vehicles to use engine preheating accessories that reduce "cold starts", which have been linked to increases in both carbon monoxide and unburned fuel emissions. This would also reduce the amount of idling of parked vehicles during extreme low temperatures, thus reducing the generation of ice fog.

Specific air quality data has not been collected at either Fort Wainwright Yukon Training Area or Fort Greely East and West Training Areas, but the air quality in these areas is considered good because they are outside of the "non-attainment" air guality control regions.

WATER-KK014: Recent surface water quality surveys have not been completed for the withdrawal lands by the military or any State or Federal entity. A limited sitespecific water quality investigation of Fort Greely training lands was conducted by the U.S. Environmental Hygiene Agency in 1990 to determine if munitions fired into the Impact Areas were having any adverse effect on water and sediment quality. No explosives were detected during sampling and the data indicated the stream chemistries were not adversely affected by munitions. Please refer to Chapter 4.8.2 and Appendix 3.8.D for further information.

Prior to this study, water samples were collected from the Delta River above Jarvis Creek near Fort Greely by the U.S. Geological Survey in 1986 (see Appendix 3.8.D). No other water samples collected within or nearby the withdrawal areas were analyzed for munitions by either military, Federal, State, or local entities.

Water quality data collection proved to be too sporadic to provide a comprehensive assessment of the water quality of the withdrawal areas. Also, an idea of current water quality could not be derived from these records. Appendix 3.8.D shows available water quality data for streams within the withdrawal areas.

Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23).

ACC-KK026: The Army permanently restricts access to approximately 9% of the withdrawal lands, leaving approximately 91% available for public access, Expansion of Impact Areas is not proposed in this LEIS and would require appropriate National Environmental Policy Act (NEPA) evaluation and documentation. Please refer to Chapter 3.16 for more information on access.

WATER-KK014

- 9. Lengthy withdrawal period. The Army seeks, without justification, to extend the previous fifteen (15) year lease of public lands to 50 years. Draft LEIS at ES-6. See also Military Land Withdrawal Act of 1986 (Pub.L.99-606).
- 10. Inadequate fire protection. Division of Forestry representative AL Edgren, reports that roughly 30 fires a year are started in and around Fort Greely. Draft LEIS at SCP-28, 29. In contrast, the Army reports that since 1957, over 243,585 acres have burned from 72 fires started in the same area. Draft LEIS at 3-76. The Army also reports that 58 of the 72 fires started from incendiary causes resulting in 86 % of the total damage. Draft LEIS at SCP-28, 29. The Bureau of Land Management (BLM) has fire protection responsibility. Draft LEIS at 3-70. According to Edgren, BLM is 100 miles away from Fort Greely. Draft LEIS at SCP-30. BLM representatives Vic Wallace and Dave Mobraten, raised concerns regarding their ability to access fires on the withdrawn lands and the safety of those fighting fires on the lands. Draft LEIS at SCP-48. With no military personnel at Fort Greely available to fight fires, nearby communities such as Delta Junction are at placed at risk.
- 11. Noise. Delta Junction residents report that noise from sonic booms and low-flying aircraft "rattles houses" and "cracks foundations." Draft LEIS at SCP-84, SCP-101. The Army's draft LEIS does not address this concern.
- 12. Mining. One obvious effect of the Fort Greely realignment is the declining percentage of military employment in the City of Delta Junction. The economic potential for placer gold in the withdrawal lands may mean job opportunities for persons otherwise displaced by the realignment. Draft LEIS 4-9. However, the withdrawal lands are currently closed to mineral exploration and development. The withdrawn lands may be opened up to mineral activity pursuant to federal land and mining laws. Draft LEIS 4-10. However, no disposition or exploration will be authorized if the Secretary of Defense determines that exploration is "inconsistent with the military use of the lands so withdrawn." 43 U.S.C. § 158. If the withdrawal is not renewed then the military use restriction is no longer an obstacle to future mining of the area. Gold mining could certainly provide jobs that the military is currently taking away from the Delta area.

Thank you for taking time to read and address our concerns. We are a small community and have always worked well with the Army. They have been a life line for Delta Junction and are a part of the community. I hope we can continue this relationship in years to come.

Sincerely,

CITY OF DELTA JUNCTION

Roy Gilbertson Mayor

9-135

 ALT-KK069
 ALT-KK069: The Army's selection of a 50-year renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A credible operational military planning horizon is limited by withdrawal renewals every 10 to 15 years. Moreover, the resource commitment, both dollars and personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to prepare this LEIS to continue existing operations, U.S. Army Alaska is proposing to lengthen the withdrawal period and utilize resources to protect resource values and implement natural resource management measures.

FIRE-KK024: The Bureau of Land Management, Alaska Fire Service is responsible for wildland fire suppression on the withdrawal lands. When fires on the withdrawal lands are called in, the fire department can record coordinates, and then contact the Bureau of Land Management, Alaska Fire Service (AFS). The ability of the fire department to report coordinates will not change after the BRAC.

