Chapter III: Affected Environment

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Chapter III: Affected Environment

A. Introduction

1. How to Read This Chapter

This chapter contains background information about the physical, biological, and socioeconomic resources, resource uses, and programs that exist or occur on the Bureau of Land Management (BLM) lands managed by the Anchorage Field Office (AFO) in the Bristol Bay and Goodnews Bay regions. This information is provided to establish the environmental baseline for analysis of the direct, indirect, and cumulative effects analyses presented in Chapter IV. Chapter III is organized topically; the order in which topics are addressed is not intended to imply relative importance of the topic.

Section B discusses the affected environment for resources, Section C covers the affected environment for resource uses, Section D is dedicated to special designations, Section E provides background on the social and economic environment, and Section F presents the subsistence environment.

2. Critical and Non-critical Elements of the Human Environment

The Bureau of Land Management National Environmental Policy Act (NEPA) Handbook (H-1790-1) lists critical elements of the human environment and notes the need to consider these resources or values in all forms of analysis under NEPA, including environmental impact statements. The critical elements are drawn from legislation and Executive Orders. BLM has identified 14 critical elements of the human environment for consideration in every environmental document. There are 15 critical elements for discussion in Alaska. They are as follows:

1. Air Quality (The Clean Air Act of 1955, as amended)
2. Areas of Critical Environmental Concern (ACECs) [Federal Land Policy and Management Act (FLPMA) of 1976]
3. Cultural Resources (National Historic Preservation Act of 1966, as amended)
4. Environmental Justice [Executive Order (E.O.) 12898]
5. Farm Lands, Prime or Unique (Surface Mining Control and Reclamation Act of 1977)
6. Floodplains (E.O. 11988, as amended)
7. Invasive, Non-native Species (Lacey Act, as amended, Federal Noxious Weed Act of 1974, as amended; Endangered Species Act of 1973, as amended; and E.O. 13112, Invasive Species, 02/03/99)
8. Native American Religious Concerns (American Indian Religious Freedom Act of 1978)
9. Subsistence [Alaska National Interest Lands Conservation Act (ANILCA) of 1980]
10. Threatened or Endangered Species (Endangered Species Act of 1973, as amended)
11. Wastes, Hazardous or Solid (Resource Conservation and Recovery Act of 1976, and Comprehensive Environmental Response, Compensation, and Liability Act of 1980)
12. Water Quality, Surface & Ground (Clean Water Act of 1987; Safe Drinking Water Act Amendments of 1996; E.O. 12088 amended by E.O. 12580, and E.O. 12372)
13. Wetlands/Riparian Zones (E.O. 11990)
14. Wild and Scenic Rivers (Wild and Scenic Rivers Act of 1968, as amended)
15. Wilderness (FLPMA of 1976 and Wilderness Act of 1964)

All of the above but one is addressed in this environmental impact statement. The missing element is Farm Lands. There are no Farm Lands, Prime or Unique, within the planning area.

3. Geographic Scope

The Bay planning area consists of 23 million acres, of which approximately 2 million acres are managed by BLM. These lands include large blocks and a few scattered tracts of unencumbered BLM land and State- and Native-selected lands. BLM manages 1,163,604 acres of unencumbered land, 52,705 acres of subsurface estate, and 759,656 acres of State- and Native-selected lands. Table 1.1 provides BLM acreage information in the planning area. Selected lands will remain under the management of BLM until land conveyance is complete. BLM Alaska is also responsible for managing both surface and subsurface resources on BLM-managed public lands. For the purposes of the following discussion, the Bay planning area is addressed in terms of two sub-regions, the Bristol Bay area and the Goodnews Bay area.

The Bay planning area is approximately an hour away by air from Anchorage. The planning area extends over 250 miles east-west and 150 miles north-south with virtually no road system access to Bureau managed lands. Nearly all access is by specialized aircraft, small tundra-tire equipped planes, float planes, ski planes, helicopters, or watercraft. Commercial aircraft are used for travel to the communities in the planning area that are served by BLM's Anchorage Field Office (AFO).

Land ownership throughout Alaska continues to change as BLM transfers land from the Federal estate to the Native community and the State of Alaska. The Native community and the State of Alaska, under their respective entitlement statutes, have selected a considerable amount of the acreage in the planning area. BLM will continue to manage selected lands in accordance with statutory or regulatory guidance. Maps 3.1, 3.2, and 3.3 show unencumbered BLM lands in the planning area. They are the main focus of discussion in this chapter.

4. The Planning Process and Existing Management

a) The Planning Process and Public Participation

A Resource Management Plan (RMP) is the primary tool used by BLM to manage lands within BLM's jurisdiction. Resource management plans and planning decisions are the basis for every on-the-ground action BLM undertakes. They ensure that the public lands are managed and used in accordance with the intent of Congress and they provide a framework to ensure that land use plans and implementation decisions remain consistent with applicable laws, regulations, orders and policies. The planning process is also compliant with the provisions of the National Environmental Policy Act (NEPA). NEPA compliance affords the BLM and the public an opportunity to evaluate the environmental consequences of BLM's planning alternatives.

The planning process involves public participation. Public involvement "…means the opportunity for participation by affected citizens in … planning … including public meetings or hearings held at locations near the affected lands, or advisory mechanisms, or other such procedures as may be necessary to provide public comment in a particular instance" (FLPMA, Section 103(d)). Scoping is a collaborative public involvement process to identify planning issues to be addressed in the plan. Planning issues are disputes or controversies about existing and potential land and resource allocations, levels of resource use, production, and related management practices. Issues include resource use, development, and protection opportunities for consideration in the preparation of the RMP. Scoping also includes the introduction of preliminary planning criteria to the public for comment.

BLM has documented the results of scoping in a formal scoping report that was made available to the public in fall 2005. The issues and actions defined during the scoping process have been analyzed and have guided the organization of Chapter III with the following goals in mind:

- Identify the relevant physical, biological, social and economic resources.
- Review available resource information.
- Establish an environmental baseline.
- Conduct a past/present effects analysis.

b) Existing Management

The Southwest Planning Area Management Framework Plan (1981) covers only the Goodnews Block.

The Land Use Plan Amendment for Wildland Fire and Fuels Management (2004, 2005) is applicable to all BLM-managed lands within the planning area.

B. Resources

1. Geography and Climate

a) Physiographic Regions

The boundaries of the Bay planning area include a varied landscape that includes portions of the Aleutian Range of mountains and two other mountain ranges, five major lake and river systems, and both coastal and interior environments. Within the area are a variety of pristine ecosystems. The planning area is part of two physiographic or geographic regions, the Pacific mountain system and the central upland and lowland region (Wahrhaftig 1965). Within this same area, a number of ecoregions have been identified. Ecoregions are based on perceived patterns of a combination of causal and integrative factors including land use, land surface form, potential natural vegetation, and soils (Gallant 1996). They are:

- Interior Forested Lowlands and Uplands
- Ahklun and Kilbuck Mountains
- Subarctic Coastal Plain
- Bristol Bay-Nushagak Lowlands
- Alaska Peninsula Mountains
- Alaska Range

b) Environmental Change

Climate trends over the last three decades have shown considerable warming (USDA 2004; UAF 1999; AMAP 1997). This has already led to major changes in the environment and in Alaska's ecosystems. Alaska has experienced the largest regional warming of any state in the U.S., with a rise in average temperature of about five degrees Fahrenheit since the 1960s and eight degrees Fahrenheit in winter (UAF 1999). This has led to extensive melting of glaciers, thawing of permafrost and reduction of sea ice (UAF 1999).

Alaska's warming is part of a larger warming trend throughout the Arctic. The warming has been accompanied by increases in precipitation of roughly 30% between 1968 and 1990 in some areas. Other areas have experienced drying (UAF 1999; McClenahan 2006, Pers. Comm.). Projections suggest that the strong warming trend will continue, particularly warming during the winter months (UAF 1999). Some anticipated changes in weather patterns include intensification of the Aleutian low-pressure system, which may shift slightly southward. Alaska would then continue to grow wetter, with annual precipitation increases of 20-25% in the north and northwest, but little change from present conditions in the southeast. Winters are anticipated to be wetter in the east and drier in the west, with summers being drier in southeast Alaska and wetter elsewhere. Winter soil moisture changes with precipitation, but summer increased evaporation from a warmed climate exceeds any projected increases in precipitation, and soils are dry everywhere (UAF 1999).

Tree growth in the boreal forest depends on temperature and precipitation. Boreal forests may be at risk from climate change associated with regional warming. Potential impacts may include decreases in effective moisture sufficient for forest growth, tree mortality from insect and disease outbreaks, probability of an increase in wildland fires, changes caused by permafrost thawing and invasion of trees, shrubs and other plant species that are acclimated to the new conditions (USDA 2004; UAF 1999).

Regional environmental changes are observed to be impacting the entire Bay planning area, including coastal areas. The reduced sea ice along Alaska's coasts and rising sea level are rapidly eroding the coastal soil. Some of these locations contain archaeological and paleoontological sites (UAF 1999).

Coastal wetlands are being affected by rising sea level and increased storm surges as salt water and beach gravel are being moved inland (UAF 1999). These are natural processes, but should be monitored on BLM-managed lands for effects on a wide variety of resources.

The following impacts have been observed in Alaska in recent years:

- The warmer, drier climate has caused forest problems such as increased tree mortality, fire frequency and insect outbreaks (USDA 2004; Juday 1996; Fleming and Volney 1995).
- Spruce bark beetle outbreaks in Alaska have recently become one of the most widespread infestations observed to date, surpassed recently in Alaska by the aspen leaf miner and the birch leaf miner (USDA 2004). Such infestations of bark beetle have been observed in the forests near Iliamna and those around Dillingham and Aleknagik in the Bay planning area.
- A warmer climate has lengthened the growing season and growing degree days by 20% (UAF 1999).
- Boreal forests are expanding north at the rate of 60 miles for each two degrees Fahrenheit increase (UAF 1999).
- Shrubs and trees are expanding into arctic tundra (Starfield and Chapin 1996; UAF 1999).
- Vegetation communities are being converted to communities with taller, denser vegetation (Starfield and Chapin 1996; Rupp et al. 2000a; Rupp et al. 2000b).
- Concerns about invasion of non-native plants are increasing statewide.

The following effects are anticipated should the current trend continue:

- There is an ever increasing risk of wildland fires in areas that to date have seen few fires (USDA 2004; UAF 1999).
- One projection (Rupp et al. 2000a), for example, shows a 200% increase in the total area burned per decade, leading to a deciduous forest-dominated landscape on the Seward Peninsula, presently dominated by tundra vegetation.
- Burning of the vegetative cover may increase the risk of soil erosion.
- Changes in temperature and precipitation will affect coastal forest hydrology and salmon spawning streams important to subsistence, commercial and sport fisheries (UAF 1999).
- Hydrologic changes in forested watersheds include warmer stream temperatures and lower summer flow from low elevation streams, higher flow from higher elevation streams (already being reported from the New Koliganek region)(BLM 2005b; UAF 1999).
- There are likely to be changes in the range of vertebrate animals and changes in productivity of aquatic ecosystems (UAF 1999). As the boreal forest intrudes further north at the expense of tundra and shrub communities, there will be changes in habitats and the distribution and density of a number of wildlife species on land (UAF 1999).
- Long-term effects might include general treeline advance in elevation as well as latitude; colonization of formerly glaciated lands; and transition of tree species and ecotypes (UAF 1999).
- Regional environmental warming is affecting areas traditionally underlain by permafrost, melting frost wedges, changing drainage patterns, and drying up small lakes and wetland complexes within the Bay planning area. (UAF 1999)
- The nature and composition of soils in this region probably will be affected over time by these changes should the warming trend continue (Birkeland 1999).
- With so much melting of glaciers and permafrost, mechanisms such as slump, soil creep, and mass wasting (i.e. avalanches) can become more active (UAF 1999; McClenahan 2004).

2. Air Quality

Air is a ubiquitous resource vital to most life on earth. Air resources consist of the gaseous atmosphere. The air resources within the Bay planning area are constantly changing as winds and climatic systems move air masses across the globe.

The Air Resources Program oversees this resource according to Federal and State laws. A primary function of the Air Resources Program is to evaluate proposed actions on jurisdictional Federal lands according to the National Environmental Policy Act. There are no specific BLM-AK goals and objectives, other than compliance with Federal and State laws.

The management/enforcement of the air quality standards falls within the jurisdiction of the U.S. Environmental Protection Agency (EPA), which has the primary responsibilities under the Federal Clean Air Act (CAA). The EPA has transferred a number of responsibilities to the states and in most cases, to regional air quality management districts. The Alaska Department of Environmental Conservation, Division of Air Quality, has responsibility for air quality in Alaska. These responsibilities include monitoring, permitting, enforcement, and issuing air advisories for hazardous health conditions when necessary.

To identify an area by its air quality, all geographic areas in the state are designated by the Federal administrator as “attainment,” “nonattainment,” or “unclassifiable.” An area is designated “attainment” for a particular contaminant if its air quality meets the ambient air quality standard for that contaminant. If there is insufficient information to classify an area as attainment or nonattainment for a particular contaminant, the area is designated “unclassifiable” for that contaminant. The Bay planning area has been designated unclassifiable/attainment. For air quality monitoring purposes, Alaska has been divided into four “air quality regions.” The Bay planning area falls within the South Central Alaska Intrastate Air Quality Control Region.

The air resources within the planning area are generally considered pristine or of very good quality, except during summer when wildland fires may increase the airborne particulates. This resource may be affected by other natural and human-related activities locally, regionally, or globally. Natural conditions can temporarily degrade air quality. Ash and gases from volcanic eruptions and wind blown glacial till or sand can also degrade air quality. Most of this region is very sparsely populated. Impacts to human inhabitants are generally localized and temporary.

Increasing population and development can stress air resources due to increased emissions from aircraft and vehicle internal combustion engines, burning of wood and fossil fuels, and industrial facilities that emit a broad spectrum of chemical by-products into the air. Portions of this region may continue to experience population growth and a corresponding increase in commercial, residential, and industrial development, which will exert increased demands on the regional air resources.

Primary stressors or sources of air pollution that may degrade local air resources more often will not come from BLM lands, but from surrounding lands within the Bay planning area, based on current and projected land use patterns. Except for issues of smoke from wildland or prescribed fires, wind-blown dust from infrastructure development (for example, dust from newly developed roads with heavy traffic running at high speeds) and airborne contaminant dispersion and deposition (for example, from new or existing mining operations) there are no other known current public issues regarding air quality within the Bay planning area. The State of Alaska Department of Environmental Conservation monitors these activities for air quality violations.

a) Smoke Management

The Alaska Department of Environmental Conservation (ADEC) is responsible for declaring air episodes and for issuing air quality advisories, as appropriate, during periods of poor air quality or inadequate dispersion conditions. ADEC is a member of the Alaska Wildland Fire Coordinating Group. During periods of wildland fire activity, the Multi-Agency Coordinating Group, a sub-group of the Alaska Wildland Fire Coordinating Group, addresses air quality and smoke management issues. As ADEC develops its State Implementation Plan for regional haze, changes may be necessary to address additional fire tracking and emission management needs based upon policies and guidelines developed by the Western Regional Air Partnership. Under State law, all agencies, corporations, and individuals that burn 40 or more acres of land require written approval from ADEC prior to burning. The Enhanced Smoke Management Plan being developed by ADEC will outline the process and items that must be addressed by land management agencies to help ensure that prescribed fire activities minimize smoke and air quality problems. The Enhanced Smoke Management Plan will also address elements required by the EPA regulations: 40 CFR Parts 50 and 51 Treatment of Date Influenced by Exceptional Events.

b) Critical Thresholds

During the NEPA process, air resources are evaluated for impacts. According to the Clean Air Act, each Federal agency must demonstrate that decisions or actions comply with applicable air quality requirements. Non-compliance with the Clean Air Act is a critical threshold that could stop a proposed action. State air quality regulations may also be considered a threshold. If a proposed action is expected to degrade air quality, additional information or further study may be required to quantify the amount of degradation (amount of pollutants released), to analyze the impact the action would have on the air resource (including impacts on human and ecological populations), and to evaluate the action's compliance with Federal and State regulations.

3. Soil resources

The Soil Resources Program is responsible for the protection, restoration, and enhancement of soils on BLM-managed lands. Inventory and monitoring are the typical means used to assess the condition of the resource.

a) Soils Inventory

Except for three soils studies and a number of archaeologically-related soils investigations, no detailed soil resource inventories are known to have been done in the Bay planning area, and none have taken place on BLM-managed lands. However, soils in the Bay planning area have been surveyed on a very broad scale (USDA SCS 1979) (Maps 3.4 and 3.5). This survey is best used for general land use planning and as a guide to areas for a specific purpose. Map units are very large and lacking in detail. Alaska has been divided into fifteen major land resource areas. The Bay area is comprised of portions of the Alaska Peninsula, the Kuskokwim Highlands, and the Western Alaska Coastal Plains and Deltas.

Intensive soil surveys have been done on limited areas, most notably in the Nondalton area (Hinton and Neubauer 1966), the King Salmon-Naknek area (Furbush and Wiedenfeld 1970), and the Dillingham area (Rieger 1965). A brief summary of the major soil associations (USDA SCS 1979) in the Bay planning area (based on soils maps 3.5 and 3.6) are as follows:

(1) Inceptisols (Map 3.4)

Sixty-four percent of the Bay planning area soils are Inceptisols. An Inceptisol is a type of soil in which there has been only relatively minor modification of the parent material by soil-forming processes. There has been enough modification to be able to tell an Inceptisol from an Entisol, but not intense enough to form the kinds of soil horizons (soil layers) that are required for classification in other soil orders. Generally, poorly drained soils with permafrost are considered to be Inceptisols even though they have no diagnostic horizon other than an epipedon. Most soils in Alaska are Inceptisols (USDA SCS 1979:35).

(2) Spodosols (Map 3.4)

Nineteen percent of Bay planning area soils are Spodosols. In Spodosols, organic carbon, aluminum, and in most places, iron, have been leached by percolating water from the upper part of the soil and deposited or precipitated at greater depth to form a spodic horizon. Most Spodosols in Alaska have a surface mat of organic litter, which is at least partially decomposed and a gray mineral horizon (an albic horizon) above the spodic horizon. Spodosols are dominant on uplands in areas with high precipitation, where moisture in excess of that required by the natural vegetation moves completely through the soil. Except in very coarse material and in special situations in tundra areas, Spodosols in Alaska normally occur only where mean annual precipitation exceeds 15 inches. Spodosols are most common in forested areas, but a few occur in western Alaska tundra areas (USDA SCS 1979:46).

(3) Histosols (Map 3.4)

Only 2% of lands within the Bay planning area contain soils known as Histosols, which are made up completely or in large part of organic material. The organic material accumulates under wet conditions, in depressions or other low areas that are nearly always inundated, on slopes affected by seepage, or as a blanket on rolling hills in areas of very high rainfall. Examples of this type of soils can be found at Brooks Lake in Katmai National Park (USDA SCS 1979:30).

(4) Entisols (Map 3.4)

Only 1% of soils within the Bay planning area are classified as Entisols. In Entisols there is little or no evidence of change as a result of soil-forming processes; most of them have few diagnostic horizons. Wet mineral soils are classified as Entisols. In Alaska, Entisols occur most commonly on flood plains and outwash plains which receive new deposits of sediment at frequent intervals, on uplands adjacent to major rivers where new material blown from the river beds is deposited, in other young material, such as recently exposed glacial moraines, and in very cold or very steep areas where vegetation is sparse, where soils are unstable, or where parent material is exceptionally resistant to chemical weathering (USDA SCS 1979:15).

(5) Rough Mountainous Land (Map 3.4)

Fourteen percent of the Bay planning area consists of Rough Mountainous Land (RM1) and Cinder Land (CL). Rough mountainous land is made up of steep rocky slopes, ice fields, and glaciers. Some slopes in the mountains support sparse shrubby vegetation, but most are barren. Thins soils occur in the vegetated areas on lower slopes and in valleys, but almost all are stony and shallow over bedrock or bouldery deposits (USDA SCS 1979:150-151).

Cinder lands can be found on the Alaska Peninsula and on the western Alaska coastal plains and deltas. Areas of fresh volcanic ash and cinder flows occur on slopes of active volcanoes on the Alaska Peninsula. These areas have little or no vegetation except for willows and grasses in deeply incised drainageways, such as the Valley of Ten Thousand Smokes in Katmai National Park. The loose ash is highly subject to disturbance by wind. Because of the instability of the volcanic material and the possibility of future depositions, they are poor sites for roads or buildings. The paucity of vegetation

restricts their value for most wildlife (USDA SCS 1979:56). These areas are unsuitable for agriculture, forestry or building construction. A more detailed breakdown of specific soil types is provided in Map 3.5.