NOISE-KK002 wi

NOISE-KK002: Noise impacts from the military would continue under the Preferred Alternative as has occurred on the withdrawal lands over the past 50 years. Subsonic aircraft flights are the dominant military noise source (subsonic flights occur at speeds below the speed of sound level and so do not produce sonic booms).

MIN-KK029 Overall, few noise complaints have been received by the Army for artillery, explosions, or small arms firing. Most noise complaints have been from helicopter overflights while traveling from the Fort Wainwright Airfield to the Fort Wainwright Yukon Training Area or Fort Greely. As Army use of the relatively loud UH-1 "Huey" helicopter shifts to the quieter UH-60 Blackhawk helicopter, noise complaints are expected to decrease (Zeman, pers. com. 1998). Noise complaints received by the U.S. Air Force for jet aircraft in the vicinity of the Yukon Training Area and Fort Greely average 24 complaints per year (Gifford 1998). The noise is usually from low flying aircraft entering or exiting an Impact Area.

Mitigation measures are listed in Chapter 4.22 and 4.23.

MIN-KK029: Some potential does exist for placer gold and possibly lode gold in the withdrawal areas, although no discoveries of significance have been documented.

Mineral development compatibility with Army uses has been evaluated by the military and the BLM on a case-by-case basis whether it is appropriate to open the withdrawal lands to the mining laws that do not conflict with the military mission.

9-136

LL

Subject: [Fwd: Alaska Army Lands Withdrawal Renewal] Date: Fri, 12 Feb 1999 07:00:09 -0700 From: CEMML <cemml@CEMML.ColoState.EDU> To: Cindy Herdrich <CHerdrich@CEMML.ColoState.EDU>

Subject: Alaska Army Lands Withdrawal Renewal

Date: Wed, 10 Feb 1999 00:02:05 -0900 From: Richard/IGC <rmccaffrey@igc.org> To: CEMML@CEMML.ColoState.EDU

Ms. Cindy Herdrich Center for Ecological Management of Military Lands Vocational Education Building Colorado State Univ. Ft. Collins, CO 80523

9 Feb 99

Dear Ms. Herdrich,

This is a comment on the Draft Legislative Environmental Impact Statement regarding Alaska Army Lands Withdrawal concerning Forts Greeley and Wainwright. I want to express my concerns about the salmon WATER-LL015 fishery that depends upon the quality of the water originating on the watershed, and the fishers who depend upon the salmon.

It has come to light recently that the fall run of chum salmon, as well as other species of fish, depend on upwelling groundwater along the 30-mile stretch of the Tanana River below Big Delta, AK, for spawning. In Interior Alaska conditions are sub-arctic. The fall run of Chum salmon evidently seek the special gravel spawning beds that do not freeze, even during the of winter. Unlike in most areas, certain gravels don't freeze, even in the depth of the subarctic winter, evidently because these gravels are flushed with upwelling groundwater, which is warm in winter compared to the river water. Not warm enough to qualify as a warm spring, but warm enough to remain a few critical degrees above the freezing point. The thermal property of groundwater accounts, at least in part, for the existence of suitable winter spawning habitat.

The influence of water during winter of sufficient warmth to maintain possible spawning sites is one of the requirement for such habitat. Why the upwelling water is so warm is an open question. It may be that it is so because most of it infiltrates into the ground during summer and the water is "imprinted" by summer temperatures and shielded from sub-zero air temperature afterward while underground. Being warmer than ice, it tends to melt its way through permafrost and create flow channels ("taliks"). Taliks are most commonly formed beneath lakes and streams. When groundwater later emerges as an upwelling, it is warm relative to the cold glacial meltwater the supplies the great majority of he river water. A very different explanation of its temperature is conceivable, namely, that the upwelling water gets it heat from percolating hundreds of feet down into the to where the earth's temperature is significantly warmer due to geothermal heat flow. Such a process could potentially

RESPONSES TO COMMENT LL

FISH-LL007

WATER-LL015: Noted. Please refer to responses for POL-A001 and POL-A002. Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23).

FISH-LL007: Please refer to responses POL-A001 and proposed mitigation in Chapter 4.23 concerning pollution. At the present time no State or Federal agency has expressed concern about military actions affecting critical salmon habitat. Through the proposed mitigation, the Army will determine if contamination from military activity occurs.

is also possible. Although the detailed cause of the warmth is uncertain, the thermal quality of the water is critical to successful spawning. It is the particular qualities of the upwelling groundwater that makes the fishery possible.

A major concern of this nation over at least the last thirty years has been to maintain and improve water quality. Water qualities in addition to temperature are important for sustaining both human and wildlife populations. It is reasonable to assume that in regard to fish habitat, water temperature and other qualities, such as water chemical composition, are likely to be very important. However, little is known either about the chemical composition of the groundwater that upwells or the specific compositional requirements of spawning fish. It is known, however, that a minimum concentration of dissolved oxygen, about 5 parts per million, is needed for the survival of salmon eggs in spawning gravels. In most cases, the importance of other water properties in this regard is more speculative.