Table 3.1. Soils Found in Bay Planning Area Unencumbered BLM Lands: Suitability and Limitations for Selected Uses

Planning Block, Unencumbered BLM Land	Soil Associations Present	NRCS Suitability and Limitations for Selected Uses (SCS (NRCS) 1979)
Klutuk Creek Block	IA13, IQ2	Unsuitable for livestock grazing; moderate to very severe drawbacks for locating roads, constructing low buildings, slight to very severe drawbacks for recreation and off-road trafficability. Unsuited for commercial forestry. Some areas (IA13) suitable for crops, all areas suitable for caribou.
Iliamna (West) Block	IA7, IA4, IA9, HY5, HY4	Unsuitable for crops, slight to very severe drawbacks for locating roads, constructing low buildings, recreation, and off-road trafficability. Unsuited for commercial forestry. Fair to unsuitable for domestic livestock grazing; suitable for caribou; primarily valuable for natural water storage and wildlife habitat.
Iliamna (East) Block Chekok Creek Chulitna River	RM1, IA7, SO7 SO7, RM1	Unsuitable for crops, slight to very severe drawbacks for locating roads, constructing low buildings, recreation, and off-road trafficability. Poor to unsuited for commercial forestry. Fair to unsuitable for domestic livestock grazing; suitable for caribou.
Alagnak Block	IQ2, IA4, IA9	Unsuitable for crops, domestic cattle and sheep grazing; severe to very severe drawbacks for locating roads, constructing low buildings, recreation, and off-road trafficability. Unsuited for commercial forestry. Suited for caribou and other wildlife habitat.
Kvichak Block	RM1, IQ2, IA4, HY5, IA7	Unsuitable for crops, slight to very severe drawbacks for locating roads, constructing low buildings, recreation, and off-road trafficability. Poor to unsuited for commercial forestry. Fair to unsuitable for domestic livestock grazing; suitable for caribou.
Koggiling Creek Block	IQ2, IA3	Unsuitable for crops, slight to very severe drawbacks for locating roads, constructing low buildings, recreation and off-road trafficability. Unsuited for commercial forestry. Fair to unsuitable for domestic livestock grazing; good for caribou.
Yellow Creek Block	EF1, IA13, IQ2, IA3	Exceptionally high quality of habitat for a large variety of wildlife. Unsuitable for livestock grazing; moderate to very severe drawbacks for locating roads, constructing low buildings, slight to very severe drawbacks for recreation and off-road trafficability. Unsuited for commercial forestry. Some areas suitable for crops.
Goodnews Block	IU1, IU2, IU3, IQ6	Fair to unsuited for crops, poor to unsuited for grazing domestic cattle and sheep; moderate to very severe drawbacks for locating roads, constructing low buildings, recreation, and off-road trafficability. Generally unsuited for commercial forestry. Generally good for caribou.

b) Soils Overview

The soil resources within the planning area are generally considered pristine or unaltered by human activity, except in areas adjacent to villages and urban areas. This resource may be affected by natural forces such as wind and water erosion and from human activities such as road building and mining. A primary function of the Soil Resources Program is to evaluate proposed actions on jurisdictional Federal lands according to the National Environmental Policy Act. For all authorized activities in the area, required operating procedures and stipulations mitigate potential sources of soil degradation.

c) Permafrost

A dominant factor in defining soils is the presence or absence of permafrost. Permafrost is defined as soil, sand, grave, or bedrock that has remained below 32 degrees Fahrenheit for two or more years (Muller 1945). Intermittent throughout the planning area, permafrost can exist as massive ice wedges and lenses in poorly drained soils or as a relatively dry matrix in well-drained gravel or bedrock. During the short arctic summer, these soils thaw, forming a shallow unfrozen zone termed the active layer. Permafrost forms a confining barrier that prevents infiltration of surface water and keeps the active layer of soils saturated. Permafrost also provides the structural integrity to hillsides and stream channel banks. Map 3.6 shows the distribution of permafrost in the planning area.

As permafrost is an integral component of the soils in the planning area, any surface disturbance that removes the overlying vegetation can initiate melting of ice-rich permafrost and result in surface subsidence (termed thermokarsting), drastically altering the surface topography, hydrological regime, and temperature of the underlying soils. As permafrost begins to thaw near the surface, it warms to greater depths, forming thaw ponds, gullies, and beaded streams. The hydrologic and thermal regime of the soil is the primary factor controlling the vegetation. These changes to the thermal regime of the soil initiate a long process of recovery with perhaps 20 to 50 years of cumulative impacts (Hinzman et al. 2000).

Soils and glacial residues in the Bay planning area contain isolated masses of intermittent permafrost. In the Bristol Bay Coastal Plain, permafrost underlies nearly all areas except the southern part of the plain. It is deep or absent in sand dunes and natural levees along streams, except in the case where tall grasses and deep sod exist (USDA SCS 1979). The region is undergoing a warming and drying trend that probably has affected the locations and depth of permafrost as well as the seasonal freeze-up of surface soils. Because no in-depth soil surveys have been accomplished for BLM lands in the Bay planning area, it is not known how future activities, for example, attempts to build ice roads to haul equipment and gravel for carrying out oil and gas exploration activities, will affect vegetation and soils (Map 3.6).

d) Soils Demand Analysis and Forecast

Soil is an important resource in the proposed planning area, as it supports habitat important to the abundant wildlife present in the Bay planning area, promotes stream bank stability and habitat important to the myriad anadromous and freshwater fish that inhabit the region. Subsistence, commercial, and recreational uses of the land are all related directly or indirectly in some way to soil use.

At the present time, the activities that demand the most from the soil in the Bay planning area are subsistence and recreational in nature, particularly the use of all-terrain vehicles. Marked winter trails between villages have the potential to become summer four-wheeler trails. A trail from Kokhanok to Katmai National Preserve that crosses BLM lands, used by four-wheelers, has created some erosion problems. Another 4-wheeler trail has been created from a lodge on the Alagnak River in Katmai National Preserve to Sugarloaf Mountain, with access across BLM lands. It has not yet been investigated by BLM staff. A trail that follows the Goodnews River and crosses BLM lands should be monitored for its soil impacts.

Two types of soil degradation can occur with any human activity. The first is introduction of hazardous materials, e.g., a fuel spill. The second is other types of pollution, e.g., erosion and silting.

Currently there are no timber harvests occurring on BLM lands in the Bay planning area, and none are anticipated.

Soils have a role to play in wetlands, which are lands transitional between terrestrial and aquatic systems, and are generally described as lands where water saturation is the dominant factor in determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface (Cowardin 1979).

Soil resources have a role in the social and cultural aspects of rural Alaskans. The resource indirectly affects and is used for subsistence and personal use. In the past, a fine blue clay often found adjacent to the rivers in the planning area (i.e. upper Naknek River at Lake Camp) was used historically and prehistorically in the region to make bisque-fired pottery lamps and bowls (McClenahan 1994).

e) Critical Thresholds

Physical soil characteristics that may limit the degree to which reclamation may take place include sandy soils, clayey soils, soils with large coarse fragments, including glacial rubble, a shallow depth to parent material, soils with low organic matter content, and hydric soils with a shallow depth to groundwater (McClenahan 2006, Pers. Comm.).

4. Water Resources

BLM-managed lands within the Bay planning area contain many hydrologic features that contribute to the area's diverse water resources. Maps 3.1, 3.2, and 3.3 depict the major water bodies in the planning area. Major watersheds throughout the United States are assigned a name and an 8-digit hydrologic unit code (HUC). Nine major watersheds are incorporated within the boundary of the Bay planning area. These watersheds are the Naknek (19030204); Lake Clark (19030205); Upper Nushagak River (19030301); Mulchatna River (19030302); Lower Nushgak River (19030303); Wood River (19030304); Togiak (19030305); Lake Iliamna (19030306); and Kuskokwim Delta (19030502). These watersheds are composed of a complex network of streams, wetlands, and lakes that combine to support wildlife, plants, and a multitude of human activities.

The unencumbered BLM lands within the Bristol Bay region are dominated by four major watersheds: the Kvichak River, the Alagnak River, the Naknek River, and the Nushagak River drainages. The Kvichak River flows from Lake Iliamna to Kvichak Bay in a west-southwest direction. Major tributaries include the Alagnak River, Ole Creek, Levelock Creek, Ben Courtney Creek, and Kaskanak Creek (Map 1.1; Photos 3.1, 3.3, and 3.6).

The Alagnak River is located to the south of the Kvichak River, and drains into it just above Cape Horn, immediately before the Kvichak empties into Kvichak Bay. It originates from upland streams that feed into Kukaklek and Nonvianuk Lakes, located near the northwestern corner of Katmai National Park and Preserve.

The Nushagak River begins in the Nushagak Hills and flows generally southward to tidewater at the head of Nushagak Bay. The valley floor of the Nushagak River slopes in a southward direction and is dotted with hundreds of small lakes. Large tributaries of the Nushagak include the Nuyakuk, Wood, Snake, and Igushik rivers. Tides affect the Nushagak as far upstream as the Keefer Cutoff, approximately 43 miles above the mouth of the river, where the Iowithla River flows into the Nushagak on its west side. Tidal waters, though having maxima of only 19 and 21 feet, respectively, at Clarks Point and Dillingham, pile up in the narrow waterways of the lower parts of the Wood and Nushagak Rivers and raise the water levels

upstream several feet higher. The tidal currents are strong, the ebb being the stronger because of the current from the Nushagak and Wood Rivers (Mertie 1938). Other tributaries flowing into the Nushagak from the west include Koggiling Creek, Lower Klutuk Creek, the Mulchatna River, and Cranberry Creek. Tributaries entering the Nushagak from the east above the Iowithla include Koklong Creek, Upper Klutuk Creek, and Napatoli Creek.

The Naknek River is the Southeasternmost major river in the planning area. Its headwaters are in the western mountains of the Aleutian Range. It flows westward from Naknek Lake and empties into Bristol Bay. The communities of King Salmon, Naknek, and South Naknek are located on its banks. BLM lands in this vicinity are all either State- or Native-selected and are not expected to remain in Federal ownership.

Unencumbered BLM lands within the Goodnews region of the planning area are located within watersheds dominated by the mainstem, Middle Fork, and South Fork of the Goodnews River, Indian River, and Arolik River. Smaller flowing waterbodies include Jacksmith Creek and Cripple Creek.

The Middle Fork, South Fork, and mainstem of the Goodnews River begin in the Ahklun Mountains and flow in a southwesterly direction. These waterbodies converge near the village of Goodnews Bay before emptying into Kuskokwim Bay via Goodnews Bay. The mainstem of the Goodnews River begins within the Togiak Wilderness area and intersects various tributaries, including Wattamise Creek, Granite Creek, and Barnum Creek. The headwaters of the Middle Fork of the Goodnews River are located within the Togiak National Wildlife Refuge. The South Fork of the Goodnews River begins in the Togiak National Wildlife Refuge, intersects Tivyagak Creek, and is located predominately on unencumbered BLM land.

The Indian River drainage consists of Indian River and the North Fork and South Fork of Indian River. The North Fork of Indian River begins just east of Kiugtlugtulit Mountain and intersects Nautilis Creek before converging within the saltmarsh flatlands of the mainstem of the Indian River. The headwaters of the South Fork of the Indian River are located on the west end of Explorer Mountain. Each of these rivers flows east to west and empties into Kuskokwim Bay via Carter Bay.

The Arolik drainage consists of the East and South Fork of the Arolik River. The headwaters of the South Fork of Arolik River are located on the east side of Tatlignagpeke Mountain and flow north before intersecting the mainstem of the Arolik River within the Togiak National Wildlife Refuge. The East Fork of the Arolik River begins south of Chingekigtlik Mountain and flows northwest into Arolik Lake before converging with the South Fork, eventually emptying into Kuskokwim Bay, south of Quinhagak village.

Cripple Creek flows from its headwaters at Cot Mountain east to Kuskokwim Bay, a journey of approximately 30 miles almost entirely across unencumbered BLM land.

Jacksmith Creek begins on unencumbered BLM land at Mitlak Mountain, flows southwest before doglegging northwest across coastal saltmarshes into the Togiak National Wildlife Refuge, then into Kuskokwim Bay via Jacksmith Bay.

Subsistence, commercial, and recreational uses are all related in some way to water use. National Weather Service data suggest the variable annual precipitation amounts throughout the region range from 25-120 inches (Map 3.7). Generally, it is believed that the surface water in these watersheds is of good quality. There are no waterbodies on BLM-managed lands within the planning area that are classified as impaired by the State of Alaska (Clean Water Act, section 303d).

Minimal water quality information is available on most waterbodies in the planning area. Most preliminary water quality samples on BLM-managed lands were gathered in conjunction with fisheries, wildlife, and riparian studies in the Goodnews Bay and Bristol Bay areas. Water quality constituents for these studies included pH, total dissolved solids, total alkalinity, and temperature. Most of this data is unpublished except BLM Open File Report 107, which identifies variability in the total alkalinity of tundra ponds on

BLM-managed land n the Kvichak River area (Seppi, 2006). For all authorized activities in the area, adherence to State water quality standards is a minimally required stipulation of the authorization.

No streams are monitored for water quantity within the planning area by BLM. The USGS has established stations to conduct water quantity and quality monitoring within the planning area. Though some stations have been discontinued, other stations have been established. The USGS maintains information concerning historical and currently running stations[1]. The USGS has also collected information concerning ground water resources within the planning area, including the Lower Nushagak River, Lake Clark, and Kuskokwim Delta watersheds[1]. No ground water data has been collected on BLM-managed lands within the Bay planning area.

Current management practice under the Southwest Planning Area (SPA) Management Framework Plan (MFP), section W-2.1, for the Goodnews block only, identifies the need to "Perfect legal water rights to the water resources on public lands in support of Bureau programs, and in compliance with the Alaska Water Use Act" and to "Protect existing water rights of the U.S." Section W-3.1 of the SPA MFP advocates wetland and flooplain identification."

Water resources play a significant role in the social and cultural aspects of rural Alaskans' lives. The resource is used extensively for subsistence and personal use. Within the planning area, major programs that can generate point or non-point water quality problems are mineral development, recreation, forest management, hydroelectric development, and wildland fire.

a) Mineral Development

Table 3.2 shows active (pre-ANSCA) mining claims on BLM-managed lands within the planning area. Currently, there is only one active mining operation within the planning area. Hanson Industries maintains a block of mining claims near Platinum. This placer mine operation has used a bucket-line dredge since 1937 to extract mineral deposits along the Salmon River. After decades of mining, there have been considerable changes to the hydrological characteristics of the Salmon River basin. Tailings composed of porous gravel and cobble-sized material as high as 50 feet now occupy areas once filled with fine particulate material necessary to support proper river functions. During periods of low flow, the Salmon River becomes a discontinuous river in sections where the tailing porosity is too great to support the surface flow of the river. This discontinuity of river flow at times prevents access to anadromous fish spawning habitat. There are no active coal or oil and gas leases within the Bay planning area.

Table 3.2. Lode and Placer Properties on BLM-managed Land with Active Mining Claims and/or APMAs Located in the Bay Planning Area

Deposit name	ARDF/AMIS no.	Land status	Mining claims	APMA no. (2005)	Deposit type
GOODNEWS BAY/SNOW GULCH AREA					
Arolic River	GO036/101-016	Native-selected	State	A052798	Placer
ILIAMNA/KVICHAK AREA					
Iliamna Project, D block	None	BLM/State-selected	State		Lode
Iliamna Project, H block	None	BLM/State-selected	Federal & State		Lode
LSS	None	BLM/State-selected	State		Lode
PLATINUM AREA					
Salmon River	HG012/123-004	Native-selected	Federal	A055585	Placer

[1] Information pertaining to USGS surface and ground water data collection efforts can be found at: http://waterdata.usgs.gov/ak/nwis

b) Recreation

The primary regulated recreational activities in the planning area are guided hunting, sport fishing, and float trips. These activities have the potential to impact water resources. Though State of Alaska regulations (18 AAC 72.020 and AS 46.03.800-810) prohibit the disposal of human waste within close proximity of waterbodies, the public's dumping of garbage and human waste near rivers and streams and the effects such activities have on water quality were cause for concern during scoping. It is not known whether such activities occur near the rivers and streams that flow through unencumbered BLM lands in the planning area.

Recreation within the planning area covers a wide range of activities including OHV use, camping, raft and canoe float trips, and sightseeing. Many of these activities include shoreline use resulting in minor disturbance of vegetation, erosion and increased water turbidity. Should OHV use increase, the effects on water quality may become more widespread.

c) Fire Management

The potential for wildfire exists in areas of dense spruce forests. Wildland fires can greatly alter the hydrologic characteristics of stream basins, by removing the tree canopy, undergrowth, organic litter, shallow roots, and obstructions and by creating water-repellent soil conditions. As a result, severe flooding and fire-related erosion often follow fire damage, particularly when intense rain falls over small steep watersheds soon after a wildfire that has burned both the soil and canopy. The risk of fire-flood events drops considerably after only a few years as new vegetation is reestablished and the soil infiltration is increased by wetting, frost action, and animal activity.

Erosion from fire is further aggravated by the use of mechanized fire equipment on ice-rich, fine-grained, permafrost soil. Complete removal of all of the vegetation and organic material during fireline construction causes much deeper permafrost melting than occurs in adjacent burned areas. Runoff channels and deep gulleys frequently form, and siltation can result.

d) Forest Products

Currently, there are no timber harvests occurring on BLM lands in the planning area and none are anticipated.

5. Vegetation

This section describes the occurrence and current vegetation classes derived from satellite imagery within the planning area. Alaska Earth Cover Classification divides major vegetation types into categories derived from satellite imagery and verified by site visits to improve the accuracy of the categories. There are few detailed plant inventories for the planning area. Forestry and wildland fire management as they relate to vegetation are addressed in separate sections.

a) Alaska Earth Cover Classification

Vegetation on most of the BLM lands of the planning area was mapped on a broad scale using satellite imagery. Four joint USDI BLM/ FWS-Ducks Unlimited, Inc. projects: Kvichak Earth Cover Classification (2002), Goodnews Bay Earth Cover Classification (2003), Naknek Military Operations Area Earth Cover Classification (2001), and Iliamna Earth Cover Classification (1994) provide a baseline inventory of vegetative cover classifications. This mapping generalizes vegetation and therefore is best utilized for general land use planning and as a guide to areas for further analysis. More intensive studies have been done for limited areas, including the Goodnews Bay region and the Ahklun Mountains (Lipkin 1994,

Parker 2004), and the northwestern Alaska Peninsula (Batten and Parker 2004). Since the Earth Cover Classification covers most of the BLM lands covered in this plan, these classifications are used to define the vegetation within the plan boundaries.

The classification scheme consists of 10 major categories and 27 subcategories. A classification decision tree and written descriptions were developed in support of the classification. The classification was based primarily on Level III of the Viereck (and others) classification of 1992.

Classes that could not reliably be discerned from satellite imagery were merged into a more general class. Because of the importance of lichen for site characterization and wildlife forage, and because the presence of lichen can be detected by satellite imagery, shrub and forested classes with and without a component of lichen are distinguished.

A few classes from Level IV of the Viereck classification were mapped because of their identifiable satellite signature and their importance for wildlife management. These Level IV classes are tussock tundra, low shrub tussock tundra and low shrub willow/alder.

b) The Natural Vegetation Cover

Table 3.3 provides the Earth Cover Classes for vegetation for the areas that were covered in the planning area, and Table 3.4 gives the percentage of unencumbered BLM lands in the planning area in each land cover type. The vegetation in the Bay planning area is for the most part unimpacted by humans. Based on the studies cited above, the vegetation in the four vegetation study areas, Naknek, Kvichak, Iliamna, and Goodnews, comprises the following percentages of each general category (Maps 3.8 a-d, 3.9 a-d, 3.10 a-d, and 3.11 a-d).

Table 3.3. Earth Cover Classes for Vegetation in Portions of the Bay Planning Area

Vegetation Type	Needleleaf	Deciduous	Mixed	Tundra	Tussock/Wet Tundra
Study Region					
Naknek	21%	14%	5%	51%	3%
Kvichak	10%	14%	5%	40%	6%
Iliamna	2%	3%	1%	20%	47%

Table 3.4. Percentage of Planning Block in Major Land Cover Types Bay Planning Area Unencumbered BLM Lands

Planning Block	Forest	Clear Water	Grass/Forb	Riparian	Wetlands	Coastal Graminoid	Saltwater Estuary
Alagnak	19%	4%	32%	8%	33%	4%	0%
Goodnews	1%	5%	46%	22%	23%	3%	1%
Iliamna West	33%	7%	28%	14%	19%	0%	0%
Chulitna River	78%	1%	15%	3%	3%	0%	0%
Klutuk Creek**	15%	3%	47%	4%	32%	0%	0%
Koggiling Creek**	20%	10%	32%	8%	30%	0%	0%
Kvichak	20%	8%	35%	10%	26%	0%	0%
Yellow Creek	14%	10%	41%	5%	31%	0%	0%

**Portions of the western edges of these planning blocks were outside of the study area.

c) Wetlands, Herbaceous Tundra, and Forests in the Bay Planning Area

Land cover, together with data about food sources, water, shelter, and living space, is used by biologists to assess wildlife habitat. The existing classifications, discussed above, have been utilized to produce maps of wetlands (Maps 3.10a-d), grasslands (Maps 3.8a-d), forest landcover (Maps 3.9a-d), and lichens (Maps 3.11a-d). Exclusive of the Chulitna River block, between 19% and 33% of the land cover on BLM unencumbered lands in the planning area is wetland vegetation. Wetland vegetation decreases and forest vegetation increases in the planning blocks to the north and east in the Kvichak study area. Riparian vegetation is more prevalent in the Iliamna West block (14%) and the Goodnews block (22%).

d) Noxious and Invasive Plant Species in the Planning Area

The harmful effects of invasive non-native plants is a matter of some concern. In sufficient quantities invasive non-native plants can adversely affect forage, wilderness, wildlife habitat, visual quality, recreation opportunities, and land value. These plants are more prevalent near areas of human disturbance. It is BLM's responsibility to ensure that management actions do not increase the spread of invasive non-native plants. Prevention measures are considered where soil is disturbed on or adjacent to BLM-managed lands. One prevention measure is the use of weed free seed and mulch. Where practical, native species are used in any revegetation effort on BLM-managed lands.

e) Treatments

Vegetation manipulation by wildland fire, prescribed fire, or mechanical or manual treatments are forest management practices used to enhance sustained yield or reduce wildland fire risks.

6. Fish and Wildlife

a) Wildlife

BLM has responsibilities in the planning area for habitat management, and cooperatively manages habitat with the State of Alaska under a Master Memorandum of Understanding between the Alaska Department of Fish and Game and the Bureau of Land Management (1983) (Appendix G).

BLM manages wildlife habitat with an emphasis on habitat maintenance, enhancement and restoration.

Table 3.5 provides a list of mammal and amphibian species within the Bay planning area. Table 3.6 is a list of bird species known to occur in the Bay planning area, and Table 3.7 presents the variety of marine invertebrates that may be present in the coastal parts of the Bay planning area. Some of the mammals and many of the birds are migratory.

Table 3.5. Table of Amphibian and Mammal Species Present in the Bay Planning Area (ADF&G CPDB 2005, Foster 1991, Mountaineers 1994, Udvardy 1977, Whitaker 1980, Jacobsen 2004, USFWS 2005)

Common Name	Scientific Name	Common Name	Scientific Name
Amphibian		Wolverine	*Gulo gulo*
Wood Frog	*Rana sylvatica*	Masked Shrew	*Sorex cinereus*
Land Mammals		Dusky Shrew	*Sorex monticolus*
Large Land Mammals		Arctic Shrew	*Sorex arcticus*
Black Bear	*Ursus americanus*	Pygmy Shrew	*Microsorex boyi*
Brown Bear	*Ursus arctos*	Tundra Shrew	*Sorex tudrensis*
Caribou	*Rangifer tarandus*	Little Brown Bat	*Myotis lucifugus*
Moose	*Alces alces*	Hoary Marmot	*Marmota caligata*
Dall Sheep	*Ovis dalli*	Red Squirrel	*Tamiasciurus hudsonicus*
Small Land Mammals		Northern Red-Backed Vole	*Clethrionomys rutilus*
Beaver	*Castor Canadensis*	Meadow Vole	*Microtus pennsylvanicus*
Coyote	*Canis latrans*	Tundra Vole	*Microtus oeconomus*
Red Fox	*Vulpes vulpes*	Singing Vole	*Microtus gregalis*
Arctic Fox	*Alopex lagopus*	Brown Lemming	*Lemmus sibiricus*
Alaskan (Tundra) Hare	*Lepus othuss*	Northern Bog Lemming	*Synaptomys borealis*
Snowshoe Hare	*Lepus americanus*	Collared Lemming	*Dicrostonyx torquetus*
River Otter	*Lontra canadensis*	Meadow Jumping Mouse	*Zapus hudsonius*
Lynx	*Lynx canadensis*	**Marine Mammals**	
Marten	*Martes americana*	Northern Fur Seal	*Callortinus ursinus*
Mink	*Mustela vison*	Bearded Seal	*Erignathus barbatus*
Ermine	*Mustela erminea*	Harbor Seal	*Phoca vitulina*
Least Weasel	*Mustela rivalis*	Ringed Seal	*Phoca hispide*
Muskrat	*Ondatra zibethicus*	Ribbon Seal	*Phoca fasciata*
Porcupine	*Erethizon dorsatum*	Spotted Seal	*Phoca largha*
Parka Squirrel (Arctic Ground Squirrel)	*Spermophilus parryii*	Steller Sea Lion	*Eumetopias jubatus*
Wolf	*Canis lupus*	Walrus	*Odobenus rosmarus*
		Beluga Whale	*Delphinapterus leucas*

Table 3.6. Table of Resident, Migratory, Wintering, Rare* and Accidental Birds (ADF&G CPDB 2005, Foster 1991, Udvardy 1977, USFWS 2005

Common Name	Scientific Name	Common Name	Scientific Name
Red-throated Loon	*Gavia stellata*	Short-billed Dowitcher	*Limnodromus griseus*
Pacific Loon	*Gavia pacifica*	Long-billed Dowitcher	*Limnodromus scolopaceus*
Common Loon	*Gavia immer*	Wilson's Snipe	*Gallinago gallinago*
Yellow-billed Loon	*Gavia adamsii**	Red-necked Phalarope	*Phalaropus lobatus*
Horned Grebe	*Podiceps auritus*	Red Phalarope	*Phalaropus fulicaria**
Red-necked Grebe	*Podiceps grisegena*	Pomarine Jaeger	*Stercorarius pomarinus*
Double-crested Cormorant	*Phalacrocorax auritus*	Long-tailed Jaeger	*Stercorarius longicaudus*
Pleagic Cormorant	*Phalacrocorax pelagicus*	Bonaparte's Gull	*Larus piladelphia*
Red-faced Cormorant	*Phalacrocorax urile*	Mew Gull	*Larus canus*
Tundra Swan	*Cygnus columbianus*	Herring Gull	*Larus argentatus*
Trumpeter Swan	*Cygnus buccinator*	Glaucous Gull	*Larus huperbor*
Greater White-fronted Goose	*Anser albifrons*	Glaucous-winged Gull	*Larus glaucescens*
Snow Goose	*Chen caerulescens*	Slaty-backed Gull	*Larus schistisagus*
Emperor Goose	*Philacte canagica*	Black-legged Kittiwake	*Rissa tridactyla*

Common Name	Scientific Name	Common Name	Scientific Name
Cackling Goose	*Branta canadensis minima*	Sabine's Gull	*Xema sabini*
Brant	*Branta bemicia*	Arctic Tern	*Stema paradisaea*
Mallard	*Anas platyrhyncos*	Aleutian Tern	*Stema aleutica*
Gadwell	*Anas strepera*	Common Murre	*Uria aalge*
Green-winged Teal	*Anas crecca*	Thick-billed Murre	*Uria lomvia*
Baikal Teal	*Anas formosa**	Pigeon Guillemot	*Cepphus colomba*
American Wigeon	*Anas americana*	Marbeled Murrelet	*Brachyramphus marmoratus*
Eurasian Wigeon	*Anas Penelope**	Parakeet Auklet	*Aethia psittacula*
Northern Pintail	*Anas acuta*	Kittlitz's Murrelet	*Brachyramphus brevirostris*
Blue-winged Teal	*Anas discors**	Horned Puffin	*Fratercula comiculata*
Garganey	*Anas querquedula**	Tufted Puffin	*Fratercula cirrhata*
Canvasback	*Aythya valisineria*	Short-eared Owl	*Asio flammeus*
Redhead	*Aythya Americana*	Great Horned Owl	*Bubo virginianus*
Ring-necked Duck	*Aythya collaris**	Snowy Owl	*Bubo scandiaca*
Tufted Duck	*Aythya fuligula**	Northern Saw-whet Owl	*Aegolius acadicus**
Greater Scaup	*Aythya marlia*	Northern Hawk Owl	*Sumia ulula*
Lesser Scaup	*Aythya afffinis*	Boreal Owl	*Aegolius funereus*
Common Eider	*Somateria mollissima*	Belted Kingfisher	*Ceryle alcon*
King Eider	*Somateria spectabilis*	Northern Flicker	*Colaptes auratus*
Spectacled Eider	*Somateria fischeri*	Downy Woodpecker	*Picoides pubescens*
Steller's Eider	*Polysticta stelleri*	Hairy Woodpecker	*Picoides villosus*
Black Scoter	*Melanitta nigra*	American Three-toed Woodpecker	*Picoides dorsalis*
White-winged Scoter	*Melanitta deglandi*	Black-backed woodpecker	*Picoides arcticus*
Surf Scoter	*Melanitta perspicillata*	Olive-sided Flycatcher	*Contopus cooperi*
Harlequin	*Histrionicus histrionicus*	Alder Flycatcher	*Empidonax alnorum*
Long-tailed Duck	*Clangula hyemalis*	Say's Phoebe	*Sayomis saya*
Barrow's Goldeneye	*Bucephala islandica*	Northern Shrike	*Lanius excubitor*
Common Goldeneye	*Bucephala clangula*	Gray Jay	*Perisoreus canadensis*
Bufflehead	*Bucephala albeola*	Black-billed Magpie	*Pica hudsonia*
Common Merganzer	*Mergus merganser*	Common Raven	*Corvus corax*
Red-breasted Merganzer	*Mergus merganser*	Horned Lark	*Eremophilla alpestris*
Osprey	*Pandion haliaetus*	Tree Swallow	*Tachycineta bicolor*
Northern Harrier	*Circus cyaneus*	Violet-green Swallow	*Tachycineta thalassina*
Golden Eagle	*Aquila chrysaetos*	Bank Swallow	*Riperia riparia*
Bald Eagle	*Haliaeetus leucocephalus*	Cliff Swallow	*Petrochelidon pyrrhonota*
Sharp-shinned Hawk	*Accipiter striatus*	Black-capped Chickadee	*Poecile hudsonica*
Northern Goshawk	*Accipiter laingi*	Boreal Chickadee	*Parus hudsonica*
Red-tailed Hawk	*Buteo jamaicensis*	Red-breasted Nuthatch	*Sitta canadensis*
Rough-legged Hawk	*Buteo lagopus*	Brown Creeper	*Certhia Americana*
American Kestrel	*Falco sparverius*	Winter Wren	*Troglodytes troglodytes*
Merlin	*Falco columbarus*	American Dipper	*Cinclus mexicanus*
Perigrine Falcon	*Falco peregrinus*	Golden-crowned Kinglet	*Regulus saatrapa*
Gyrfalcon	*Falco rusticolus*	Ruby-crowned Kinglet	*Regulus calendula*
Spruce Grouse	*Falcipennis canadensis*	Arctic Warbler	*Phylloscopus borealis**
White-tailed Ptarmigan	*Lagopus leucura*	Northern Wheatear	*Oenanthe oenanthe*
Rock Ptarmigan	*Lagopus muta*	Gray-cheeked Thrush	*Catharus minimus*
Willow Ptarmigan	*Lagopus lagopus*	Swainson's Thrush	*Catharus ustulatus*
Lesser Sandhill crane	*Grus canadensis*	Hermit Thrush	*Catharus guttatus*
Black-bellied Plover	*Pluvialis squatarole*	Varied Thrush	*Ixoreus naevius*

Common Name	Scientific Name	Common Name	Scientific Name
American Golden Plover	*Pluvialis dominica*	American Robin	*Turdus migratorius*
Pacific Golden Plover	*Pluvialis fulve*	Eastern Yellow Wagtail	*Motacilla flava tschutschensis*
Semipalmated Plover	*Charadrius semipalmatus*	American Pipit	*Anthusrubescens*
Lesser Sand Plover (Mongolian Plover)	*Charadrius mongolus**	Bohemian Waxwing	*Bombycillagarrulus*
Black Oystercatcher	*Haematopus bachmani*	Orange-crowned Warbler	*Vermivora celata*
Greater Yellowlegs	*Tringa melanoleuce*	Yellow-rumped Warbler	*Dendroica coronata*
Lesser Yellowlegs	*Tringa flavipes*	Townsend's Warbler	*Dendroica townesndi*
Wandering Tattler	*Heteroscelus incanus*	Blackpoll Warbler	*Dendroica striata*
Solitary Sandpiper	*Tringa solitaria*	Yellow Warbler	*Dendroica petechia*
Spotted Sandpiper	*Actitis macularius*	Wilson's Warbler	*Wilsonis pusilla*
Whimbrel	*Numenius phaeopus*	Northern Waterthrush	*Seiurus noveboracensis*
Bristle-thighed Curlew	*Numenius tahitiensis*	American Tree Sparrow	*Spizella arborea*
Black-tailed Godwit	*Limosa lapponica*	Fox Sparrow	*Passerella iliaca*
Hudsonian Godwit	*Limosa haemastica*	Savannah Sparrow	*Passerculus sandwicensis*
Black Turnstone	*Arenaria melanocephala*	Lincoln's Sparrow	*Melospiza lincolnii*
Ruddy Turnstone	*Arenaria interpres*	Song Sparrow	*Melospiza melodia*
Surfbird	*Aphriza virgata*	White-crowned Sparrow	*Zonotrichia leucophrys*
Rock Sandpiper	*Calidris ptilocnemis*	Golden-crowned Sparrow	*Zonotrichia atricapilla*
Red Knot	*Calidris canutus**	Slate-colored Junco	*Junco hyemalis*
Sanderling	*Calidris alba**	Lapland Longspur	*Calcarius lapponicus*
Dunlin	*Calidris alpine*	Snow Bunting	*Plectrophenax nivalis*
Semipalmated Sandpiper	*Calidris pusilla*	McKay's Bunting	*Plectrophenax hyperboreus**
Western Sandpiper	*Calidris pusilla*	Rusty Blackbird	*Euphagus carolinus*
Least Sandpiper	*Calidris minutilla*	Red Crossbill	*Loxia curvirostra*
Baird's Sandpiper	*Calidris bairdii**	White-winged Crossbill	*Loxia leucoptera*
Long-toed Stint	*Calidris subminuta**	Pine Grosbeak	*Pinicola enucleator*
Red-necked Stint	*Calidris ruficollis**	Pine Siskin	*Carduelis pinus*
Pectoral Sandpiper	*Calidris melanotos**	Gray-crowned Rosy Finch	*Leucosticte tephrocotis*
Sharp-tailed Sandpiper	*Calidris acuminate**	Common Redpoll	*Carduelis flammea*
Buff-breasted Sandpiper	*Tryngites subruficollis**	Hoary Redpoll	*Carduelis homemanni*

Table 3.7. Table of Marine Invertebrate Species of Subsistence or Recreational Interest Present at Coastal Locations Potentially Present in the Bay Planning Area (ADF&G CPDB 2005, Mountaineers 1994, Foster 1991)

Common Name	Scientific Name	Common Name	Scientific Name
Nutclams	*Nucula tenuis*		*Clinocardium californiense*
	Nuculana minuta		*Serripes groenlandickus*
	Nuculana permula	Gapers and Surfclams	*Mactromeris polynyma*
	Nuculana radiate	Razor Clams	*Siliqua alta*
	Nuclana fossa	Tellins and Macomas	*Tellina modesta*
Yoldias	*Yoldia scissurate*		*Tellina lutea*
	Yoldia myalis		*Macoma calcarea*
Mussels	*Mytilus edulis*		*Macoma oblique*
	Musculus discors		*Macoma middendorffi*
	Musculus corrugatus		*Macoma moesta*
	Musculus olivaceous		*Macoma lama*
	Musculus niger		*Macoma inquinata*
	Modiolus modiolus		*Macoma balthica*
Scallops	*Patinopecten caurinus*	Venus Clams	*Liocyma fluctuosa*
	Chalmys rubida	Butter Clams	*Saxidomus giganteus*
Jingles	*Pododesmus macroschisma*	Turtons	*Turtona minuta*
Axinopsids	*Axinopsida serricata*	Softshells	*Mya arenaria*
Diplodons	*Diplodonta aleutica*		*Mya pseudoarenaria*
Kelllyclams	*Kellia suborbicularis*		*Mya truncate*
Mysellas and Montacutids	*Boreacola vadosus*	Hiatellas and Roughmyas	*Cyrtodaria kurriana*
	Mysella tumida		*Hiatella arctica*
	Pseudopythina compressa		*Panomya priapus*
Carditas	*Crassicardia crassidens*		*Panomya ample*
	Cyclocardia ovata		*Panomya arctica*
	Cyclocardia crebricostatta	Piddocks	*Zirfaea pilsbryi*
Astartes	*Astarte esquimalti*		*Penitella penita*
	Astarte alaskensis	Shipworms	*Bankia setacea*
	Astarte borealis	Thracias	*Thracia myopsis*
	Astarte montagui	Lyonsias	*Lyonsia arenosa*
Cockles	*Clinocardium ciliatum*	Pandoras	*Pandora glacialis*
	Clinocardium nuttalli		

Two National Wildlife Refuges, two National Parks and Preserves, four NPS-administered Wild and Scenic Rivers, three State parks and special habitat management areas and two Western Hemispheric Shorebird Reserve Network (WHSRN) special management habitat areas are present in the planning area.

The Bristol Bay region is dominated by four major watersheds, the Kvichak River, the Alagnak River, the Naknek River, and the Nushagak River drainages. The Kvichak River flows from Lake Iliamna to Kvichak Bay in a west-southwest direction. Major tributaries include the Alagnak River, Ole Creek, Levelock Creek, Ben Courtney Creek, and Kaskanak Creek (Map 1.1, Photos 3.1, 3.3, and 3.6).

The Alagnak River is located to the south of the Kvichak River, and drains into it just above Cape Horn and immediately before the Kvichak empties into Kvichak Bay. The Alagnak is a designated Wild River by Title VI, Section 601(25) and 603(44) of ANILCA, which preserves the upper 56 miles of the river in a free-flowing condition. It is administered by the National Park Service. It originates from upland streams that feed into Kukaklek and Nonvianuk Lakes, located near the northwestern corner of Katmai National Park and Preserve.

The Nushagak River begins in the Nushagak Hills and flows generally southward to tidewater at the head of Nushagak Bay. The valley floor of the Nushagak River is an abandoned flood plain sloping southward

and is dotted with hundreds of small lakes. Large tributaries of the Nushagak include the Nuyakuk, Wood, Snake, and Igushik rivers. The mouth of the Nushagak River is directly east of Dillingham and just south of the mouth of the Wood River. The river maintains a continuous downstream current at Black Point, about 20 miles to the southeast. Tides affect the Nushagak as far upstream as the Keefer Cutoff, approximately 43 miles above the mouth of the river, where the Lowithla River flows into the Nushagak on its west side. Tidal waters, though having maxima of only 19 feet at Clarks Point and 21 feet at Dillingham, pile up in the narrow waterways of the lower parts of the Wood and Nushagak Rivers and raise the water levels upstream several feet. The tidal currents are strong, the ebb being the stronger because of the current from the Nushagak and Wood Rivers (Mertie 1938).

The Nushagak is navigable at an average stage of water for small boats for more than 250 miles upstream (Mertie 1938). Other tributaries flowing into the Nushagak from the west include Koggiling Creek, Lower Klutuk Creek, the Mulchatna River, and Cranberry Creek. Tributaries entering the Nushagak from the east above the Lowithla include Koklong Creek, Upper Klutuk Creek, and Napatoli Creek.

The Naknek River is the Southeasternmost major river in the Bay planning area. Its headwaters are in the western mountains of the Aleutian Range. It flows westward from Naknek Lake and empties into Bristol Bay. The communities of King Salmon, Naknek, and South Naknek are located on its banks. BLM lands in this vicinity are all either State- or Native-selected and are not expected to remain in Federal ownership.

The blocks of unencumbered BLM land in the Bristol Bay region can be found in Game Management Units (GMUs) 9(B), 9(C), 17(B) and 17(C). Uniform Coding Units (UCUs) are smaller units within GMUs (Maps 3.12 a, b, and c).

GMU 9(B) is located just west of Lake Iliamna, and is 2,004,000 mi^2. It is dominated by the Kvichak River and its tributaries, which crosses BLM lands. Thousands of large and small shallow lakes and ponds dot the landscape and provide riparian habitat and summer water-dependent vegetative habitat. BLM lands in this GMU are nearest to the communities of Port Alsworth, Nondalton, Pedro Bay, Iliamna, Newhalen, Kokhanok, Igiugig, and Levelock.

A portion of GMU 9(C) is in the Bay planning area. In its entirety, 9(C) is 818,000 mi^2. BLM lands in this GMU are located adjacent to the Alagnak Wild River on the south side of the river. To the east, elevations rise to as much as 2,085 feet at Sugarloaf Mountain. BLM lands in the area are drained by a large number of small streams that empty into the Alagnak River, and the entire area is dotted by numerous large and small lakes. Vegetation is predominantly wet tundra. The Southern most extent of BLM lands crosses into the Naknek River drainage at the headwaters of deciduous brush-lined Pauls Creek. GMU 9(C) includes the communities of Naknek, King Salmon, and South Naknek.