Most of the volume of water that forms the Tanana is derived from glaciers in the Alaska Range to the south. Much of it is derived directly from glacial melting. However, the water that sustains the spawning habitat is generally not the turbid glacially supplied river water, but is upwelling groundwater. This middle reach of the Tanana is, in fact, famous for its "clearwater" rivers, which reflect their proximate origin as groundwater. It is character of this groundwater that accounts for the water quality to which spawning salmon are exposed.

Thinking about the source of this water, I came to realize that these upwellings will be an expression of everything that has happened to that water since it originally fell as precipitation elsewhere on the watershed and made its tortuous way across the surface or through the ground to where it ultimately emerges at or near the river. This implies that the quality and quantity and timing of the upwelling groundwater is the final product of all of the biological, geochemical, hydrological, and climatological processes that influenced that piece of water on its odyssey from the mountains to the river.

It is this dawning realization that makes me be concerned about what has happening or is planned to happen on the watershed. I urge you to do what is necessary to ensure that the activities on the watershed do not result in degradation of this valuable fishery. It would be unfortunate if we fail to learn from our past mistakes, as exemplified by the Hanford-Columbia River-Salmon situation. This salmon fishery is one of the sustainable natural resources that Alaska will have to depend upon as the oil reservoirs are depleted.

It takes a watershed to raise a salmon.

--Richard McCaffrey

PO Box 86, Ester, AK, 99725

MS. Cierte, Herdich Cute. for Ecol. Magnet. Q Militare, Corde Voc Ed. Bedg. Colo State Univ. F4. Collins, Co 80523

2 5.99 John D Like 9) Box 83715 Fairbanks, Alaska 99708

For the record, the Ductorate of Public Works for the US Army, Mark Nelson, thanked readers for their partic pation in the provers of participating in the draft LETS which identified neguficant issues re: withdraw revewal, of this were a genune effort to solicit and encorporate and act upon the public's reaction, then 30 days is gronly inadequate. The public Open House Meetings were Jan. 5-7, 1999 and public comment expires Feb 7, 1999. This is not enough time, as designed by the US Brony "Open House weetings are not adequate for collecting + documenting public concerns for the public record - again by design. In a 1/20/99 AP articles Nature villagers from Ft. Yuhon are fearful of low level PCB contaminants from 1950 radar sites in the vicinity of their village, and demand all tixics be removed from their lands. US military spokesmen claim the concern is unuaranted. This may or may not be the case, but residents around Faulanks are also concerned by US Military plans to expand bouting areas around Fairbanks, for many naovs.

MM

RESPONSES TO COMMENT MM

OTH-MM037 OTH-MM037: The Notice of Availability for the Draft LEIS was published in the Federal Register on November 6, 1998. Public comments were accepted for a 90 day period extending from November 6, 1998 until February 7, 1999.

- OTH-MM038 OTH-MM038: During the scoping process, both Open Houses and Public Hearings were held to obtain testimony. The positive feed-back from individuals participating in the Scoping Open Houses led the Army to utilize an Open House meeting format to obtain comments on the Draft LEIS. In addition, the Open House format allowed a six hour time period during which the public could provide comments. During Public Hearings, individuals are usually limited to the amount of time they can speak. The Open House meeting format did not limit the amount of time an individual spent addressing their concerns or comments with the representatives present. In addition, U.S. Army Alaska provided a court reporter at each Open House for the six hour duration to record the testimony of those attending.
- **USE-MM045 USE-MM045:** U.S. Army Alaska is not proposing to expand bombing areas around Fairbanks. They are requesting to continue current military operations on the withdrawal lands in the Fairbanks area.

9-138

Expanded military presence in and around

Faubanks, and consequent increases in military operations (inc. bombing exercises), will increase the incidences of the following: 1) bombing-related forest fires in thick forests in Interior Alaska, increasing in pollution; loss of private & public property; loss of human, forest and animal life; increasing expenditure of state, local & federal funds for fire fighting and loss of subsistance hunting, trapping and fishing grounds for many residents.

- -) uneases in cume in our community. Then already exists a high priventage, a disporportion ately high porportion of cume committed by military pursonnel. Further increases in pursonnel and operations will surely also increase numbers of sixual and physical assurets, homicides, robbines and other violent cumes.
- 3) A bombing range on the headwaters of the chena River would produce toxic rungs into our food supply, for thousands of years. an exploded

FIRE-MM025 FIRE-MM025: The Army is concerned about incendiary-caused fires and their effects on State and private property and the surrounding communities. The Army enforces management to decrease possible fire hazards. Please review Chapter 4.15 for a discussion of this topic.

SOC-MM018 SOC-MM018: There are no statistics to show that military personnel contribute significantly to crime. Military personnel should not be characterized as prone to drunken driving, larceny, and theft, any more than persons in mining, forestry, fishing, or the tourist service industries (whichever occupations are employed in alternative uses of the withdrawal lands). Fairbanks compares favorably with the rest of the United States as far as crime is concerned.

POL-MM019

POL-MM019: No baseline studies to assess the effects of munitions on soils, surface water, groundwater, vegetation, or wildlife have been completed for the Fort Wainwright Yukon Training Area, including Stuart Creek Impact Area or the surrounding areas by the military or State and Federal agencies. The Army's proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23).

CUE ON LOD'S SAME HINTS FOUNDING " 1/24/44 CUE ON 100% 28 CR 2000 00010 CUERTE VON ONDO! expenses of not impossible to dear up bounded butomunded. A appress hos extremely Award be argined to those areas alleady be everely. Any future bending and shedling ben revended in 2001. That land ought to there and highly heredous areas up for @ the us military have "a few hundred thousand here already been secretably degraded? expand loude & bombug when much loud cleared up to inoppropriate. Do weed, with the existing ranges having been properly allowing une wood a ways of ouch ranges while & Alandoned menes and bombs an wattered. good heatweal reason. respervable standa of the land, and with pros 29 ap do not tweet the military but they record is shally. Houry Alcohour military tollis a good respirable neighbor hise wint , wint surrowit toxic ward onto Multitury sites in Alaster are avery our Ð and humans will.

740MM-3SU

POL-MM020

years. renewal request. Military use will remain the same as in the past 15 requesting to increase its Impact Areas with the withdrawal 970WW-350 ton si system VimA .S.U : S.U .S. bins blacks is not

POL-MM020: Noted. Thank you for your comments.

would pour hazardo to animals

aduance

MM

9-140

MM

D Sure, the military offers much to the

Findanks business community conomically, ust social and environmental costs have always been inadequately calculated and Why? " leby does this continue? reported Article in 1/18/99 FDNMiner: "Military (8) Otten Ignores Domestic Abrise" reenforces the previous point. Spousal abuse in the US nultary is FIVE times higher than in the general population. Secy of Defense um Cohen neused to speak to "60 minutes" recently about this issue. Sweep it under the carpet. We don't need more of this sort of thing in AK We already have rates of abuse and vidence much higher than the national average. (9) The military already has 2 vast interior

training ranges (Twiw's 248,000 a we" Jukon Training Range and FF. Theelip's 660,000 acre nance. That totals close to a <u>million</u> acres of "no-man's land"- land trashed and off limits Why do they need more? They don't need more. They have more than enorgen already. For Miner 1/18/99 SOC-MM019

SOC-MM019: Environmental costs to which the commentor refers to are not quantified in the socioeconomic analysis; however, environmental impacts are assessed throughout the LEIS.

SOC-MM020 SOC-MM020: There are no statistics to show that military personnel contribute significantly to crime. Military personnel should not be characterized as prone to drunken driving, larceny, and theft, any more than persons in mining, forestry, fishing, or the tourist service industries (whichever occupations are employed in alternative uses of the withdrawal lands). Fairbanks compares favorably with the rest of the United States as far as crime is concerned.

USE-MM048

USE-MM048: U.S. Army Alaska is not requesting additional land for military training. It is requesting to renew the withdrawal lands it is currently using.
MM

no link has been made to cleaning up

toxic sites inc. oil spills, PCBIS existing disxins, old smapnel, unexploded ordinanus and oil spills. In 1980 a wass Kiel- off of ducks were reported near Anch. and linked to artillery rounds used and not cloaned up by the US military. Todate # 20 million has been spent on Cleaning the Cagle K. Flats and the job isn't finished. Who well for this clean up? Will it come out US militaris annual budget? Don't count on it US military's annual budget has (1). The never been a part of Congress annual budget process. It happens separately and usually is a bipartisan blank check. Major clean up a) military hogardous waste setes comes out a other federal military budges EPA Junds, not military created these thrus and of sites awould the country and literally walks away from them. Swept under the carpet.

MIT-MM021: The Army's proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical and biological resources (see Chapter 4.23).

Chapter 2.1.3.5 *Decontamination* contains an estimate of the total cost to clear the Impact Areas on the withdrawal lands.

OTH-MM039 OTH-MM039: Federal Agencies are not allowed to use Superfund money (EPA) at Federal facility sites (per CERCLA/SARA). Funds to clean-up Federal facilities comes from individual yearly Federal Agency Operation and Maintenance Accounts or from special funding passed by Congress, for example the Defense Environmental Restoration Account (DERA).

> Clean-up of abandoned former military sites are funded under a Defense Environmental Restoration Account program known as Formerly Used Defense Sites. Base Realignment and Closure is a program of DERA also.