GMU 17(B) is drained by the Nushagak and Mulchatna rivers, their tributaries, lakes and ponds. BLM lands in this GMU are in the southcentral portion of the unit near the community of Koliganek. This area is part of the extensive glacially defined Bristol Bay Plain. BLM lands sit at elevations of from 200 to 600 feet, and are drained primarily by Klutuk Creek and other streams that empty into the Nushagak River. The rolling terrain has many kettle lakes, and is covered with wet tundra.

GMU 17(C) is contiguous to 17(B), extending southward and westward. BLM lands are located in the middle and lower Nushagak river drainage and its tributaries, nearest the communities of Koliganek, New Stuyahok, Ekwok, and Portage Creek. At a slightly greater distance, but still within their subsistence use areas, are the communities of Ekuk, Clarks Point, Dillingham, Aleknagik, and Manokotak. Many small lakes and ponds dominate the landscape in this region that is a continuation of the Bristol Bay Plain. To the north, north of the Lowithla River, are the Muklung Hills. North of Dillingham and Aleknagik are the headwaters of the Wood River and the Wood-Tikchik lakes.

b) The Role of Fish and Wildlife Habitats in the Bay Planning Area

Salmon is the single most important subsistence food in the diet of planning area residents. Residents are dependant upon a mixed subsistence-cash based economy based largely on traditional subsistence hunting and fishing and commercial fishing (ADF&G 2005a) (Maps 3.13 a, b, c, and d). Alaska's 2005 commercial exports to other countries were led by Alaskan seafood at 53% of the state's total exports. Southwest Alaska is home to the most productive and well-managed fisheries in the world (SWAMC 2005). In a recent 5-year average of salmon harvests of selected Alaska commercial salmon fisheries, Bristol Bay, the Alaska Peninsula and the Aleutian Islands ranked a close second to Southeast Alaska and Yakutat. During this period, Bristol Bay, the Alaska Peninsula, and the Aleutian Islands brought in 153,057,263 pounds of salmon worth $69,765,000, or 30% of the total value of the state fishery (Woodby et al. 2005).

The Bristol Bay commercial salmon district provided a harvest of approximately 26 million salmon in 2005, at a value of over $93,000,000. The 1985-2004 average sockeye salmon harvest for the Naknek-Kvichak district was 7,800,000 fish, or approximately 33% of the total sockeye take in all of the Bristol Bay districts, and the average sockeye salmon harvest for the Nushagak district for the same time period was 4,000,000 fish or 17% of the total. The 2005 Naknek-Kvichak district harvest was slightly less than average at 6,700,000 sockeye, and the Nushagak district harvest was more at 7,100,000 sockeye (ADF&G 2005c).

In addition to subsistence and commercial use of fish in the region, in 2004 there were 140 registered freshwater fishing guides on Bristol Bay freshwater streams and lakes (ADF&G 2004). Recreational angler effort in this region has risen steadily from 1977 to the present. In 1995, angler effort in the South West Management Area was 4.6% of the total angling effort in Alaska (Minard et al. 1998). Sockeye, Chinook and coho salmon are the most frequently harvested species, followed by Dolly Varden/Arctic char, rainbow trout, and Arctic grayling. Recreational fisheries in Southwest Alaska provide the angler with a unique combination of high quality salmon and rainbow trout fishing in a pristine wild and roadless setting. In 1997 the sport fishery was valued at over $50,000,000 (Minard et al. 1998).

The State's Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes – Southwestern Region lists many of the streams and rivers that cross BLM lands in the Bay planning area (Johnson et al. 2004). Fish require healthy watersheds and BLM lands in Bristol Bay contain important fish spawning and rearing habitat.

In addition to their commercial value, anadromous fish bring back deposit nutrients in the terrestrial environment. Salmon are a keystone species in vertebrate communities (Willson and Halupka 1995). Salmon feeding in the ocean put on approximately 90% of their body weight there, incorporating and accumulating nutrients from the marine environment in their body tissues (Finney et al. 2000). A massive movement of marine-derived nutrients then occurs from ocean to freshwater and terrestrial ecosystems via their migrations (Levy 1997). After spawning, salmon die and their carcasses fertilize the freshwater systems with marine-derived nutrients which are important nutrient sources for riparian vegetation and terrestrial fauna such as bears, wolves, birds, and small mammals (Juday et al. 1932; Willson et al. 1998; Cederholm et al. 1999). "Anadromous salmon provide a rich, seasonal food resource that affects the ecology of terrestrial and aquatic consumers, and indirectly affects the entire food-web that knits the water and land together" (Cederholm et al. 2000).

Caribou are second in importance only to salmon in the subsistence diet of residents of the planning area (ADF&G 2005a). They are also important to hunters from other regions of Alaska and to guided and unguided hunters from outside of Alaska. According to ADF&G Harvest records for caribou from 1983-2002, Game Management Units (GMUs) 9 and 17 provided approximately 25% of all caribou harvested in the state. This is an impressive number for a largely roadless area. BLM lands in the planning area provide prime caribou habitat and comprise a small but vital portion of these GMUs (Map 3.14).

In recent decades, the Bristol Bay region has witnessed both a rise and fall in the size of the Mulchatna Caribou Herd (MCH). The region, including BLM lands, provides winter range and calving aggregation and post-calving aggregation habitats for caribou (Hinkes et al. 2005).

The most significant wintering area for the MCH during the 1980s and early 1990s was along the west side of Iliamna Lake north and west of the Kvichak River, including BLM lands. More recently, the MCH has wintered in scattered clusters throughout an expanded range due to overgrazing of its traditional winter range areas (Woolington 2003a).

Since 1993, the MCH has shifted its core calving grounds to an area near BLM lands on the upper Nushagak and Mulchatna Rivers (Hinkes et al. 2005; Woolington 2003a. The herd does not move in a mass nor are its seasonal locations predictable. Biologists have however noted a recent trend in herd movement. Most of the herd moves to the western side of its range during the fall, back to the middle part of its range for calving and into the upper Mulchatna River drainage for post-calving aggregations. The herd is widely dispersed throughout its range in late summer. In the fall it forms into large groups and moves westward (Woolington 2003a). Study of the MCH distribution map in relation to BLM lands places the MCH squarely (but not exclusively) on BLM lands in the western Iliamna-Kvichak-Nushagak-Mulchatna watersheds for much if not all of the year (Hinkes et al. 2005) (Maps 3.14 and 3.15).

Moose run a close third in importance in the subsistence diet of Bay planning area residents. They are relative newcomers to the region and have yet to populate all available habitat (ADF&G 2005a). ADF&G harvest records for 1983 - 2002 indicate that Game Management Units 9 and 17 provided 7% of the total moose harvest in Alaska (ADF&G 2004). Moose hunting in this region by hunters from outside of Alaska provides an exceptional setting for those seeking a remote fly-in or boat-in experience and a trophy harvest. The entire Kvichak-Iliamna-Alagnak BLM land block is important moose habitat. Although many riparian areas along rivers and streams lie outside BLM lands, BLM lands in this block provide winter, calving and breeding habitat and yearlong migration routes to and from seasonal ranges (Maps 3.16 and 3.17).

Moose are dependant upon riparian and wetland vegetation. During fall and winter, moose eat large quantities of willow, birch, and aspen twigs. In spring moose take advantage of sedges, horsetail, pond weeds, and grasses. During summer they rely on vegetation in shallow ponds, eating forbs, and birch, willow and aspen leaves (Rausch and Gasaway 1994) (Maps 3.16 and 3.17).

Brown bears are found throughout the planning area, and are sought after by trophy hunters and occasionally by subsistence hunters (Map 3.18). Game Management Units 9 and 17 together produced 25% of the state's brown bear harvest (ADF&G 2004). Out-of-state brown bear hunters seek a remote hunting experience and a trophy harvest (Map 3.18).

Records of the numbers of caribou, moose, and brown bears taken specifically on BLM-managed lands from year to year are not kept. Patterns of use for humans and animals shift over time. Examples of such shifts in the planning area include the long-term changes in range use by the Mulchatna Caribou Herd. Alaska Department of Fish and Game Community Profile Database and Harvest Records (ADF&G 2004b) are the primary source for the following discussion. Information about General Management Units and Uniform Coding Units have been included as a means to orient the reader to the location of the discussion within the planning block(s) and to link the information to its source.

c) Wildlife and Wildlife Habitat Relative to Specific Unencumbered BLM Lands in the Bay Planning Area

(1) Iliamna Block (6 blocks) (Portions of GMU 9(B); UCUs 0202, 0203, 0301, 0303, 0701)(Portion of GMU 9(C); UCU 0701)(Map 3.2).

The Iliamna area is mountainous terrain which includes glaciers and ice fields of the Neacola, Aleutian, and Chigmit Mountains to the northeast of Iliamna Lake, with alpine tundra giving way as elevation decreases to dense tall willow and alder shrub thickets, coniferous and mixed conifer/deciduous forested glacially carved river valleys and rounded bedrock hills. Large, deep glacially carved lakes are scattered throughout the glacier scoured bedrock hills. Iliamna Lake and Lake Clark are examples of the very large glacially carved lakes that dominate the region.

The BLM lands that lie west and south of the communities of Iliamna, Iguigig and Kokhanok are dominated by terminal moraines that reflect the succession of major glacial periods since the early Pleistocene (Biekman 1980). The youngest of these moraine features occurs in a wide arc within 20-25 miles of the lower portions of Iliamna Lake and is a terrace of repeating small broken terminal moraines deposited as the last glaciers receded (Biekman 1980). Conifer timber consisting of black spruce in bogs with hundreds of lakes and associated narrow riparian shorelines, patchy deciduous forest on well-drained sites and wet tundra wetlands dominate the habitats found here (BLM 1994). This moraine is drained by Kaskanak, Ole, and Ben Courtney Creeks, all of which flow into the Kvichak River that is the outlet of Iliamna Lake (Photos 3.1 and 3.2). South of the Iliamna block, the Alagnak River, locally known as the Branch River, flows around the southern boundary of this most recent moraine complex (Photo 1.1). This morainal area is a transition zone between the habitats of tundra and trumpeter swan population distributions. Trumpeter swans are a Special Status Species.

The substantial salmon fishery resources in this area and the large lakes provide for high densities of brown bear. Bears can be found everywhere in the planning area, predictably near the most abundant resources available at the time. In spring, caribou and moose calves attract them, and in summer they congregate on salmon streams, following the salmon upriver into tributary streams. They are opportunistic omnivores and they range widely.

Photo 3.1. Kaskanak Creek, Northwest Iliamna Block, View North

Photo 3.2. Tundra Lake on BLM Lands West of Lake Iliamna. There is a brown bear on the shoreline and a moose in the pond. The bear has been tracking the moose – note the wake in the pond.

Photo 3.3. Ole Creek, Southwest Iliamna Block

Kaskanak Creek crosses and provides drainage for BLM-managed lands (Photo 3.1). BLM blocks of land are dotted with thousands of large and small shallow lakes and ponds that provide moisture for riparian habitat, summer water-dependent vegetative habitat, and tundra (Map 3.2).

Residents of the communities of Pedro Bay, Port Alsworth, Aleknagik, Dillingham, Ekwok, Igiugig, Iliamna, Kokhanok, Levelock, Manokotak, Nondalton, and New Stuyahok use BLM lands in the Iliamna Block for a wide variety of subsistence hunting and gathering activities during their yearly round of seasonal activities (Wright et al. 1985; Morris 1983, 1985, 1986; Endter-Wada and Levine 1992; Fall et al. 1986; Chythlook and Fall 1988; Schichnes and Chythlook 1985; ADF&G 2004b) (Appendix D).

- Nondalton (Iliamna East) – trapping, hunting black bear, moose, and caribou
- Pedro Bay (Iliamna East) – hunting brown bear, moose, and sheep
- Port Alsworth (Iliamna East) – gathering berries, hunting moose, caribou, black bear, waterfowl
- Iliamna (Iliamna East and West) – hunting caribou, moose, waterfowl, and trapping
- Igiugig (Iliamna East) – hunting moose, caribou, waterfowl, and trapping

In Game Management Unit 9(B), UCUs 0202 and 0203 include two large blocks of unencumbered BLM land located immediately west of Lake Iliamna. Except for one, the BLM Special Use Permit holders in this area have operations on either Native-selected or State-selected BLM lands in the Lake Iliamna area (Map 3.2 and Photo 3.4).

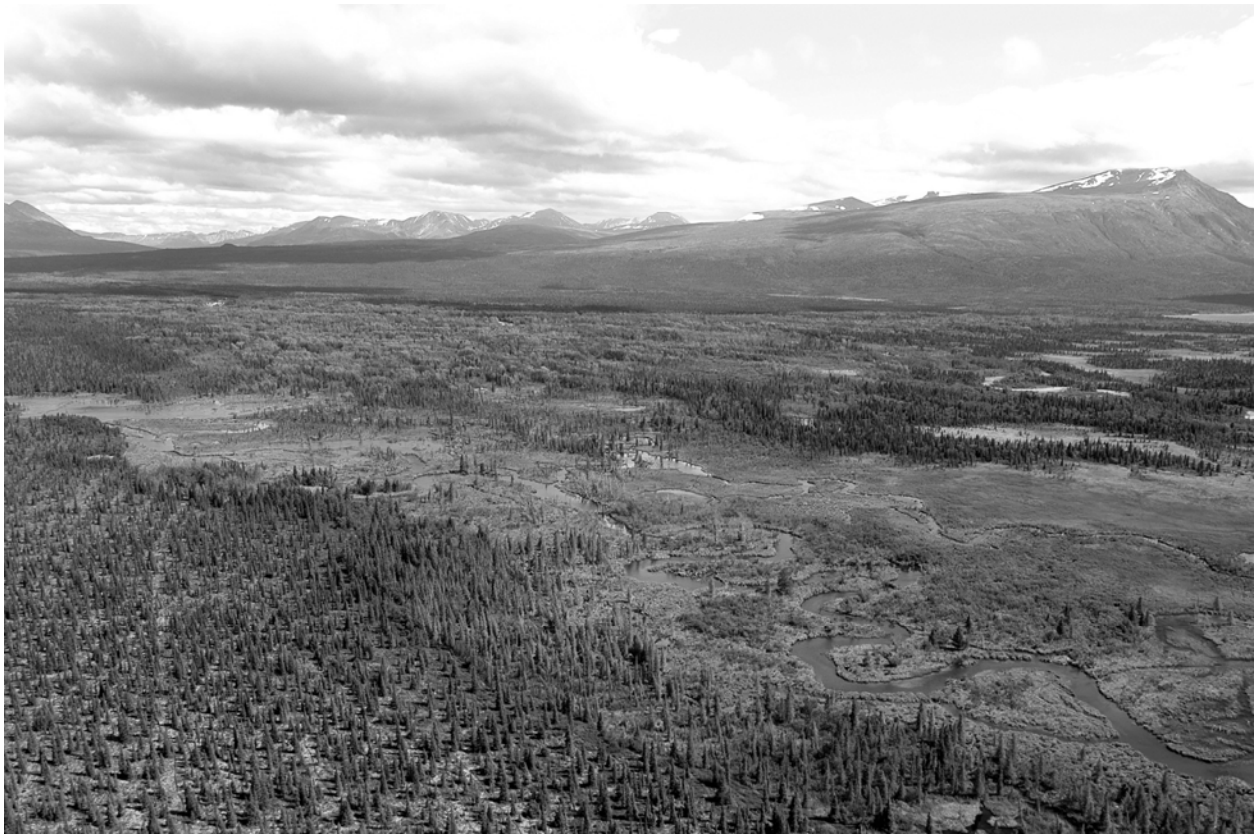


Photo 3.4. Chekok Creek, View North East. BLM lands in the background are in GMU 9(B) UCU 0303.

A smaller block of unencumbered BLM land is located in Iliamna East in UCU 0303, on the northeast side of Lake Iliamna on Chekok Creek (Map 3.2). UCU 0303 comprises only 206 mi², of which 10% is BLM unencumbered lands, located in the Chekok Creek drainage (Map 3.4). One of six Special Use Permit guides maintains a camp on unencumbered BLM lands in this UCU, which is accessed by aircraft for

hunting caribou, moose, and brown bear. However, there is also some use of boats for hunting brown bear. Six percent of all brown bears harvested in GMU 9(B) during the reporting period 1983 – 2002 were harvested in UCU 0303. The majority of them were taken by hunters from outside of Alaska. This region is known for trophy bear hunting opportunities. Subsistence hunting for brown bear in this region does not usually take place every year, but is more likely to occur once every several years. The only GMU 9(B) community recorded as having hunted brown bear in this UCU is Iliamna.

These three UCUs were second in importance for moose harvests in GMU 9(B) for the reporting period from 1983 - 2002. UCUs 0202 and 0203 vary in size from 463 mi² to 580 mi², and each is comprised of between 34% and 39% unencumbered BLM lands. Over half of the hunters have been from out of state in the southern UCU, and from outside of the region in Alaska for the northern UCU. Approximately 9% of moose hunters in these UCUs are local residents of the communities of Igiugig, Iliamna, King Salmon, Naknek, South Naknek and Pedro Bay. Moose harvest in this area was declining through 2002. Approximately ¾ of moose hunters access UCU 0202 by aircraft and ¼ by boat. Moose hunters access UCU 0203 primarily by boat, closely followed by fly-ins.

One or two out of state hunters have consistently hunted moose in East Iliamna. Alaskans from outside the region have also hunted moose in this area. Until 1999, residents of this GMU also hunted moose in the Chekok Creek area. The local moose hunters are residents of Iliamna and Port Alsworth. In addition, subsistence use area map data gathered in 1982 for Pedro Bay suggest that members of that community subsistence hunt Dall sheep on unencumbered BLM lands in the Chekok Creek drainage, along with moose and brown bear (Morris 1986). There are no ADF&G Harvest records further documenting sheep hunting in UCU 0303. However, the fact that Dall sheep have been hunted in this area by Pedro Bay residents was also reported to McClenahan by community members in the 1990s (McClenahan 2004, Pers. Comm.). Harvest records indicate that the Unit 9(B) communities of Iliamna, Nondalton, and Port Alsworth and the Unit 9(C) communities of King Salmon and Naknek hunt sheep in Unit 9(B). It is possible that these communities have also used UCU 0303 to hunt sheep in the past (Map 3.19).

The southern portion of the West Iliamna blocks were second in importance for caribou harvest between 1983 and 2002. Over half were taken by non-local Alaska residents. Over one-quarter were harvested in the southern portion of the block by local subsistence hunters from Igiugig, Kokhanok, King Salmon, Naknek, and South Naknek. Hunters from out of state hunted in the northern part of the block. There has been a general downward trend of caribou harvests in the northern portion since 2002. The overall trend for hunters from outside of this region hunting in the southern portion seems to be declining, while attempts by local subsistence users appeared to be increasing in the southern portion as of 2002. At the same time, the numbers of animals in the Northern Alaska Peninsula Caribou Herd nearest to the Unit 9(C) communities have been in serious decline, precluding much opportunity to hunt them. Caribou hunters hunt caribou in this area using aircraft, with some use of boats.

A small but significant part of the Southwestern most portion of the Iliamna blocks is within GMU 9(C) UCUs 0701 and 0703. This area is to the north of the Alagnak River drainage, and is discussed under the Alagnak Block.

A small isolated piece of unencumbered BLM land that makes up less than 2% of the 808 mi² UCU 0301 is located in the Northern most corner of the Iliamna Block at the Chulitna River (Map 3.2). Another small isolated piece of land is located south of Lake Iliamna near Gibralter Lake where it makes up less than 1% of 761 mi² UCU 0701 (Map 3.2). Due to their size they will not be detailed here.

(2) Alagnak Block (2 blocks) (portions of GMU 9(C) in UCUs 0701 and 0703) (Map 3.1)

The Alagnak Blocks of BLM lands lie in a strategic and picturesque region east of Kvichak Bay and south of the Alagnak River (Map 3.1). Residents of the communities of King Salmon, Naknek, South Naknek, Egegik, Levelock, and Kokhanok use BLM lands in this block for a wide variety of subsistence pursuits during their annual round of seasonal subsistence activities (Wright et al. 1985; Morris 1983; Wright et al. 1985; Krieg et al. 1996; Endter-Wada et al. 1982.; Schichnes and Chythlook 1985, 1989, and 1991; ADF&G 2004b) (Appendix D).

- Levelock – hunting caribou, moose, waterfowl, trapping, and gathering vegetation
- King Salmon – hunting moose and trapping
- Naknek – hunting moose and caribou and trapping
- South Naknek – hunting moose, caribou, and waterfowl and gathering vegetation

Hunters access these UCUs primarily by aircraft for moose, caribou, and brown bear hunting, except for caribou in UCU 0701, where snowmachines and four-wheelers are the principal modes of transportation. A small number of boats are used in both UCUs for moose hunting, and in UCU 0701 for brown bear hunting.