6-143

Ô zus weather. ii. A reently and sup SN environmental record man the instakes "," "We want to be known for our a then home, their life. Haska Natures who wers his employed bravado 100° windchill the several delades. us any Secretary brus Caldera was in AK. his duama Army burking i - drean't quite 00 durs in Aluska! ty and say "Dive got bragging nights feels good to say Dive bun in 30° below cather " Coldera's flash of military hlers. This is wideness aldera sup AN dicarit impurs AK residente, esp. be needs os a "goo and wake suce to remediate some of the nustakes hundra. Q winters day ground; 1 dep live and subject in group Z environmental steward creation clean up the worke S year after year. This continues, wants to Phere Durty ONMMER flash of military The Army top all the implication more and more bucious under the test to wit vacant, we don't repear over the page "Today borties The 1/20/99, .09. apr -USE-MM049 **MIT-MM022** USE-MM049: Noted. MIT-MM022: Noted

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9-144

MM

Plans to uplode 3,500 rochets with

high explosives into the Chena River drainage are rediculous. And additionally, to shoot 50,000 high explosives and dup 4,300 bombs in the same area is insame. How will these ordinances NOT Containinate the water and sort? The figures above are past, not proposed new statistics. Why increase then already exceedingly high figures? IS US Any has not done any sort contamination Atudies as part of the draft LEIS. How can this be? 1 Unexpedded ordinances pose grave danger to firefighters and increase threat of fires. Once

fires start, yound fighters are unable to deal

with the blize, further unlasing possibility

& large scale forest fires. B a canoed and uploted the Gerotte River, and not been aware of the large concentrations of some of the most deadly chemical agents known to math, This Carge area drains into the Juhon Run. It has not been assessed or cleaned cep. Why? At world cost too much. So noone pap, * neve + mustaid 995 (FDN/MINI 12/31/98).

USE-MM050 **USE-MM050:** The Military Lands Withdrawal Act, which authorized the military withdrawals at Fort Wainwright and Fort Greely, did not restrict the amount of military activity permitted. Proposed military activities on the withdrawal lands for the renewal period will be consistent with those conducted during the past 15 years. Any changes in the military's mission in Alaska would require the appropriate NEPA documentation be completed.

SOIL-MM009: Please refer to responses for POL-A001 and POL-A002. SOIL-MM009 Proposed mitigation would implement a program to gather baseline data to develop a long-term monitoring and remediation program for physical resources as outlined in Chapter 4.23. They would determine the location, extent, and potential migration of contaminates in soils. Current decontamination efforts are described including an ordnance cleanup history by the Air Force (see Appendix 2.C). FIRE-MM026

> FIRE-MM026: All Impact Areas are listed by the Alaska Fire Service as Hot Zones. Firefighters are not allowed in these areas. Fires in Impact Areas can be fought with air support. The Army and Alaska Fire Service work closely to assure accessibility to the withdrawal lands for fire-fighting. Please refer to the Fire Protection Status Boundary maps (Figure 3.15.a and 3.15.b). Many of the Fire Protection Status Boundaries are coordinated with State Fire Protection Status Boundaries.

OTH-MM040: The Gerstle River Test Site is not part of this withdrawal renewal action.

OTH-MM040

MM and people wire suffer in the long term. Again, swept under the carpet. B People don't heressailly agree of Evator Ted Storens who wants to make Alaska the military training capital of the world. Federal mories shored be used to clean up existing military toxic sites and dumps and bombing ranges, MOT expand them. D The "open house" was not a public hearing where testimony was collected for the public record. It was a white wash. It was inappropriate and insufficient. D The Dupt LEIS doesn't address other factors such as loss g tember, "habitat, subsectione will D-MM021

VILD-MM021 SUB-MM014 REC-MM010

As a citizin, an Alaskan, a teacher in unal Nature Alaskan Villages; as the Chain of the Friends (Quakers) Social Concerns Committee, and Usin of the Alaska Reace with Justice Council USE-MM051 (totalling 300+ members) I strongly Object to the US (Umy's proposal to expand operations in Alaska. Sincerely, John D. use

(hunting fishing + trapping areas) and

reneational facilities for Alaskans.

MIT-MM023: Noted.

OTH-MM041: During the scoping process, both Open Houses and Public Hearings were held to obtain testimony. The positive feed-back from individuals participating in the Scoping Open Houses led the Army to utilize an Open House meeting format to obtain comments on the Draft LEIS. In addition, the Open House format allowed a six hour time period during which the public could provide comments. During Public Hearings, individuals are usually limited to the amount of time they can speak. The Open House meeting format did not limit

the amount of time an individual spent addressing their concerns or comments with the representatives present. In addition, U.S. Army Alaska provided a court reporter at each Open House for the six hour duration to record the testimony of those attending.

FOR-MM003: An assessment of the loss of timber and wildlife habitat has not been conducted on the withdrawal lands. The Alaska Department of Fish and Game works with the Army to decrease wildlife habitat loss. Proposed mitigation in the LEIS would increase the lands protected for wildlife. Timber loss due to military activity will be assessed in the Forest Management Plan for the withdrawal lands. While loss of timber and wildlife habitat for certain species occurs from incendiary-caused fires, these areas are then available as habitat for other species. The value placed on timber loss and associated wildlife habitat loss varies according to the resource being managed for in that particular area. Communication with the Bureau of Land Management indicated that public requests for timber harvesting on the withdrawal lands has been minimal. The Army will be conducting a Forest Inventory and assessing the possibility for timber harvesting on the withdrawal lands. Timber harvests would be managed by the Bureau of Land Management from the Army.

WILD-MM021: See response FOR-MM003.

SUB-MM014: Changes to Chapter 4.20 have been made to reflect increased access of the withdrawal lands under the No Action Alternative. The transfer of former withdrawn lands to the State of Alaska would improve access for hunting, trapping, and fishing to some degree. Over 90% of the lands are already open to hunting, fishing, and trapping when military operations or safety hazards do not conflict.

Based on current subsistence use of the withdrawal lands, the effects of additional subsistence opportunities are likely not to be significant. The proposed action does not change access for subsistence over what has occurred during almost 50 years of military use. Fishing in particular would not be significantly impacted by the Preferred Alternative since almost all quality fishing lakes are open nearly year-round.

REC-MM010: The LEIS does address this issue in Chapter 4.16 and 4.17. Also review responses SOC-T007 and SOC-T008.

USE-MM051: U.S. Army Alaska is not requesting to expand operations in Alaska as a part of this withdrawal renewal action.

			NN	
Delta PO B Delta Phon	Area Forestry Sex 1149 Junction, Alaska 99737 e (907) 895-4225 Fax (907	7) 895-4934	MEMOR STATE OF Department of Natura Division	ORANDUM OF ALASKA itural Resources ision of Forestry
Т о :	Robert Layne Division of Land	Date:	February 9, 1999	
Thru:	Les Fortune <i>H</i>			
From	: Al Edgren K	Re:	Public Review Draft	

The following are comments to the Public Review Draft of the Alaska Army Land Withdrawal Renewal Draft Environmental Impact Statement. Under Section 3.15 Fire Management there are several statements that are misleading or erroneous.

Page 3-70, paragraph 2; Under the agreement the Alaska Fire Service is responsible for all fire FIRE-NN027 detection and suppression on withdrawn lands,

The detection of fires has historically been done by the Fort Greely Fire Department or Range Control Officer. I am not aware that the BLM has provided this service. With the down sizing of the Base Fire Department, this document doesn't address how this service will be provided.

Page 3-71, paragraph 2: Through the Reciprocal Fire Protection Agreement and the Annual Operating Agreement, the Department of Forestry has agreed to provide detection and initial attack suppressim services for Fort Greely West and East Training Areas which lie within the Department of Forestry Protection Area.

The BLM/State agreement is not written as stated above. We will provide initial attack and detection upon request and subject to available forces by the Military Fire Chief or the AFS Military FMO.

The statement above implies that the East and West Training Areas are within the Division of Forestry's protection area. It is not. The BLM has retained the Fort Greely Withdrawn lands in its protection area.

Page 3-72, paragraph 5: Unplanned areas are lands which have not been given an official designation but receive protection equal to that given lands in full.

On our latest Fire Management plans, the Gerstle River Test Site is designated "unplanned". This area has been designated for no suppression activity due to the hazardous materials assumed to be present.

BESPONSES TO COMMENT NN

FIRE-NN027: The Bureau of Land Management, Alaska Fire Service (AFS) is responsible for wildland fire suppression on the withdrawal lands. When fires on the withdrawal lands are called in, the fire department records coordinates, and contacts the AFS. The ability of the Fire Department to report wildland fire locations will not change after the Base Realignment and Closure. The Alaska Fire Service will adopt necessary strategies as needed to maintain fire suppression response on withdrawal lands.

FIRE-NN028: Correction has been made. The Division of Forestry agrees to provide detection and initial attack suppression services upon request, subject to available forces, on military lands. "No Entry Areas" are excluded. The request will be made by the Military Fire Chief or the Alaska Fire Service Military Fire Management Officer. All requested detection and suppression costs are reimbursable.

FIRE-NN029: The Gerstle River Test Site is not part of this withdrawal renewal action.