Photo 3.5. Coffee Creek

UCU 0701 is 598 mi², 50% BLM lands and is adjacent to the Alagnak River. UCU 0703 is 478 mi², contains 4% BLM lands, and is adjacent to the Alagnak River. This portion of GMU 9(C) has been a moderately productive area for moose during the reporting period from 1983–2002, particularly the Westernmost block. However, harvests have declined since peaks between 1990 and 1994. The majority of hunters trying to harvest moose in this portion of the block since 1990 have been subsistence users, residents primarily of the GMU 9(C) communities of King Salmon, Naknek, and South Naknek, but also several residents of the GMU 9(B) communities of Kokhanok, Igiugig and Levelock, the Unit 9(D) community of Cold Bay, and the Unit 9(E) community of Chignik. Subsistence hunters have been less consistent in their use of the eastern portion of area, but their efforts picked up between 1988 and 2002. There were four nonresident moose hunters per year attempting to harvest moose. There were one or two Alaska resident hunters from outside of the region attempting to harvest moose between 1999 and 2002.

Caribou harvests in the area of the western portion of this block were robust in 1992, 1993, and 1998. However, the numbers of caribou harvested in the area have been declining since the 1990s. The hunters most actively seeking to harvest caribou in this area are the Unit 9(C) residents of King Salmon and Naknek, followed by Alaska residents from other GMUs. Only since 1999 have hunters from outside of Alaska attempted to harvest caribou here, up to 15 per year in the eastern portion. Caribou hunting is on the decline.

Harvest of brown bears has been strongest in the eastern portion of the area, primarily by hunters from outside of Alaska, and harvest effort is increasing. Since 1997, the majority of hunters in the western portion of the area have been residents of GMUs 9(B) and 9(C), from the communities of Iliamna, Levelock, King Salmon, and Naknek. Subsistence hunters do not take bears every year, but may take a bear once every several years. Bear fat is greatly appreciated, particularly by the Elders, and is shared throughout a broad sharing network.

(3) Kvichak blocks (8 blocks) (portions of GMU 9(B) in UCU 0201, 0202 and 0203)(Map 3.1)

These smaller but very important blocks of BLM lands are in close proximity to the Kvichak River. Two pieces of land in this block are crossed by Ben Courtney Creek. The area consists of rolling tundra-covered hills and open spruce parklands, with wide floodplains vegetated with wet tundra, grasses, and deciduous brush (Maps 3.6 and 3.7).

The following Bay area communities use BLM lands in the Kvichak Block for several subsistence pursuits (Morris 1983; Endter-Wada and Levine 1992; Fall et al. 1986; Wolfe et al. 1984; ADF&G 2004b) (Appendix D).

- Iliamna – hunting moose and waterfowl, trapping, gathering vegetation
- Igiugig – trapping, hunting waterfowl, caribou, and moose
- Dillingham – hunting caribou and moose

Portions of the 554 mi² GMU 9(B) UCU 0201 are located in the Kvichak Blocks as well as the Yellow Creek Block of BLM land. The BLM blocks together comprise 32% of the UCU, with the Kvichak blocks being smaller than the Yellow Creek block. The two Kvichak blocks are located in the Southwestern portion of this UCU. A complete description of the moose harvest in this UCU is provided under the heading, “Yellow Creek Block,” and will not be repeated here. Bear Creek crosses the Southwesternmost piece of land in this block (Photo 1.3).

Photo 3.6. Confluence of Branches of Ben Courtney Creek

Photo 3.7. Headwaters of Ben Courtney Creek

Portions of UCU 0202 contain two blocks of BLM land in the Southeastern portion of the Kvichak Block. Since portions of UCU 0202 are also located in the Iliamna Block, the activities in this UCU will not be repeated here.

UCU 0203 contains the northernmost four small blocks within the Kvichak Block. Since a portion of the Iliamna Block is also within UCU 0203 and has already been discussed in that section, the reader is referred to the Iliamna Block discussion for details. Some of the more northerly Kvichak blocks are within the Kvichak River watershed and contain greater concentrations of riparian vegetation than the southern blocks. To the extent that moose are present in the area, they would be attracted to riparian vegetation. Moose hunters may frequent the area in search of game.

(4) Yellow Creek Block (one block of unencumbered land) (portions of GMU 9(B) in UCU 0201 and GMU 17(C) in UCUs 0901 and 0501)(Photo 3.8).

The Yellow Creek Block is located in a relatively flat, slightly elevated area of the Bristol Bay Plain between the Nushagak and Kvichak River drainages. The area is dominated by thousands of large and small kettle lakes and small drainages. Yellow Creek, one of the most prominent tributaries of the Kvichak River, drains the eastern portion of this piece of BLM land in a southeasterly direction (Map 3.8). In the western portion, the land is drained by Klutuk Creek and other small creeks that flow to the west and empty into the Nushagak River. Copses of spruce dot the landscape, which is dominated by wet tundra. The lakes and drainages support mixed deciduous growth (Photos 3.10 and 3.11).

Residents of the communities of New Stuyahok, Manokotak, Levelock, Kokhanok, Iliamna, Igiugig, Ekwok, Dillingham, and Platinum use the Yellow Creek Block of BLM lands to carry out a wide variety of subsistence activities. The following communities use the Yellow Creek Block for the following

subsistence purposes (Morris 1983; Schichnes and Chythlook 1991; Schichnes and Chythlook 1989; Wolfe et al 1987; Wright et al 1985; Fall et al. 1986; ADF&G 2004b) (Appendix D).

- Iliamna – trapping
- Aleknagik –hunting caribou
- Ekwok – hunting caribou and moose
- Dillingham – trapping and gathering wild vegetables
- Platinum – hunting caribou

Photo 3.8. Upper Yellow Creek, View North West

The Yellow Creek block is located in UCUs that are the most significant for harvesting moose of all the UCUs containing BLM blocks in the planning area. GMU 9(B) UCU 0201 is 554 mi² and includes 32% BLM land, GMU 17(C) UCU 0501 is 1,326 mi² and includes 26% unencumbered BLM land, and UCU 0901 is 505 mi² and is 40% BLM land. Yellow Creek block shares UCUs 0801 and 0901 with Klutuk Block.

Fifty-four percent of moose hunters in the northern part of the area were subsistence users, including residents from Igiugig and Levelock in GMU 9(B), and from King Salmon, Naknek, and South Naknek in GMU 9(C). Seventeen percent were non-local Alaska residents, and 27% were non-residents, making this area important for resident hunting for nearby villages, but also somewhat important for guided and non-guided hunting by hunters from outside of Alaska. Moose hunters access this area primarily by boat, with some use of aircraft.

From 1983 to 2002, 829 moose were harvested from UCU 0501. Hunting in the western portion of this area steadily increased during the reporting period from 1983 to 2002. From 1983 to 1989, between 9 and 20 moose were harvested annually; from 1990 to 1995 annual harvest numbers were between 13 and 46 animals. From 1996 to 2002, annual moose harvest numbers were between 34 and 105 animals, with the greatest numbers occurring in 2001 and 2002. Hunters from outside of Alaska have played a very small role in harvests in this area, and have made no effort since 1994. Residents of the GMU 17(C) communities of Aleknagik, Clarks Point, Dillingham, Ekwok, Manokotak, New Stuyahok, and Portage Creek were the principal harvesters. Other GMU 9 and 17 communities harvesting in this area are King Salmon, Koliganek, Naknek, Pilot Point, Port Moller, and Togiak. The remainder are Alaska residents from outside of the region. Moose, caribou, and brown bear hunters access this area with a mix of boats, snowmachines, and aircraft.

The northern area is also very important for the residents of GMU 17, who accounted for 74% of the hunters attempting to harvest moose, and for 78% of the moose harvested during the reporting period of 1983 to 2002. GMU 17(C) communities participating in the moose hunt included Dillingham, Clarks Point, Ekwok, and New Stuyahok; from GMU 17(B) the community of Koliganek, and from GMU 17(A) the community of Togiak. Hunters from outside of Alaska accounted for 6% of those hunting for moose in this area, and for 7% of the moose harvested during the reporting period. The remainder were Alaska residents from outside of the region. Moose harvests peaked in this UCU in the late 1990s and have been declining since. Moose hunters access this area using boats, snowmachines, and aircraft.

Caribou hunters in the western part of this unit were successful during the reporting period 1983 – 2002, but harvest numbers declined to 19 animals in 2002. Leading in harvest are the residents of the GMU 17(C) communities of Aleknagik, Clarks Point, Dillingham, Ekwok and Portage Creek. Other GMU 9, 17, and 18 communities harvesting in this area are Chevak, King Cove, and Koliganek. Hunters from outside of Alaska account for only 19% of the harvest for the reporting years. The northern portion of this planning block lies in an area where hunters have also been very successful. This portion and the equally promising western section are discussed in the "Klutuk Creek" section.

Only 15 brown bears were harvested in the western portion during the reporting period 1972-1999, four of them by hunters from outside of Alaska and the rest (where the residency is known) by residents of the GMU 17(C) community of Dillingham. Hunting remained at one or two hunters per year during the reporting period. Hunting success in the other areas was roughly similar during the reporting period.

(5) Koggiling Creek Block (portions of GMU 9(B) in UCU 0101 and portions of GMU 17(C) in UCU 0501 (Photo 3.9).

As one proceeds west across the Nushagak River to the Koliganek area, and southward to the shores of Bristol Bay, the character of the habitat changes to older, more eroded moraines that are more gently rolling terrain and lowlands dominated by wet tundra, small patches of deciduous and mixed forest and thousands of large and small lakes with associated riparian shorelines (Photo 3.9). The Koggiling Creek Block, like the Yellow Creek Block, is situated at the junction of the Nushagak and Kvichak river drainages. The block is drained to the east by King Salmon Creek and Copenhagen Creek, which flow into the upper reaches of Kvichak Bay, and to the west by Koggiling Creek which flows into the Nushagak River to the north of Keefer Cutoff (Photo 3.9). The western portion of this area transitions to spruce woodland as one travels west toward the Wood-Tikchik lakes. This region hosts high-density tundra swan nesting populations, and is one of the five high waterfowl areas in Alaska (USFWS 2005c). The communities of New Stuyahok, Levelock, Dillingham, and Naknek use BLM lands in the Koggiling Creek Block for a variety of subsistence activities (ADF&G 2004). The following communities use these BLM lands for the following subsistence resources (Schichnes and Chythlook 1991; Wolfe et al. 1984; Wright et el. 1985; Fall et al. 1986; Wolfe et al. 1984; Morris 1985; Krieg et al. 1998; ADF&G 2004a) (Appendix D).

- New Stuyahok – caribou and waterfowl hunting, trapping
- Dillingham – trapping
- Naknek – hunting waterfowl

Activities in GMU 9(B) UCU 0101are discussed in detail under the Yellow Creek and Klutuk Creek Blocks, and will not be repeated here. Hunters access this area to hunt caribou and brown bear using aircraft, and moose using a mix of boats and some aircraft. In the southern portion, hunters use a mix of boats, snowmachines, and aircraft to hunt moose, caribou and brown bear.

Photo 3.9. King Salmon Creek

(6) Klutuk Creek Block (Two blocks) (portions of GMU 17(B) in UCU0101 and GMU 17(C) in UCUs 0801 and 0901 (Photos 3.10 and 3.11).

BLM lands in the Klutuk Creek Block are also part of an older glacially formed landscape of more eroded moraines and gently undulating terrain of wet tundra-dominated lowlands, copses of spruce, and fewer large and small lakes and ponds than are found in the Yellow Creek Block. As one proceeds westward, the size of the trees and the density of the spruce forests and mixed deciduous forests increase. The larger block of BLM land is drained to the southwest into the Nushagak River most prominently by Klutuk Creek (Photos 3.10 and 3.11). The smaller block, situated to the southwest, sits adjacent to the Kakwok River and one of its main tributaries, which also flows into the Nushagak River. Residents of the communities of New Stuyahok, Manokotak, Ekwok, and Dillingham use the Klutuk Block of BLM lands for a wide variety of subsistence resources in their annual round of seasonal subsistence activities (Schichnes and Chythlook 1985; Wolfe et al. 1987; Wright et al. 1985; ADF&G 2004b) (Appendix D).

ADF&G Subsistence Division subsistence use area maps drawn up in the 1980s and 1990s indicate that the following communities were utilizing the following subsistence resources on BLM lands:

- Ekwok – caribou and moose hunting
- Aleknagik – caribou hunting
- Dillingham – caribou and moose hunting

Photo 3.10. Klutuk Creek

BLM land in GMU 17(B) is located in the southcentral part of the GMU, specifically a portion of UCU 0101, near the community of Koliganek. This UCU comprises 454 mi² and is made up of 31% BLM land. In the western portion of this block and in surrounding lands, GMU 17(C) 0801 is 198 mi² and is 29% BLM land. In the southeast portion of the block and surrounding lands, GMU 17(C) 0901 is 505 mi² and contains 40% BLM lands.

During the reporting period 1983-2002, the northern area provided a good moose harvest. Moose harvest has been increasing since 1983. The number of moose harvested per year between 1995 and 2002 doubled, and in a few cases more than doubled the number taken between 1983 and 1994. This northern area is important to local residents, who took 55% of the harvested moose. Hunters from the GMU 17(C) communities of Dillingham, New Stuyahok, and Ekwok, the 17(B) community of Koliganek, the 17(A) community of Togiak, and the 9(C) community of King Salmon hunted for moose in this area. It is also important to guided and nonguided hunters from outside of Alaska, who harvested 29% of the moose taken in the area. Eleven percent were taken by Alaska residents from outside this region. Hunters use aircraft, snowmachines and boats to hunt moose in the area.

For the reporting period 1998-2002, caribou take in this block was the best in the planning area. Nonresident hunter efforts were consistently larger than those of Alaska residents, although the number of nonresident hunters has declined since 1999. The second highest number of caribou hunters in this area was Alaska residents from outside the region. GMU 9 and 17 residents accounted for the smallest number of hunters hunting in this area, although there was marked increase in local hunters in 2002. They were from the GMU 17(B) community of Koliganek, the 17(C) community of New Stuyahok, the 17(A) community of Togiak, the 9(C) community of King Salmon, and the 9(D) community of King Cove.

Residents of Alaska Peninsula communities sometimes subsistence hunt and fish in Bristol Bay during the commercial fishing season. Caribou hunters primarily use aircraft for access in this area, followed by boats, four-wheelers, and snowmachines.

During the reporting period 1984 – 2001 only nine brown bears were harvested in this northern area. Hunters were fairly balanced between hunters from outside of Alaska, Alaska residents from outside of the region, and residents of GMU 17 (Dillingham and Koliganek). Bear hunters primarily use aircraft to access this area, although some hunters do use boats and snowmachines to access the area.

In the western portion of this area, a total of 160 moose were reported harvested during the reporting period 1983-2002, with 333 hunters attempting to harvest during the same period. Only a very small number of hunters from outside of Alaska attempted to hunt moose in the western area during the reporting period. The area is used by moose hunters from the GMU 17(C) communities of Dillingham, Aleknagik, Ekwok, Manokotak and New Stuyahok, the 17(B) community of Koliganek, the 9(B) community of Pedro Bay, and the 9(C) community of King Salmon. Hunters from these communities harvested 73% of all the moose taken in this area during the reporting period. Moose hunters access the area primarily by boat, followed by snowmachines and aircraft.

The western area is also good for harvesting caribou. During the reporting period 1998-2002, 51% of hunters were from outside of Alaska, 37% were residents of the Bristol Bay region, and 12% were Alaska residents from outside of the region. Local communities harvesting in this area include the GMU 17(C) communities of Dillingham, Ekwok, and New Stuyahok, the 17(B) community of Koliganek, and the 9(C) community of King Salmon. The caribou harvest trend in this western area has been downward since 1998. Access to this UCU for caribou hunting is primarily by aircraft, with some use of boats, four-wheelers, and snowmachines.

During the reporting period 1985-2001 only a few bears were harvested in the western area, three by residents from outside of Alaska, and two by GMU 17(C) residents of Ekwok and New Stuyahok. The residency of the remainder of hunters is not known. Bear hunting has remained consistent at one or two bears harvested a year in this area. Hunters access the area by aircraft and boats.

The southeast area has also been good for moose harvesting. However, nearly twice as many hunters attempted to harvest than were actually able to harvest a moose during the reporting period 1983 - 2002. This southeast area is very important for the residents of GMU 17, who accounted for 74% of the hunters attempting to harvest moose, and for 78% of the moose harvested. Local communities harvesting in this area include the GMU 17(C) communities of Dillingham, Clarks Point, Ekwok, and New Stuyahok, from the 17(B) community of Koliganek, and the 17(A) community of Togiak. Hunters from outside of Alaska accounted for 6% of those hunting for moose in this area, and for 7% of the moose harvested during the reporting period. The remainder were Alaska residents from outside of the region. Moose harvests peaked in this area in the late 1990s and have been declining since. Moose hunters access this area using boats, snowmachines, and aircraft.

Caribou hunting efforts and the 300 caribou harvested in the southeast area during the reporting period from 1998 to 2002 were fairly evenly divided among nonresidents, Alaska residents from outside of the region, and local residents. Hunters from outside of Alaska accounted for 37% of hunters trying for caribou in this area, and for 40% of the caribou harvested. Residents of GMUs 9 and 17 accounted for 32% of hunters attempting to harvest and for 30% of the caribou harvested during the reporting period. The remainder were Alaska residents from outside the region. The GMU 17(C) communities of Aleknagik, Dillingham, Ekwok, Manokotak, and New Stuyahok used the southeast area during this period, as did the 17(B) community Koliganek, the 9(C) communities of King Salmon and Naknek, and the 9(B) community Port Alsworth. The greatest majority of caribou hunters access the area by aircraft, but a few use snowmachines, boats, and four-wheelers.

Hunters from outside of Alaska accounted for the harvest of the majority of the brown bears harvested in the southeast area during the reporting period from 1990 to 1997. No harvests by residents of the Bristol

Bay region were reported during this period. Bear harvests in this area dropped off after 1994. Access for brown bear hunting is by aircraft.

Photo 3.11 . Klutuk Creek in regional perspective

A small portion of GMU 18 lies within the westernmost part of the planning area. The communities closest to BLM lands in this region are Goodnews Bay, Platinum, Quinhagak, Togiak and Twin Hills. These are the communities primarily using BLM lands in this block for a wide variety of subsistence (ADF&G 2004). ADF&G Subsistence Division subsistence use area maps gathered in the 1980s and 1990s indicate that residents of the community of Platinum were using BLM lands in the Goodnews Block for hunting waterfowl, trapping, and gathering plants.

(7) Goodnews Bay Block (GMU 18; UCUs 1701 and 1801)(Map 3.3)

The Goodnews block lies on Alaska's west coast and is surrounded by the Togiak National Wildlife Refuge. Habitats are varied, and include beaches, ocean spits, tidal mud flats, coastal salt marshes, and coastal wetlands in a narrow zone between Kuskokwim Bay and the front of the Ahklund Mountains (Photos 1.2 and 3.12). This narrow complex of habitats forms a funnel for large numbers of migratory waterfowl and shorebirds from the Yukon Delta, Western Alaska and the North Slope. These migratory birds include T&E Species. The area is important nesting, molting and brooding habitat for several special status species including Steller's eider, bristle-thigh curlew, white-front geese, emperor geese, and numerous sea ducks (Seppi 1997, Peterson et al. 1991, Shaw et al. 2005). The Carter Spit area is

on the southern fringes of the Yukon Kuskokwim Delta, Western Hemisphere Shorebird Reserve Network, which is of global importance.

Carter Spit and adjacent unnamed spits and wetlands are important for the abundance and variety of birds and plants. Sea bird nesting colonies also occur on BLM-managed lands in Goodnews Bay (Peterson et al. 1991, Shaw et al. 2005). The Ahklun Mountains are non-forested alpine tundra with willow-lined drainages and tall shrub (willow and alder) thickets skirting the bases of the hills and occurring in scattered patches throughout.

Photo 3.12. Takiketak, View South

UCU 1701 is 2,308 miles², of which 10% is BLM lands. There is less than 1% moose habitat on these lands, and only one moose was recorded killed during the recording period 1983-2002, although 25 hunters attempted to harvest a moose. All of the hunters except one were from the GMU 18 communities of Bethel and Quinhagak. Currently there is a moratorium on hunting moose in this region and a conservation effort to enhance the moose population in the area. In the past, moose hunters accessed this area by boat. UCU 1801 contains 1,495 mi², of which 5% is BLM land. Less than 2% of this UCU is suitable moose habitat. During the reporting period of 1983 to 2002, only 15 hunters attempted to harvest moose and only six moose were harvested. Of the six moose harvested, five were taken by GMU 18 residents from Bethel and Goodnews Bay. The remainder of the hunters in this area were from Alaska communities outside of this region. This area also has a moratorium on moose hunting. In the past, moose hunters used boats and some aircraft to access the area.