1

FIRE-NN028

FIRE-NN029

Alaska Army Land Withdrawal EIS

Delta Area Forester

NN		
Some explanation is needed that this area will not receive suppression activities. It may be appropriate to give this a "Restricted Area" category.		FIRE-INVOUST The correction has been made. The tire started on Fort Greely land, however the fire was reported to the Bureau of Land Management (BLM) at 0004 hours May 21. The detection firbut was an ORCE hours and was dehend hours its was the fract
Page 3-73 Fire History. In 1998, lightning caused fire began north of Fort Greety and spread to Fort Greety West Training Area.	FIRE-NN030	agin, was at 9500 hours and was detayed because it was the linst aircraft available. A request was made for detection assistance from the Division of Forestry (DOF), but no aircraft was available.
This is not true. The fire started on Fort Greely land in the West Training Area on May 20, 1998. The fire was reported to the BLM by Fort Greely Fire Department that evening. The BLM responded with a detection flight at 1400 the following day. The fire protection level was "modified": It burned on to State land and cost \$16 million to suppress.		FIRE-NN031: If the military fire department put a fire out and did not report it to Bureau of Land Management, the agency would not have a record of it. Since 1987 (when the USARAK/BLM agreement went into effect), fires that have burned in Hot Zones have received a number. There is some indication that a few fires
Page 3-73, paragraph 3:	FIRE-NN031	within the rukon ritaining Area an not receive numbers. The Alaska Fire Service believes all fires at Fort Greely, including those in the Hot Zones, received numbers.
The statistics are misleading and the accuracy is questionable. The BLM stopped giving fire numbers to fires unless "they" took action. If the fire department put it out or it burned in "Hot Zones" no numbers were given.		The response for FIRE-NN026 addresses suppression and future resources. Again, the BLM has the responsibility. Operational details should be spelled out in other documents such as a Fire
More importantly in the fire history is how were fires suppressed and are those resources going to be available in the future?		Management rian. FIRE-NN032: Operational details for fire suppression after the
Page 4-57 4.15 liftee Management, paragraph 3: Under the Preferred Alternative, the present management agreements and support service between U.S. Army Alaska and the Fire Service	FIRE-NN032	Base Realignment and Closure (BRAC) should be discussed in the BRAC Environmental Assessment for Fort Greely or in a Fire Management Plan.
would continue.		FIRE-NN033: The Annual Operating Agreement between Alaska Fire Service (AFS) and Division of Forestry states:
Ine missing element or the past success of the initial attack on Fort Greely has been quick detection and a rapid initial attack response provided by the Fort Greely Fire Department. With the elimination of these facilities and capabilities, how will the BLM provide this critical element to be successful at catching fires? Does the BLM plan on having wildland fire engines prepositioned at Fort Greely? Who will provide detection?		0 The Military Fire Chief at each location will operate as the land manager's representative for the military land on their base garrison/cantonment areas. BLM is responsible for supplying a land manager's representative for military lands outside of the garrison/cantonment areas. The BLM retains vegetative land
Page 4-58, paragraph 2: The Preferred Atternative continues U.S. Army Alaska as the Land Manager for fire management.	FIRE-NN033	management responsibility over all withdrawn lands and therefore the Preferred Alternative continues USARAK and BLM as land managers for fire protection. Fire Protection Status Boundary
Who is this person? Will someone be given this authority at Fort Greely to make decisions during the initial attack phase of a fire?		options (Frigures 3.13.4 and 3.19.b) are the decision of the land managers and not AFS. The AFS does provide recommendations for the boundaries.
Page 4–58, paragraph 3: However, fire information for the withdrawn lands show that out of 95 incendiary device fires, only one has crossed onto State lands indicating that the probability of this occurrence is low.	FIRE-NN034	FIRE-NN034: Information from the fire data shows that fire suppression efforts on the withdrawal lands have been able to maintain most incendiary fires to the withdrawal land boundaries. Incendiary devices increase the risk for fires. Fires may move onto
This statement is misleading. The cause doesn't have anything to do with fires that could/did threaten State land.		State land. Most of the Fire Protection Status Boundaries for the withdrawal lands have been coordinated with State Protection Boundaries as shown in Figures 3.15.a and 3.15.b.

	FIRE-NN035 FIRE-NN035: A statement has been added to Chapter under the Cumulative Effects regarding the use of incent	devices in the East Training Area. The Alaska Fire Servic provide services to protect resources on the withdrawal la	FIRE-NN036 FIRE-NN036: Changes have been made to Chapter under the No Action Alternative, to state that if the land is conveved to the State, the Bureau of Land Managen	Alaska Fire Service would retain responsibility.	FIRE-NN037 FIRE-NN037: If the State does not receive conveyant the land, the BLM, AFS would retain responsibility.	Unapter 4.15 for necessary changes to the No A Alternative.	OTH-NN042 OTH-NN042: Through the Reciprocal Fire Prote Agreement and the Annual Operating Agreement, the Div of Forestry has agreed to provide detection and initial a suppression services upon request, and subject to avai forces for Fort Greely West and Fast Training Areas whi	within the Division of Forestry Protection Bracea. "No I Areas" are excluded. The request to the Division of For will be made by the Military Fire Other or the Alaska
Any fire starting on military land which is allowed to burn unchecked could be a threat to State land. The Carla Lake Fire was a good example of how costly a military fire can be to the State, not only in suppression cost but loss of natural resources, private property, etc.	Page 4-59, parazraph 2: Cumulative effects. The number of fires from incendiary devices will continue to be high on the Impact Area, resulting in various successional stage vegetation.	This is a true statement. However, there is no reference to the use of simulator devices, blanks, and smoke canitters during maneuvers in the East Training Area during spring training exercises. These devices have caused several fires and are an immediate threat to the cantonment area and State and private land. Fort Greely Fire Department has provided the initial attack in the past. Who will provide this service now to protect these tecources?	Page 4-59, paragraph 3: No Action Alternative. Under the No Action Alternative, lands could eventually be returned to the State of Alaska. The Alaska Fire Service would no longer have primary responsibility for fire suppression on the withdrawn lands; primary responsibility would be with the State of Alaska, Department of Forestry.	This land is BLM property. The State will probably not be interested in selecting land used for military training due to the hazardous material which may exist. Fire protection could become the responsibility of the Division of Forestry through agreement with BLM.	Page 4-59, paragraph 5: Under the Alaska Fire Admagement Plan, the Alaska Fire Service would remain the first responder agency for the Fort Wainwright Yukon Training Area and the Department of Worestry would maintain the first responder for Fort Greety.	At this time there is no agreement that would implement the protection responsibility as written. The BLM has initial attack responsibility.	In closing, this document has not adequately addressed how it will provide for the protection of State and private lands if threatened by a wildland fire. The continued use of Fort Greely as a training and mat uever area has not changed. Yet, the down sizing of several key elements, (i.e. Fort Greely Fire Department and radio station for emergency notification) has changed due to the base realignment. This document needs to address in detail how they will protect the State resources. This document repeatedly refers to the Department of Forestry. We are the Department of Natural Resources, Division of Forestry.	Cc: Jim Lewandoski

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U.S. ARMY ALASKA LANDS WITHDRAWAL RENEWAL ENVIRONMENTAL IMPACT STATEMENT

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956 5 **ORGANIZATION:** 2227200 VCaCS 2020P 201.99 A perdict example is th the wind 194 H ssorietion 5 Jial River Rene Alaska N. Pole Alaska 57010 submitted ecommiss ioned COMMENT SHEET 140-SELF Nicit. P.O. Rox N:Vo missile site built on the ORGANIZATION A aska Trail t was Deek COMMENTOR REPRESENTING: COMMENTOR'S ADDRESS: ease COMMENTOR'S NAME: bb qtS ease ADDRESS: 1959 arca of the 50 vr. COMMENTS: 5 Training DATE: 1

RESPONSE TO COMMENT 00

renewal period is based on the need for substantial land mass to support training of soldiers in Arctic and Subarctic environments which will continue in the future to be critical to national defense preparedness. A credible operational military planning horizon personnel, required for renewal every 10 to 15 years places a substantial burden on the Army. Considering the large costs to ALT-OO070: Noted. The Army's selection of a 50-year the resource commitment, both dollars and Alaska is proposing to lengthen the withdrawal period and utilize is limited by withdrawal renewals every 10 to 15 years. prepare this LEIS to continue existing operations, U.S. Army resources to protect resource values and implement natural resource management measures. Moreover,

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guicker

systems are obselete tuen

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to gather baseline data to develop a long-term monitoring and remediation program for physical resources (see Chapter 4.23). Current decontamination efforts are described including MIT-00024: Please refer to responses for POL-A001 and POL-A002. Proposed mitigation would implement a program an ordnance cleanup history by the Air Force (see Appendix 2.C).

responsibility of either the Bureau of Land Management or the which might exist on military lands, the Army has no plans to Plan (Alaska State Historic Preservation Office, 1998). The plan includes general procedures to inventory and manage historic resources, which could include historic trails. Under the Preferred Alternative, the Integrated Cultural Resources Management Plan would be implemented. Under the No the State. Otherwise, specifically with respect to RS-2477 trails CULT-00005: Historic trails crossing withdrawn lands are discussed in the Integrated Cultural Resources Management Action Alternative, this plan would not be implemented, and identification and management of trails would be map or inventory such trails.

monitoring and remediation program for physical resources (see Chapter 4.23). Proposed mitigation in Chapter 4.13.2 WATER-O0016: Proposed mitigation would implement a program to gather baseline data to develop a long-term states that surveys of waterways on the withdrawn lands should be conducted to assess damage to stream banks and associated vegetation, and contamination from ammunition used in the Impact Areas.

248.9 million de contaminate Seriate Mellain - Arz.

SUBMIT YOUR COMMENTS AND MAILING REQUESTS VIA THE INTERNET:

OR

Feb. MA 98

http://www.cemml.colostate.edu/alaskaeis

Center for Ecological Management of Military Lands Colorado State University, Fort Collins, CO 80523-1500

Ms. Cindy Herdrich

(

9.3 INDEX OF COMMENTS AND RESPONSES

An index of individual comments and responses grouped by topic code is presented below. Each comment letter or transcript was assigned an alphabetic code. Comments were coded in the order of acquisition. Within each comment letter or transcript, individual points presented were assigned a topic code. Topic codes used in the comment/response process are defined in Table 9.a. Each topic code was subsequently assigned a unique numeric code. For example, comment/response ACC-A001 refers to the first comment (001) dealing with the topic of access (ACC) presented in comment letter or transcript A.

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