Caribou have been absent from most of GMU 18 for over 130 years and have only recently begun to migrate into the area. Caribou were not plentiful in UCU 1701 during the reporting period 1994-2002, and only 46 were harvested during that time. Eight caribou were taken in 1994, followed by a decline in harvest numbers until 2000, when 15 were harvested. Twelve were harvested in 2002. Few hunters from outside of Alaska attempted to harvest caribou in this UCU. A majority of the animals were taken by

residents of the GMU 18 communities of Bethel, Goodnews Bay, Kasigluk, and Quinhagak, the 17(A) communities of Togiak and Twin Hills, and the 17(C) community of Dillingham. Transportation for caribou hunting is by aircraft, boat, and snowmachine.

During the reporting period between 1994 and 2002, 32 caribou were harvested in UCU 1801. Only four were harvested by hunters from outside of Alaska. The largest number, 22 or 69% were harvested by residents of the region, including residents of the GMU 18 communities of Bethel, Chevak, and Goodnews Bay, the GMU 17(C) communities of Aleknagik, and Manokotak, and the 17(A) communities of Togiak and Twin Hills. Hunting increased dramatically in 2002. Caribou hunters use aircraft, boats, and snowmachines to access this UCU.

The harvest of brown bears in UCU 1701 has varied from one to three animals taken approximately every other year during the reporting period 1984-2002. During that time, 16 brown bears were harvested by hunters from outside of Alaska, and only one was harvested by a resident of the GMU 18 community of Bethel. The remaining five were harvested by Alaska residents from outside the region. Aircraft and some boats are used to access the area.

Between 1971 and 2002, 18 brown bears were reported harvested in UCU 1801. The harvest of brown bears in UCU 1801 has varied from one to three animals taken approximately every other year during the reporting period 1971-2002 except for 1984, when ten were harvested. Only two bears were taken by hunters from outside of Alaska during the reporting period, and the rest were harvested by residents of the GMU 18 communities of Goodnews Bay and Platinum. Snowmachines, aircraft and boats are all used by bear hunters as modes of transport to this UCU.

d) Large Mammals

(1) Caribou

Caribou (*Rangifer terandus*) inhabit treeless tundra, high mountain, and coastal areas in the Bay planning area. They have occupied various regions in the planning area in 150 to 200 year cycles (ADF&G 2005a; Whitaker 1980). Where boreal forests are available, herds may choose to winter there. Calving areas are usually located in mountains or on open, coastal tundra. Caribou tend to calve in the same general areas year after year, but migration routes may vary. Being herd animals, caribou must use a wide area to find food. Large herds may migrate up to 400 miles between summer and winter ranges. In summer, caribou eat the leaves of willows, sedges, flowering tundra plants and mushrooms. Beginning in September, they eat lichens, dried sedges, and small shrubs such as blueberry (Valkenburg 1999). Maps 3.8, 3.9, 3.10, and 3.11 show vegetation types for many BLM lands in the planning area. Maps 3.14 and 3.15 provide information about caribou ranges. Their chief predators are humans and wolves, but brown (grizzly) bears, wolverines, lynx and golden eagles may pray on the young (Whitaker 1980).

Two large caribou herds occupy tundra habitats on BLM lands in the planning area. They are the Mulchatna Caribou Herd (MCH) and the Northern Alaska Peninsula Caribou Herd (NAPCH). A third, smaller more resident herd, the Nushagak Peninsula Caribou Herd (NPCH) occupies the Nushagak Peninsula on the Togiak NWR. Numbers for all herds combined in the Bay planning area have ranged between 200,000-350,000 over the last decade, but in the last three years herds have experienced significant declines to between 85,000 and 100,000 animals (Woolington 2003b; Woolington 2005).

The 1999 photo census of the MCH indicated a population size of 160-180,000. The aerial photocensus in 2002 provided a minimum estimate of 147,000 caribou in the MCH, and the 2004 photo census indicated a population estimate of 85,000 (Woolington 2003b; Woolington 2005).

The MCH has demonstrated somewhat unusual behavior in making significant shifts in calving ranges and winter ranges in the last two decades. The traditional way to identify caribou herds has been the discrete and consistent use of long term calving areas (Valkenberg 1999). During the 2000-2002 reporting period, the MCH did not move into the traditional wintering areas along the west side of Iliamna

Lake, north of the Kvichak River, but scattered throughout the herd's range. Approximately 10,000 to 20,000 caribou spent most of their winter in southern GMU 9(B) and southeastern GMU 17(B). In March, 2002, many of these caribou moved south to the King Salmon-Naknek area for a short time before returning to the lower Mulchatna River area (Woolington 2003b).

While an objective assessment of the condition of the MCH winter range has not been made, Brelsford (1987) and Woolington (2003b) reported that the carrying capacity of the traditional wintering areas had been surpassed and that in order to continue growing, the herd had to seek other range. The 2003 ADF&G Caribou Management Report noted that portions of the range were showing signs of heavy use in the form of extensive trailing along migration routes, trampling and heavily-grazed vegetation in some summer/fall range near the Tikchik lakes. Signs of heavy use are also evident on traditional winter range on the north and west sides of Iliamna Lake (Woolington 2003b). Arctic tundra vegetation can take from 35 to over 100 years to regenerate.

All of the planning area communities are dependent on caribou as a staple of their residents' diets. Based on information from one study year, for the 17 Bay planning area communities that were surveyed, large land mammals (caribou, moose, bear, and Dall sheep) comprised 24% of the subsistence diet, and 13% was caribou (ADF&G 2005a). Harvest pressure on the MCH may increase as caribou become more plentiful near the villages; however, less pressure may be put on the local moose populations (Woolington 2003). Wolf densities follow the fluctuations in caribou numbers (Skoog 1968). Wolf predation rates traditionally were low, but probably increased as the herd grew and provided a more stable food source for wolves. Many local residents in the Bay planning area report an increase in wolf populations in the past several years (Woolington 2003b).

In addition to the ongoing monitoring efforts, a coordinated working group is currently being established for the Mulchatna Caribou Herd. The Association of Village Council Presidents in Bethel, and the Western Interior Subsistence Regional Advisory Council are working to establish this working group. This group would promote communication between stakeholders of the MCH, define population objectives for the herd, determine needed management and research, submit funding proposals to State and Federal agencies in an effort to protect, and conserve the Mulchatna Caribou Herd. As a cooperative partner in the efforts to manage the MCH, the BLM Anchorage Field Office will be involved in research objectives and management decisions for the herd.

The Northern Alaska Peninsula Caribou Herd (NAPCH) is distributed throughout the northern Alaska Peninsula and the eastern Bristol Bay regions, primarily in Game Management Units 9(C) and 9(E). The NAPCH is an important subsistence resource for the residents of this region (Woolington 2003b). Hunting is currently restricted to limited permit hunts and a bag limit of one bull. This herd has fluctuated from a high of 20,000 animals in the early 1940s to a current population of 1,200 or fewer (Sellers 2003a). Current habitat condition, nutritional deficiencies, parasites, and diseases are believed to be the primary causes of the decline (Squibb 2005, Pers. Comm.). Scientific studies carried out between 1995 and 2001 demonstrate that the NAPCH is under moderate nutritional stress (Valkenburg et al. 1996; Sellers et al. 1998a, 1998b, 1999, 2000; Woolington 2003b).

Low bull:cow ratios noted in the last four years (i.e. 25.7 bulls to 100 cows in the fall of 2002) in the MCH are reflected in the composition of fewer bulls and more cows harvested. Opportunity to harvest large bulls has declined, contributing to decline in hunter demand (Woolington 2005).

Nushagak Peninsula caribou are localized and harvest is governed by a limited permit system for local subsistence users only. Demand is expected to remain high from local users (Aderman 2004). Currently Nushagak caribou are hunted under limited drawing permit hunts only.

Current management practices allow annual monitoring to document short and long term fluctuations in productivity, disease, seasonal habitat selection, movements, population trends, and accessibility of major herds. ADF&G has limited baseline data. The agency has established an adaptive management regime with monitoring guidelines and measurable goals and objectives aimed at habitat usage, population changes, and uses of caribou in the planning area.

ADF&G management goals and objectives for caribou in Game Management Units 9 and 17 include (Woolington 2005):

- Reduce the Northern Alaska Peninsula Caribou Herd midsummer population objective of 15,000 – 20,000 caribou to 12,000 – 15,000 with an October sex ratio of at least 25 bulls: 100 cows.
- Maintain the Mulchatna Caribou Herd at a population of 100,000 – 150,000 with a minimum bull:cow ratio of 35:100.
- Manage the Mulchatna Caribou Herd for a maximum opportunity to hunt caribou.
- Manage the Mulchatna Caribou Herd in a manner that encourages range expansion west and north of the Nushagak River.

(2) Moose

Moose (*Alces alces*), a relative newcomer to this region, occupy or appear to be moving into suitable habitats throughout the planning area and are a high value recreational and subsistence species. Moose are the world's largest member of the deer family, and those found in Alaska are the largest of all moose.

Moose are found throughout the planning area, particularly in riparian habitats. They are most abundant in areas that have recently burned, in areas that contain willow and birch shrubs, on timberline plateaus, in well-watered wetland tundra areas in small lakes and ponds, and along rivers and streams. They are generally limited by their requirements for food, availability for cover, and the depth of winter snow. In fall and winter moose eat large amounts of willow, birch, and aspen twigs. In spring and summer they graze on grasses, forbs and the leaves of trees and shrubs as well as various aquatic plants (Rausch and Gasaway 1994). In summer and fall moose use wetland areas, lakes and ponds. Moose habitats are more restricted to high forage value riparian and tall shrub/mixed open forest types in winter, where they browse on woody plants, including willow, aspen, and birch. Calving and rutting concentrations take place in winter range habitats.

Moose populations are stable to increasing in the western portion of the planning area, especially notable on the Togiak Refuge in GMU 17(A) and the Goodnews drainage and are stable to decreasing in GMU 9 (Aderman 2004; Aderman and Woolington 2001b; Butler 2003). Recent radio tracking of GMU 19 moose north of the Bay planning area indicates significant movement into the planning area from GMU 19 during the winter period.

No intensive field surveys have been carried out on BLM lands in the planning area. Maps 3.8, 3.9, 3.10 and 3.11 provide information about vegetation types on most BLM-managed lands in the planning area. Maps 3.16 and 3.17 show moose range. A preliminary study of riparian areas on BLM lands in the Bristol Bay area suggests that of 2,193,902 acres of BLM lands, 12,852 acres are estimated to be riparian habitat. In the Goodnews Bay riparian study area, of the 315,052 acres of BLM lands, approximately 7,996 acres are estimated to be riparian habitat. No previous study has defined riparian areas for this region (Denton 2006 Pers Comm.).

Today much of the moose habitat in the Bay planning area is believed to be pristine. The distribution of habitat quality and quantity that supports moose populations may decline in localized areas, especially those adjacent to village areas, while that of less populated areas will fluctuate with natural events such as wildland fires or succession, as well as any future increased levels of human use and infrastructure development. In most years, the most important natural force responsible for enhancing moose habitat has been the scouring of gravel bars and low-lying riparian areas by ice and water during spring thaw, especially on the Nushagak and Mulchatna rivers and the lower reaches of their major tributaries (Woolington 2002). In the past, lightning-caused fires have not been prevalent in the Bay planning area (Cella 1996, Pers. Comm.; Maps 3.23 a,b and 3.24). However, the region is currently experiencing a warming and drying trend that may produce more fire-favorable conditions. In addition, the current trend is encouraging expansion of the type of tall shrub growth that moose prefer.

In portions of the planning area moose are currently among the most productive herds in Alaska and are expanding to new habitats in the western portion of the planning area in the Nushigak, Togiak and Goodnews Bay drainages. Moose numbers appear to be in decline in the eastern portion of the Bay planning area west of the Kvichak drainage (Woolington 2004; Butler 2003; and Seavoy 2003). These animals are highly valued for subsistence and general hunting as well as non-consumptive uses. The Bay planning area includes all or portions of State Game Management Units (GMUs) 9(B), 9(C), 17(A), 17(B), 17(C) and 18.

Unit 9(C) outside Katmai National Park had approximately 500 to 600 moose, and there were approximately 200 moose in Unit 9(B) in 2001 (ADF&G 2002a). The moose population in Unit 17(A) was 652 in 2001 (Aderman and Woolington 2001b), the population in 17(B) was estimated to be 1,953 in the western portion of the unit (Woolington 2004), and the population in 17(C) north of the Igushik River was estimated to be approximately 3,000 moose in 1999 (Woolington 2004). A gross estimated population in the planning area is around 7,500 to 10,000 moose.

Moose are the most visible large mammal for viewing in Alaska for residents and visitors. Overall consumptive and non-consumptive demand for moose is generally increasing due to many factors. The supply is stable to increasing in GMU 17, and is especially notable recently in the Goodnews drainage in GMU 18 (Aderman 2001, 2005) and is stable to decreasing in GMU 9. Generally, demand occurs in areas where moose habitat is accessible by boat and aircraft. Competition for this resource indicates that supply generally meets demand. That may change with increased access to remote areas Consistent criteria to define and determine moose habitat and resource conditions have not been established by BLM AFO, and so are not available at this time.

Alaska Department of Fish and Game Goals and Objectives for moose management in GMUs 9, 17, and 18 include (Woolington 2004):

- Allow the Unit 18 moose populations to increase to the levels the habitat can support.
- Maintain healthy age and sex structures for moose populations within the Yukon and Kuskokwim river drainages (this includes the Goodnews Block of BLM lands).
- Determine population size, trend, and composition of Unit 18 moose populations.
- Achieve a continual harvest of bulls without hindering population growth.
- Improve harvest reporting and compliance with hunting regulations.
- Minimize conflicts among user groups interested in moose within and adjacent to Unit 18.
- ADF&G population objectives are not comparable between GMUs but fall within a gross cumulative range of approximately 10,000 to 10,500 moose (ADF&G 1998).
- Allow the lower Kuskokwim River moose population to increase above its estimated size of 75-250 moose to at least 2,000 moose.
- Maintain the current age and sex structure with a minimum of 30 bulls: 100 cows for the Kuskokwim River moose.
- Conduct seasonal sex and age composition surveys for the Kuskokwim River moose as weather allows.
- Conduct winter census and recruitment surveys in the established Unit 18 survey areas.
- Conduct fall and/or winter trend counts in Unit 18 to determine population trends.
- Conduct hunts consistent with population goals.
- Improve educational outreach and hunter contacts.

(3) Brown (Grizzly) Bears

Brown/Grizzly bears (*Ursus arctos*) are found throughout the planning area with seasonal aggregations at sites of abundant food, including at caribou and moose calving locations in spring and on the many productive salmon rivers and streams in the summer. In fall they take advantage of the seasonally available berries. Den sites are used in winter, and are usually located at higher elevations. Denning areas appear to be used consistently from year to year. After bears emerge from their dens anywhere from April until June they graze on sedges and grasses and scavenge for whatever might present itself.

Current habitat in the planning area is highly productive and sustains a vigorous and relatively stable bear population (Map 3.18). Bears are somewhat tolerated in bush communities, where they visit local dumps, fish camps and homes.

Bear management is a primary function of the various agencies in the planning area. GMUs 9(B), 17(A), 17(B), 17(C), and 18 fall within the Western Brown Bear Management Area where Federal and State agencies coordinate annual management and monitoring efforts. The Togiak NWR, ADF&G, BLM, and Regional Office of the USFWS are in the process of finalizing the Togiak Refuge and BLM Goodnews Bay brown bear density and population estimate. ADF&G, USFWS, NPS and BLM coordinate other bear census and density estimates as well as harvest monitoring.

Southwestern Alaska brown bears are the most sought-after brown bear populations globally due to accessibility and trophy quality. Commercial guiding, outfitting and viewing for brown bear is a significant contributor to stability, diversification and value of regional and local economies and personal income. The Bay planning area overlaps Game Management Units 9(B), 9(C), 17(A), 17(B), 17(C) and 18. Guides/outfitters are required for out-of-State brown bear hunters, and brown bear opportunity contributes to the planning area's economy. The planning area encompasses Katmai National Park and other bear viewing areas that draw thousands of visitors annually and provide a reservoir of harvestable bears that venture outside the Park. Up to 2,500 brown bears two years old and older occupy the Bay planning area (ADF&G 1998). This resource provides for up to 90 hunters annually for a harvest range of approximately 60-80 bears.

Area management varies from drawing permits to registration permits, alternate year open seasons and general open hunting depending on the specific area, demand, accessibility and brown bear population. Public demand for brown bears is being met while bear populations are increasing (ADF&G 2000). Local concern with predation on caribou and moose has contributed to incentives to reduce large-predator populations, including the brown bear population.

Sustained yield. State game management practices of the past decade have resulted in a stable harvest of highly sought after trophy animals. Management practices may shift toward predator control with a decline in caribou and moose populations.

Brown bear habitat in the eastern portion of the Bay planning area is believed to be good to excellent, based on the number of bears inhabiting the area. Habitat in the western portion is believed to be good though bear densities appear to drop off as one moves west in the planning area (Dewhurst 2000).

The Alaska Department of Fish and game management objective for brown bear in these units is (Woolington 2003c; Seller 2003c; and Seavoy 2005):

- Maintain a brown bear population that will sustain an annual harvest of 50 bears composed of at least 50% males.

(4) Black Bears

Black bears (*Ursus americanus*) inhabit riparian areas and forested uplands, habitat used in common with the brown bear. Woodlands provide escape cover for black bears. Black bears are distributed throughout the planning area but do not extend southward beyond the Alagnak River or into the Goodnews Bay area. Forest provides escape cover for black bears. From November to late April black bears are in their dens, a specialized seasonal habitat requirement. Black bears are omnivorous. Most of the diet consists of vegetation, grubs, beetles, crickets and ants. Bears also eat small to medium-size mammals or other vertebrates and a variety of fish.

Black bears are not a popular game animal in the planning area, but they are used to some extent for subsistence purposes. In this remote region, the non-resident makes up 72 to 85% of the hunters, other Alaska residents comprise around 15 to 22% of hunters, and local residents up to 6%. Reported harvest and defense of life and property (DLP) mortality for the past 10 years has varied from 13 to 30 animals

per year. Animal take has increased as greater numbers of hunters seeking Mulchatna caribou have incidentally taken black bears (ADF&G 1998, 1999, 2000).

International trade of gall bladders and bear parts creates a demand of local consequence. No objective data are available for the population of black bears, nor for their densities, key denning areas, or other aspects of bear populations in GMUs 9, 17 or 18. However, local residents indicate that black bear populations in some areas are declining (ADF&G 1998, 2000). Brown bear-dominated habitats occur in GMU 9 and 18, where black bear densities are very low and black bears are limited by lack of favorable habitat, as well as by brown bear predation and competition for food sources, although it must be said that both bears are omnivorous and seldom fail to find something to eat (Whitaker 1980; ADF&G 1998). Black bears are in low demand in the Bay planning area for the commercial tourism industry or for watchable wildlife opportunities for Alaskans. Neither illegal harvest nor unreported harvest data are gathered or estimated for black bears by ADF&G.

Under the State's existing black bear management regime, sustainable yield thresholds and population characteristics, abundance, distribution, and habitat use have been identified for portions of the planning area. Populations are generally moderate to high although harvests are below the level of sustainable yield. As with brown bear, black bear may pose an ungulate predation problem. Black bear do pose a nuisance problem in areas of human habitation. Within the planning area, black bear bag limits are liberal (two to three bears per year). Yet, subsistence harvest and utilization of black bear is low. The majority of the harvest is by local residents. Black bear populations should remain stable in the near future. Declines in brown bear populations or expansion of black bear habitat may increase black bear populations and correspondingly their range.

(5) Dall Sheep

Dall Sheep (*Ovis dalli)* occupy habitats in the southwestern portions of the Alaska Range including Lake Clark National Park and Preserve, and areas as far south as the mountains between Lake Clark and Lake Iliamna. Historically sheep were present in portions of Katmai National Park until the volcanic eruption of 1912 displaced them. Sheep prefer rocky mountainous areas (Map 3.19).

Sheep are very loyal to their home ranges. Ewes lamb in particularly rugged cliffs in their spring range, where they remain a few days until the lambs are strong enough to travel (Heimer 1994). In winter the entire herd feeds together on woody plants including dry frozen grasses, willow, sedge stems, sage, crowberry, cranberry, and sometimes lichen and mosses. Foods available for consumption vary from range to range. In spring the herd splits into two groups. One consists of ewes, lambs, and yearling rams, and the other is made up of older rams. The oldest member of the group is its leader. Their summer forage is grasses, sedges and forbs. In late fall the rams compete as they try to gather harems of ewes. Wolves are the main predator, but lynx, wolverine, bears, and eagles also prey on sheep (Whitaker 1980).

There are historic accounts of Dall sheep in other areas of the western portion of the planning area. Simple carved sheep horn spoons, likely unsuitable for trade, were found in the PaugVik Village site near Naknek. The PaugVik Village site was occupied from at least 1100 A.D. until 1910 (Dumond and VanStone 1995). Today the sheep only inhabit the Lake Clark National Park portion of the planning area.

The general remoteness and inaccessibility of BLM sheep habitat and current management of habitat and harvest is anticipated to remain unchanged. Dall sheep populations and habitats are largely pristine. In the planning area, sheep are primarily affected by natural events. The Dall sheep resource is expected to remain healthy and vigorous. However, Heimer (1994) suggests that they are susceptible to disease introduced by domestic livestock.

(6) Wolf

Wolves (*Canis lupus*) are considered both big game and furbearers in Alaska. Wolf populations and densities are dependent on many factors, the most important being the presence and abundance of prey.

Large ungulates and their newborns, calves or lambs provide late fall, winter and spring prey in the planning area. During the summer, when wolf pups are in or near the den or rendezvous sites, beaver, ground squirrels, lemmings, hares, birds and fish are prey.

Wolf population density, pack structure and territory size depend on prey abundance and distribution. In the planning area wolves are widespread. Estimates by ADF&G (2000) suggest the planning area has a population of 780-835 wolves in 40-60 packs. Wolves are a valuable fur animal and used for personal use and Native crafts.

In GMU 17, wolves are reported to prefer the major drainages of the Nushagak and Mulchatna rivers, where they are believed to have established territories and take advantage of caribou as they migrate through (Woolington 2003b). Wolves inhabit the Kilbuk Mountains from Whitefish Lake to the southernmost tip of Unit 18 near Cape Newenham. Wolf distribution is believed to change with caribou availability. Some resident wolf packs remain throughout the year but must shift to other prey resources when caribou return to Unit 17 to calve (Seavoy 2003). Caribou distribution on the upper Alaska Peninsula is predominantly on the Bristol Bay Plain.

Wolves are carnivorous, and moose, caribou and to a more limited extent Dall sheep, are their primary prey. Wolves also dine on salmon when they are available. During summer, small mammals including voles, lemmings, ground squirrels, snowshoe hares, beaver, and occasionally birds and fish are eaten (Stephenson 1994). Wolves serve an important function in maintaining ungulate herd health and equilibrium within their habitat. They are considered a highly valued component of Alaska's fauna (Stephenson 1994).

Wolf density has been estimated to be up to one wolf per 25 square miles in favorable habitats (Stephenson 1994). Between 1992 and 1999 wolf estimates ranged from 780 to 835 animals, and the number of wolf packs were estimated at between 40 and 60 for the Bay planning area (ADF&G 2000). Based on the increasing trend in reported harvest, trapper questionnaire data, reported sightings, other reports by the public, and anecdotal information, the wolf population in the Bay planning area increased between 1999 and the most recent published estimates in 2001. In all of GMUs 9, 10, 17, and 18 it is estimated that there were between 1,050 and 1,200 wolves in from 77 to 96 packs in 2001 (Sellers 2003b).

Wolves as well as wolverines are classified as fur bearers in addition to being game species in Alaska. Over the last decade, harvests of wolves have varied widely and are a reflection of fur prices, access, predator control concerns and population changes. An overall estimate of populations is not available for the BLM management units in the planning area. Wolves are hunted and trapped primarily by local residents, but wolves are also harvested opportunistically by non-local hunters. Successful wolf harvests have been the result of relatively few participants, which have steadily increased since 1996. From 50 to 260 wolves were harvested each year from 1992 to 1999 in Game Management Units (GMUs) within the planning area (ADF&G 2000). During this time, between 40 and 98 trappers/hunters were responsible for the majority of the documented harvest in the planning area (ADF&G 2000).

Harvest methods vary widely from area to area depending on access methods, climatic conditions, terrain, and population availability. In some areas, wolves are readily accessible with snowmachines, whereas in other areas aircraft access for trapping or shooting is the major method of taking. Wolf hunting methods such as same-day airborne hunting, aerial gunning, bounty systems, poisons and a wide variety of predator control methods are still in demand; however, these methods lack public support. An unknown number of wolves, not reported, are harvested for subsistence. They are used for clothing and Native cultural and craft purposes. This unreported harvest may be significant in some areas, but varies with year, access and abundance of wolves.

Fluctuations in wolf numbers are expected to continue, and adaptive management of wolves and their prey bases is necessary to balance predator/ prey (moose and caribou) relationships with the high demand of human use for both groups of species.

e) Furbearers

Furbearers include those species of mammals that are routinely sought after by licensed trappers who place commercial value on the animals' pelts. Furbearers found in the planning area include wolverine, wolf, coyote, red fox, Arctic fox, Canada lynx, marten, otter, mink, weasel, beaver, and muskrat (ADF&G 2005a; Whitaker 1980).

Wolverines (*Gulo gulo)* are widely distributed and travel widely throughout their range. Wolverines are still of high value in the fur market and are pursued by trappers and hunters for that reason. The planning area enjoys widespread distribution of wolverines and in some cases expanding and increasing populations, based on contacts with local residents and trappers. GMUs 9 and 17(B) produce the greater harvest of wolverines from the GMUs in the Bay planning area.

Beaver (*Castor canadensis)* are widely distributed and increasing in the planning area's streams and lakes and in riparian and aquatic habitats. In many areas beaver also occur in treeless tundra areas where tall and low shrub materials are available near streams. Beaver eat the bark of favored deciduous trees and shrubs. Currently beaver are widespread and abundant throughout their available habitat. The Goodnews area has a rare phenotype pelt coloration that is unique to that area (Van Dael 2005).

Muskrat (*Ondatra zibethica)* are widely distributed throughout the wetland habitats in the planning area but are currently uncommon to scarce in most areas. Minor use of muskrat for food and personal use of fur occurs but the price for muskrat pelts is very low and the quality of muskrat fur from this region is moderate to poor. Harvest is very low.

Coyote (*Canis latrans)* arrived in Alaska around 1915 and have rapidly expanded since that time. Coyotes are widespread the planning area and occur west to Goodnews Bay. Coyotes are not abundant or common in the planning area. A few are harvested incidental to hunting or trapping fox, wolverine, wolf or lynx. Healthy wolf populations tend to dampen the rate of increase and movement of coyotes into new areas.

Arctic fox (*Alopex lagopus)* occur along the west coast of the planning area along marine beaches primarily. Foxes eat carrion, microtine rodents, lemmings as well as seasonally available birds and eggs. Population densities are linked to fluctuations in small rodent populations, with periodic peaks approximately every four years. Arctic foxes are occasionally taken in the planning area but are used for subsistence and personal use and normally are not sold as fur.

Red fox (*Vulpes vulpes*) including red, cross and black color phases, occur in the planning area. Red fox are omnivorous and diets often change seasonally but may consist of carrion, plant material, rabbits and other small mammals, ptarmigan, birds, eggs, and invertebrates.

Canada lynx (*Lynx Canadensis*) are classified as a furbearer in Alaska.

River otter (*Ljutra canadensis)* are abundant and widespread throughout the planning area and inhabit stream and lake riparian habitats. They primarily prey on the rich fishery resources as well as mussels, clams, insects, frogs, small mammals, birds or eggs, and vegetable matter.

Both least and short-tailed weasel (ermine) occur in the planning area. Least weasels are sparsely distributed and utilize forest and tundra habitats where they feed on mice, voles, insects, small birds and worms. Short-tailed weasels occur throughout a wide variety of habitats but prefer brushy, forested and broken terrain. Prey includes microtine rodents, mice, shrews, birds, eggs, ptarmigan, hares, fish and insects. Weasels are also preyed upon by a variety of avian and mammalian predators including owls, hawks, lynx, fox, coyote and mink. Fur value is low but ermine is popular to trim parkas, Native crafts, and tourist items.

Furbearer populations in the planning area are assumed to be healthy and are under the present circumstances under-harvested, according to anecdotal information. This is a diverse group of species and each is unique in its habitat requirements, productivity, distribution, and population dynamics.

The popularity of trapping furbearers has declined in recent years due to price declines and declines in world demand. Demand for furbearers is significantly dependent upon fur prices, population fluctuations, access, weather conditions, personal use, Native crafts, raw material needs, and accessibility of the resource. These species also play an important role in ecosystem functions.

Commercial and subsistence demand are primary drivers for furbearer harvest, however; much of this harvest does not require reporting and harvest is not monitored. Required sealing (wolverine, wolf, marten, river otter, beaver and lynx) and monitoring do not account for subsistence take for personal use. Furbearer species not requiring sealing are harvested but data provide only gross minimum estimates. Currently no monitoring of demand is being conducted. Poor fur prices have decreased participation in recent years (ADF&G 1998). The lack of efficient means to estimate and directly monitor populations, general low overall demand and participation, and lack of reliable snow conditions for fur harvest in the planning area hampers development of population objectives for furbearers. Voluntary trapper questionnaires, opportunistic observation and sealing requirements are the current management tools in use. This appears sufficient at this time for the relatively low trapping effort.

f) Small Mammals

Small mammals include a wide variety of shrews, mice, microtine rodents (lemmings, meadow voles), non-game and small game species such as pika and porcupine. These species and their fluctuating abundance and cycles are keystone to ecosystem function.

g) Marine Mammals

Marine mammal species occur in nearshore and offshore areas of the planning area, but do not occur on coastal BLM lands, with the possible exception of beluga whales which may travel miles up rivers in pursuit of salmon.

h) Birds

Public lands in Alaska encompass the breeding grounds, migration and staging sites and seasonal habitats for many species of resident and migratory birds. The Bay planning area includes breeding areas important for the production of migratory waterfowl, shorebirds and land birds that represent large portions of the North American populations that winter in Central and South America, as well as long distant migrant shorebird species that utilize wintering areas as distant as Hawaii, Tahiti, New Zealand and Southern Asia (Marchant et al. 1986). Some of these breeding, staging and migration areas are on public lands managed by BLM in the planning area (Goodnews Bay, Kvichak Bay areas).

(1) Landbirds

At least 50 species of migrant and 23 species of resident landbirds breed in the unbroken forests, shrub field and tall riparian shrub habitats that exist on BLM lands in the planning area (Handel et al. 1998). The area's migrant land birds winter in the lower 48 states and Central and South America. Land birds play a significant ecological role on both the breeding and wintering grounds, and many species are considered indicators of environmental and ecological changes, including global climate change (Maley et. al. 2003). The demand for landbird species involves a growing public interest nationwide in viewing, field identification and life history of landbirds, as well as ecological research related to habitat conservation. Four migrant species (olive-sided flycatcher, blackpoll warbler, gray-cheeked thrush, Townsend's warbler) occur in the planning area and are considered sensitive species. Although it is not

currently on BLM's Special Status Species list, the rusty blackbird has experienced a dramatic decline recently and monitoring is recommended (Hannah 2004, Andres 1999).

A number of rare Asian species are occasional visitors to some portions of the planning area (Petersen et al. 1991) and are highly sought by birders seeking to add rare North American species to their list.

The demand for landbirds as a game species is low, however harvest regulations do allow for the taking of landbirds for food or traditional clothing under the Migratory Bird Treaty Act (Office of Subsistence Management 2004/2005). The harvest of landbirds in the planning area is unknown.

(2) Waterfowl

At least 25 species of migratory waterfowl (ducks, geese and swans) breed or use migration staging areas in the planning area, (Bellrose 1980), and involve consumptive use demands for both resident and non-resident hunters. Wintering areas are in coastal Alaska and Canada, the western and southern United States, and Mexico. Spring and fall migration staging areas for waterfowl include the Goodnews Bay/Carter Spit area and the Kvichak Bay coastal areas. Inland waterfowl breeding wetlands and estuaries are found on large blocks of public lands in the Kvichak River and Alagnak River area and represent some of the highest waterfowl breeding densities in the State (Connant and Groves, 1993) (Map 3.20).

Wetlands in this region are associated with an extensive glacial moraine and are unique with respect to limnological characteristics and water chemistry which affects their use by breeding waterfowl (Seppi 1997). Alaska overall produces approximately 50% of the annual waterfowl production in the Pacific Flyway, with the coastal wetlands of Goodnews Bay and Carter Spit and Kvichak Bay being important migration staging sites in Alaska. Demands for waterfowl in the region include spring subsistence hunts and gathering of eggs from ducks and geese and fall hunts of several species. Resident and non-resident hunting in Alaska of all species of ducks, geese and swans occurs throughout the planning area during fall migration. Three migratory species, the tule white-fronted goose, the dusky Canada goose, and the trumpeter swan are considered sensitive species. Sport hunting of waterfowl produced in the planning area continues as birds migrate through Canada and the lower 48 states to wintering areas in the southern states and Mexico. Subsistence hunting also occurs in regions south of the United States on wintering grounds. The Steller's eider is listed as threatened, yet is subsistence hunted in the planning area in spring and during fall migration. Steller's eiders winter in coastal areas of the Alaska Peninsula, and use the Goodnews Bay area for staging and fall migration (Seppi 1997).

(3) Upland Game Birds

Upland game birds are hunted for recreation and for subsistence. However, access limits the harvest and use of this resource except near communities and road systems. Five grouse species occur in the planning area. Spruce and ruffed grouse inhabit forested areas, rock ptarmigan are on higher elevation barren habitats and tundra, and willow ptarmigan in willow and alder thickets. Demand and harvest levels of grouse in the bush is largely unknown, but is considered light in relation to the distribution and abundance of these birds. Most take is likely opportunistic in association with other hunting and subsistence activities.

(4) Shorebirds and other Waterbirds

Most shorebird species migrate and stage on coastal mudflats and nest in coastal or inland habitats, depending on the species. Sandhill cranes use these same habitats, which can be found throughout the planning area and are of regional and hemispheric importance to these and many other species of wildlife.

There are at least 17 species of shorebirds that breed or migrate within or through the planning area (National Geographic Society 1987), using alpine, tundra and forest edge habitats for breeding and coastal mud flats for foraging, staging and migration. Most shorebird species are long distant migrants,

breeding in arctic and sub-arctic habitats in Alaska and wintering in Central and South America, while other species complete transoceanic migrations to islands in the south pacific, Asia and Australia. Few shorebirds are taken for subsistence in Alaska, but birds produced in Alaska are hunted for food on wintering grounds in Central and South America. The numbers of shorebirds produced in the Bay planning area, or the numbers taken on wintering grounds is unknown. Designated Western Hemisphere Shorebird Reserve Network sites are within and adjacent to the planning area. The Carter Spit and Goodnews Bay area have been proposed as a regional fall migration shorebird staging site, and the adjacent Kuskokwim Bay has been recognized as a world class hemispheric site for spring and fall shorebird migrations (Myers et al. 1987).

Kvichak Bay is internationally recognized as a hemispheric migration stopover site for arctic nesting shorebirds, and hosts nine species of breeding and migrating shorebirds (Myers et al. 1987). Within the planning area, Goodnews Bay, Nanvak Bay, Carter Bay and the Kuskokwim River Delta are recognized as key areas for shorebird conservation in the U. S. shorebird conservation plan, of which BLM is a partner (Brown et. al 2001). Large numbers of migrant shorebirds, species diversity, and ecological importance of these sites make the region an attractive viewing area for birders. The bristle-thighed curlew and red-throated loon are BLM sensitive species potentially present in the planning area.

(5) Raptors

Raptors include various species of hawks, eagles, owls and falcons. The planning area contains various habitats that host 21 species of raptors (National Geographic Society 1987), including the northern goshawk and the Arctic peregrine falcon, BLM special status species. Eagles are protected under the Eagle Protection Act, and all other raptors under the Migratory Bird Treaty Act. Snowy owls are an exception, and are legal to subsistence hunt, but the numbers taken are likely low due to their relative rare occurrence. Owl, hawk, eagle and falcon species include both resident and migratory species that winter in coastal areas, the lower 48 states and Central America. Demand for raptors as watchable wildlife, especially during migration when birds pass through corridors where they can be counted and viewed, is large and growing. The population and productivity of raptors in the planning area is unknown. The planning area hosts 10 species of owls, 7 species of hawks, including osprey, 2 species of eagles and 4 falcons.

(6) Seabirds

Twenty species of seabirds are found in the planning area, and include gulls, cormorants, kittiwakes, guillemots, auklets, murrelets, murres, puffins and terns. Many species are pelagic oceanic birds or coastal species that nest on coastal cliffs and fringes. Coastal tidal nesting habitats important to seabirds exist in the southern portion of the planning area, with cliff nesting habitats at Goodnews Bay and Chagvan Bay. Demands for seabirds include subsistence uses and egging for some species where they are accessible. Population and harvest numbers for the planning area are unknown. Sea birds on the Special Status Species list that may be found seasonally on BLM lands include the marbeled murrelet, harlequin duck, king eider, long-tailed duck, black scoter, black guillemot, black brant, and surf scoter.

i) Fish

Throughout the Bay planning area there is a lack of detailed baseline data on the size of fish populations, fish spawning and rearing areas, and the productive capacity of the waters administered by the Bureau of Land Management. BLM does not currently operate any salmon escapement projects in the Bay planning area to assess run timing. The Alaska Department of Fish and Game, Division of Commercial Fisheries (ADF&G - CF) operates salmon escapement projects on several major rivers in the Bristol Bay area. Data concerning the salmon count and run timing for these rivers can be found at http://csfish.adfg.state.ak.us/mariner/brbcatch/brbsummary.php. In addition, the ADF&G - CF operates a weir on the Middle Fork of the Goodnews River. Data from this project are available at http://www.cf.adfg.state.ak.us/region3/kuskhome.php.

There are six major watersheds in the planning area. The Goodnews and Arolik Rivers flow into Kuskokwim Bay and the Kvichak, Alagnek, Nushagak, and Naknek Rivers flow into Bristol Bay. Fish occurring in the planning area include all five species of Pacific salmon and a wide variety of resident species (Table 3.8). Maps (3.13a-d) display known anadromous and resident fish streams within the planning area.

Table 3.8. Common Fish Species Endemic to the Waters of the Bay Planning Area

Common Name	Scientific name	Subsistence /sport species
Chinook salmon	*Oncorhynchus tshawytscha*	Sb/s
coho salmon	*Oncorhynchus kisutch*	Sb/s
sockeye salmon	*Oncorhynchus nerka*	Sb/s
chum salmon	*Oncorhynchus keta*	Sb/s
pink salmon	*Oncorhynchus gorbuscha*	Sb/s
rainbow trout	*Oncorhynchus mykiss*	Sb/s
Arctic grayling	*Thymallus arcticus*	Sb/s
Dolly Varden	*Salvelinus malma*	Sb/s
Arctic char	*Salvelinus alpinus*	Sb/s
northern pike	*Esox lucius*	Sb/s
Alaska blackfish	*Dallia pectoralis*	Sb
burbot	*Lota lota*	Sb/s
lake trout	*Salvelinus namaycush*	Sb/s
round whitefish	*Prosopium cylindraceum*	Sb
humpback whitefish	*Coregonus pidschian*	Sb
pygmy whitefish	*Prosopium coulteri*	Sb
Bering cisco	*Coregonus laurettae*	Sb

*Sb = Species harvested for subsistence.
*s = Species targeted for sport fishing.

Other species reported to occur in the planning area include ninespine stickleback (*Pungitius pungitius*), threespine stickleback (*Gasterosteus aculeatus*), slimey sculpin (*Cotus cognatus*), longnose sucker (*Catostomas catostomas*), Alaska blackfish (*Dallia pectoralis*), Rainbow smelt (*Osmerus mordax*), Arctic lamprey (*Lampetra japonica*), and Pacific lamprey (*Lampetra tridentata*). The rainbow smelt and Pacific lamprey are subsistence species. Whitefish play an important role in the food chain as prey for other fish, as well as being a popular subsistence fish (ADF&G 2004).

(1) Essential Fish Habitat

Through the Magnuson-Stevens Fishery Conservation Act, Essential Fish Habitat for Alaska is defined by NOAA as all salmon streams listed in Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes (ADF&G 2005a, 2005b). This Catalog defines the essential habitat as any stream or lake or other water body that is used for migration, spawning, and rearing by anadromous fish. The planning area contains numerous streams listed in the Catalog, and these waterbodies are shown in Maps 3.13a-d.

(2) Fish Habitat Description

Public lands in the planning area provide important spawning, rearing, and over-wintering habitat for resident and anadromous fish. Waters in the planning area provide a diverse array of lotic and lentic fish habitat. Glaciers have influenced the geomorphology of the area and have provided for lakes ranging from small potholes to the largest freshwater lake in Alaska, Illiamna. Stream types include small steep high energy systems, large wide valley multiple channel systems, and slightly entrenched meandering streams. Nearly all waters in the planning area provide habitat to these fish species during all or some of their spawning, rearing and migrating life stages.

Small isolated lakes with depths greater than three feet are likely to provide habitat for Alaska blackfish and sticklebacks. Alaska blackfish utilize heavily vegetated freshwater swamps and ponds, but also are found in vegetated flowing waters and lakes. They can tolerate cold water and have the ability to breathe atmospheric oxygen, which helps them survive in stagnant, hypoxic muskeg or tundra pools (ADF&G 2004, Morrow 1980). Larger lakes connected to streams are important to juvenile sockeye salmon and northern pike utilize weed areas in lakes, sloughs, and flooded areas.

First and second order higher gradient streams are likely to be quality rearing habitat for juvenile char and coho salmon. Moderate sloped tributary streams with cobble and gravel substrate provide some of the best spawning habitat for salmon. The lower, middle and upper reaches of larger streams provide spawning and rearing habitat for chum, coho, and Chinook salmon. Lower reaches of the major rivers influenced by saltwater and whose substrate is fine material are used by salmon as migratory routes to access spawning areas in the upper reaches and tributaries of streams.

Drainages in the Southwestern portion of the planning block are within the Ahklun Mountains Province. Streams slope gradient over most of the province range between zero and eight degrees (Gallant et al. 1995). Mountains in the province have elevations of approximately 1,800 feet and are drained by shallow clear streams dominated with gravel and cobble substrate that flow directly to the Bering Sea. Fish distribution is influenced by elevation, relief, lithology, and geologic structure.

A National Hydrolographic dataset is not available from the U.S. Geological Survey for the Hydrological Unit that comprises streams on BLM lands in the Southwestern portion of the planning area. Statistics on stream miles for this area were derived from named streams in the planning area and may not include tributaries. Therefore, the total miles of streams in the BLM Bay planning area are underestimated.

Most streams on the BLM lands in the Goodnews Bay area are remote with limited access. BLM manages 249 miles of streams in the Goodnews watershed and 50 miles of these streams are directly utilized for subsistence and/or sport fisheries, which includes: 30 miles of the Goodnews River, eight miles of the Middle Fork of the Goodnews River, eight miles of the South Fork of the Goodnews River, and four miles of the East Fork of the Arolik River. The remaining BLM-managed streams and stream sections are not directly utilized for subsistence, commercial, and recreational fisheries but provide important spawning and rearing habitat that support these fisheries. Commercial, subsistence, and recreational fisheries intercept fish that are bound for BLM lands.

The Goodnews River originates and flows through the Togiak National Wildlife Refuge before entering BLM lands. The historical average salmon escapement to the mainstem of the Goodnews River is 3,137 Chinook salmon, 36,925 sockeye salmon, 21,284 chum salmon, and 27,897 coho salmon (Linderman 2005a). Residents of Quinhagak, Goodnews Bay, and Platinum, located along the south shore of Kuskokwim Bay (approximately 220 households), harvest subsistence salmon primarily from the Kanektok, Arolik, and Goodnews River drainages (ADF&G 2001). The Goodnews River is the primary source of commercial fisheries for the village of Goodnews and also contributes to the commercial fisheries in the villages of Quinhagak and Togiak. The rainbow trout stocks which inhabit the Kuskokwim Bay streams are considered “world class” with high catch rates and are capable of producing rainbow trout that exceed 25 inches (ADF&G 2004a). The mainstem of the Goodnews River supports the second largest sport fishery in Kuskokwim Bay Area and angler effort (angler days) has averaged 2,522 from 1983 to 2002 (Lafferty 2004).

During recent inventories of Goodnews River watershed, many first and second order streams were found to provide rearing habitat for coho salmon, and char. Sculpin were also common in most of these higher elevation streams. In addition to coho rearing, small schools of adult sockeye salmon were observed spawning in some of the larger third and fourth order streams not associated with lakes. Resident species, Dolly Varden, rainbow trout, and Arctic grayling were also found to inhabit most of the larger streams on BLM lands. These observations were documented on the ADF&G Freshwater Fish Inventory website (ADF&G 2005a, 2005b). The maps spatially display the sampling locations where fish have been collected or observed and also include field data and sampling location photos.

The South Fork of the Goodnews River contains Chinook, coho, chum salmon, Arctic char, and whitefish. These anadromous fish species use the river for spawning, rearing, and migratory habitat; therefore this river is characterized as Essential Fish Habitat (EFH) by the National Marine Fisheries Service (NMFS), Anadromous Water Catalog (AWC) #335-00-10850-2080. The Middle Fork of the Goodnews River contains Chinook, coho, chum, pink, sockeye salmon, Arctic char, and whitefish. These anadromous fish species use the river for spawning, rearing, and migratory habitat; therefore this river is characterized as EFH by the NMFS, AWC #335-00-10850-2090.

The Arolik River is also a significant salmon producing river that drains into Kuskokwim Bay (Linderman 2005b). The Arolik River flows through the Togiak National Wildlife Refuge downstream of BLM lands. The Arolik River is accessible from Arolik Lake by plane and/or by boat from the village of Quinhagak. Residents of Quinhagak, Goodnews Bay, and Platinum, located along the south shore of Kuskokwim Bay, harvest subsistence salmon primarily from Kanektok, Arolik, and Goodnews River drainages (ADF&G 2001). The Arolik River supports the third largest rainbow trout sport fishery in Kuskokwim Bay and angler catch has averaged 1,122 fish from 1997 to 2002 (Lafferty 2004). The South and East Fork of the Arolik River and Faro Creek also contribute to the Kuskokwim Bay watershed. The rainbow trout stocks of the Arolik River are considered “world class” with high catch rates and are capable of producing rainbow trout that exceed 25 inches (ADF&G 2004a). The Arolik River supports the third largest rainbow trout sport fishery in Kuskokwim Bay and angler catch has averaged 1,122 fish from 1997to 2002 (Lafferty 2004).

Faro Creek and the South and East Fork of the Arolik River contribute the majority of the drainage to the Arolik River. They provide important spawning and rearing habitat for economically important subsistence, commercial, and recreational fisheries. Faro Creek, a major headwater tributary to the Arolik River contains Chinook, coho, and chum salmon. These anadromous salmon species use the river for spawning, rearing, and migratory habitat; therefore this river is characterized as EFH by the NMFS, AWC #335-00-10650-2300. The East Fork of the Arolik River contains Chinook, coho, sockeye, chum salmon, Arctic char, and whitefish. These anadromous fish species use the river for spawning, rearing, and migratory habitat; therefore this river is characterized as EFH by NMFS, AWC #335-00-10650-2401. The South Fork of the Arolik River contains Chinook, coho, sockeye, chum, pink salmon, Arctic char, and whitefish. These anadromous fish species use the river for spawning, rearing, and migratory habitat; therefore this river is characterized as EFH by the NMFS, AWC #335-00-10650-2472.

Jacksmith Creek contains Coho (*O. kissutch*), Chinook (*O. tshawytscha*), Sockeye (*O. nerka*), Chum (*O. keta*), Pink (*O. gorbushcha*) salmon and drains into the Kuskokwim Bay. Chinook, chum, pink, sockeye, and coho salmon, Arctic char, and whitefish use the river for spawning, rearing, and migratory habitat; therefore this river is characterized as Essential Fish Habitat (EFH) by the National Marine Fisheries Service (NMFS), Anadromous Water Catalog (AWC) #335-00-10700. Production of salmon from this river contributes to the subsistence and commercial harvest for the villages of Goodnews and Quinhagak.

Cripple Creek also drains into the Kuskokwim Bay and produces Chinook, chum, pink, and coho salmon, and whitefish. These anadromous fish species use the river for spawning, rearing, and migratory habitat; therefore this river is characterized as EFH by the NMFS, AWC #335-00-10750. Production of salmon from this river also contributes to the subsistence and commercial harvest for the villages of Goodnews and Quinhagak.

BLM manages several large areas in the Southeast of the planning area. The physiography of this area is referred to as the Nushagak-Bristol Bay Lowlands, and they have a large influence on fish distribution. The lowlands are underlain by outwash and morainal deposits that are mantled with silt and peat. The local relief of the lowlands is 50 to 250 feet, and elevation ranges from sea level to about 300 feet with slope gradients of less than 2% (Wahrhaftig 1965, Gallant et al. 1995). The majority of streams in the lowlands are low gradient, low velocity, silt and peat substrate, and tannic colored water. Results of fish and habitat surveys by BLM and ADF&G of these low gradient streams with silt, sand, and/or small gravel substrate suggest they provide marginal habitat for salmon spawning and rearing (ADF&G 2005a, 2005b). Although, these lowland streams are connected to some of most productive salmon watersheds

(Kvichak, Alagnek, Nushagak and Naknek) in the world (Minard et al. 1998) which arise from the mountains and lakes of this eco-region.

The Nushagak watershed is the largest in the Southeastern portion of the planning area, with a watershed area of 12,000 square miles. It has over 20,900 stream miles, of which BLM manages 2,000 miles (10%). In the Alagnak and Naknek watershed there are 1,600 and 4,331 streams miles in each watershed, respectively, of which BLM manages 547 (34%) and 358 (8%) miles. The Kvichak watershed is 5,915 square miles with over 6,500 miles of streams, of which BLM manages 2,301 miles (34%).

Nushagak and Bristol Bay Lowlands are also dotted with moraine and thaw lakes (Wahrhaftig 1965). There are over 8,000 lakes between 2 and 150 acres and over 70 lakes greater than 150 acres in the planning area. Most are small internal drainages often with no outlet or inlet stream and very few have been inventoried. An inventory of six lakes in 2003 found they all contained northern pike, threespine stickleback, whitefish (probably least cisco) (Haas, 2004). In addition, char and sculpin were found in one of the lakes that had an outlet stream. This species assemblage is probably typical of these lowland lakes.

Small parcels of land of less than one or two townships make up most of the remaining planning area. There are more than 700 miles of streams and 620 lakes between 2 and 150 acres within these small parcels. Fish distribution data is not available for most of these parcels.

(3) Factors Affecting Fish Habitat and Production

Many factors influence the productivity of a resident fish population, including water temperature, streamflow, food availability, adequate spawning and rearing habitat, spawner-recruit ratio, and fishing pressure. Anadromous species complicate matters by introducing ocean conditions which influence marine survival. Inter- and intraspecies competition also plays a role in determining how many fish a watershed produces. Fisheries habitat on BLM lands in the planning area is mostly undisturbed and currently should not be limiting to the production of resident and anadromous fish.

Although most of the fisheries habitat within the planning area exists in an undisturbed state, there are few areas that have been impacted by mining. The Salmon River is a relatively short river (about 10 miles long) in southwest Alaska with a basin area of about 30 square miles. The placer platinum deposits in this tributary to Kuskokwim Bay have been commercially mined since 1927, including about 40 years of mining with a bucket line dredge. The Salmon River and its tributaries provide habitat for all five species of Pacific salmon and several resident fish species. Typical woody riparian vegetation is tall shrub willows and alders.

Mining operations have reduced or eliminated access for fish between the Salmon River and several tributaries, and have significantly altered much of the river's riparian habitat. Some tributaries have also been mined. Despite extensive dragline work done in the early 1990s to establish a new channel for the Salmon River through the tailings along the west side of the valley, the Salmon River flow goes subsurface in several places at normal discharge levels. It is believed that fish passage upstream through the entire length of the tailings can only occur at high water levels.

The State of Alaska developed the Bristol Bay Area Plan (1984, 2005), which identified 64 designated anadromous streams to be closed to new mineral entry. Salmon production was recognized as a significant surface use of state land. The development of mining claims within the active stream channel in these designated anadromous streams and adjacent uplands creates an incompatible surface use conflict with salmon propagation and production, and jeopardizes the economy of the Bristol Bay region and the management of the commercial, sport, and subsistence fisheries in the Bristol Bay Area. Klutuk Creek was only one of the designated 64 anadromous streams closed to new mineral entry by the State that is located on the BLM lands. It originates in the Kemuk Mountains and flows southeasterly 36 miles into the Nushagak River. Klutuk Creek was determined navigable on the BLM lands in T. 7 S., R. 49 W., Secs. 11-13, 24 and up to the feeder creek in the E2 of Sec. 2 and T. 7 S., R. 48 W., Sec. 19 (BLM 1991a) and therefore the State of Alaska has title to the submerged lands of Klutuk Creek.

7. Special Status Species

a) Special Status Plants

The botany of the Bay planning area is poorly known. However, inventory of the Ahklun Mountains and Goodnews Bay vicinity in 1990 and 2004, and the northwestern Alaska Peninsula in 2003 provided information about plants of the area. Taken together, the two surveys and the additional ALA holdings from the area documented 379 vascular plant species for the region. There are 47 plant species on the Alaska BLM Special Status Species list. The list is developed through a process that considers two factors – rarity and endangerment. Plants that are imperiled and critically imperiled in the state are considered for the list. Threatened or endangered species are on this list. However, not all rare plants are included. One plant on the Special Status Species list has been documented in the planning area (Table 3.9). Others may be added as the list is updated. Five plants that could be considered for the list were recently found (Table 3.10). The current Special Status Species list was last updated in 2003.

Table 3.9. Rare and Imperiled Plant Species and BLM Special Status Species Documented in the Planning Area

Common Name	Scientific Name	BLM SSS List	Status: AKNHP Ranking
Forbs			
Pearshaped smelowskia	*Smelowskia pyriformis* Drury and Rollins	Yes	S2

Table 3.10. Other Rare and Imperiled Plant Species Documented in the Planning Area

Common Name	Scientific Name	BLM SSS List	Status: AKNHP Ranking
Grass and Grasslike			
Kamchatka spikerush	*Eleocharis Kamtschatica* C.A. Meyer	No	S2S3
MacKenzie Valley mannagrass	*Glyceria pulchella (Nash) Schum*	No	S2S3
Forbs			
Fragile rockbrake	*Cryptogramma stelleri* (S.G. Gmel.) Prantl	No	S2S3
Chukchi primrose	*Primula tschuktschorum* Kjellm.	No	S2S3
Kamchatka buttercup	*Ranunculus Kamchaticus* DC	No	S2S3

As Alaska becomes more developed, BLM lands will become increasingly valuable to preserving plant species diversity. It is BLM's policy to prevent management actions from causing a species to decline to a point where listing under the ESA would be warranted (BLM 2001) 6840 manual and the Special Status Species list is used to assist in meeting this policy.

The flora of this region appear to be a blend of coastal and interior floristic elements (Parker 2005). One plant, the Walpole poppy (*Papaver walpolei)*, reported as rare in earlier studies (Lipkin 1996) was found to be present. According to Parker (2005) this tiny white-flowered poppy is often relatively abundant when found. A recommendation to designate the area as an ACEC on the basis of the occurrence of the Walpole poppy at Goodnews Bay was officially accepted in the Southwest Planning Area Management Framework Plan, signed and published in 1981 based on the information about the poppy at that time. Because of the newer information on the poppy, the poppy as a basis for the ACEC is no longer supported in the current Bay RMP/EIS.

b) Special Status Fish

Sensitive Status Fish Species & Essential Fish Habitat. There are no threatened, endangered or sensitive fish species in the BLM Bay planning area.

c) Special Status Wildlife

(1) Threatened, Endangered, and Sensitive Species

The purpose of this BLM program is to provide policy and guidance, consistent with appropriate laws, for the conservation of special status species of plants and animals, and the ecosystems upon which they depend. Special Status Species are species which are proposed for listing, officially listed as threatened or endangered, or are candidates for listing as threatened or endangered under the provisions of the Endangered Species Act (ESA); those listed by a State in a category such as threatened or endangered implying potential endangerment or extinction; and those designated by each State Director as sensitive (BLM 2005c). BLM objectives for Special Status Species are to ensure that actions authorized on BLM-managed lands do not contribute to the need to list a species under the Endangered Species Act, to conserve threatened or endangered species and the ecosystems on which they depend, and to assist efforts to de-list through conservation of existing habitats and populations.

> *"Addressing special status species is a requirement in our land use plans and environmental assessments to ensure that actions taken by the BLM are consistent with the conservation needs of special status species. This also ensures the BLM does not contribute to the need to list any special status species under the provisions of the Endangered Species Act of 1973, as amended."* (BLM 2005c).

Special Status Species conservation entails the use of methods and procedures which are necessary to improve the condition of Special Status Species and their habitats to a point where their special status recognition is no longer warranted (BLM 2001).

(2) Federally-listed Threatened and Endangered Species and Designated Critical Habitats.

Table 3.11. Federally-listed Threatened and Endangered Animal Species Present in the Bay Planning Area

Species Common Name	Species Scientific Name
Eskimo Curlew*	*Numenius borealis*
Steller's Eider	*Polystricta stelleri*
Steller Sea Lion	*Eumetopias jubatus*
Federally-listed Candidate Species That May be Present in the Bay Planning Area	
Kittlitz's Murrelet**	*Brachyramphus brevirostris*

* Eskimo Curlews have not been seen in Alaska since the mid-1800s (Gill et al 1998).
**Rare in the Bay planning area.

There are no designated Critical Habitats in the Bay planning area. One endangered species (Eskimo Curlew), one threatened species (Steller's eider), and one candidate species (Kittlitz's murrelet) are found in the planning area. They are listed under the Endangered Species Act. The Eskimo curlew has not been seen in Alaska since the mid-1800s. The Steller sea lion may be an occasional visitor to the coastal spits of Carter's Bay but there are no known haulouts located on BLM-managed land in the Bay planning area (Table 3.11). Historically, spectacled eiders, a threatened species, nested discontinuously along the coast of Alaska from Nushagak Peninsula on Bristol Bay to Barrow and eastward nearly to the Yukon border. Today, spectacled eiders' breeding distribution is only on the Yukon-Kuskokwim Delta, to the north and west of the planning area and on the north coast of Alaska, but do not breed within the planning area based on current knowledge of the species (Petersen et al 1991). Spectacled eiders migrate

between winter and breeding ground following coastal and offshore migration corridors through the Bering and Chukchi seas to offshore wintering areas. Molting areas include the eastern portion of Norton Sound and Ledyard Bay, between Cape Lisburne and Point Lay. The primary wintering area is in the central Bering Sea south and southwest of St. Lawrence Island (U. S. FWS 2002c). Spectacled eiders do not migrate, breed or molt within the planning area.

BLM is consulting with the appropriate Federal agencies on potential impacts to threatened and endangered species as required under Section 7 of the ESA. These consultations are required during the development of a BLM land use plan and environmental impact statement.

Steller's Eider. Steller's eider occurs within the planning area as a migrant between wintering and breeding areas (see Map 3.21). Birds stage and molt in shallow near shore marine waters adjacent to Carter Spit in the planning area. The Alaska breeding population is listed as threatened (Federal Register 1997). Current breeding distribution includes the Arctic coastal regions of northern Alaska from Wainwright to Prudhoe Bay up to 56 miles inland, and Arctic coastal regions of Russia (Federal Register 1997). Historically, Steller's eider was a common breeder in the Yukon-Kuskokwim Delta but now occurs there at low densities (USFWS 2002c). Spectacled eiders are not as closely tied to the coastal areas as the other eider species. Preferred nesting habitat includes inland tundra ponds of various sizes. A recovery plan has been developed for the species (USFWS 2002c).

The recovery plan for the Steller's eider identifies recovery criteria and preliminary management actions needed for delisting.

When the Alaska-breeding population of the Steller's Eider was listed as threatened, the factor or factors causing the decline were unknown. Factors identified as potential causes of decline in the final rule listing the population as threatened (62 FR 31748) included predation, hunting, ingestion of spent lead shot in wetlands, and changes in the marine environment that could affect Steller's Eider food or other resources. Since listing, other potential threats, such as exposure to oil or other contaminants near fish processing facilities in southwest Alaska, have been identified, but the causes of decline and obstacles to recovery remain poorly understood. A significant number of early recovery tasks, therefore, will involve research to identify threats and evaluate their impacts.

(3) Candidate Species

Consistent with existing laws, BLM is required to implement management plans that conserve candidate species and their habitats, and will ensure that actions authorized, funded, or carried out by BLM do not contribute to the need for the species to become listed. The Kittlitz's murrelet is a Federally-listed candidate species (Federal Register 2004) that may be present in the Bay planning area seasonally (Table 3.11).

Kittlitz's Murrelet. Kittlitz's murrelet is a Beringian species that nests along most coastal regions from southwestern to western Alaska (Day et al. 1999). In Alaska, the majority of the summer populations are found in Southeastern Alaska, Prince William Sound, and Cook Inlet (Day et al. 1999). It is also known to breed in the coastal areas of Bristol and Kuskokwim Bays. Nesting habitat consists of unvegetated scree slopes or steep, rocky slopes. The scarcity of breeding records makes determination of exact breeding range difficult. Nesting sites are most often inland, up to 16 miles from the coast (Kessel 1989). The winter marine range is poorly known. There is no reliable population information at this time. Indications are that a substantial proportion of the world population died as a result of the Exxon Valdez oil spill in 1989. One estimate of this mortality was 5–10% (Van Vliet and McAllister 1994). This species is sparsely distributed within the planning area (Map 3.22). The only potential nesting area where a risk to the habitat might exist is on the scree-covered slopes of lode-bearing mountains on BLM lands in the Goodnews block. To date no Kittlitz's murrelets have been observed nesting in that area.

(4) State Listed Species

It is BLM policy, found in the 6840 manual, to carry out management for the conservation of State listed plants and animals. Four species of neotropical migrant landbirds that are State of Alaska species of special concern occur in the planning area (Table 3.12).

(5) BLM Sensitive Species

Fifteen birds and two mammals identified as BLM sensitive species occur within the planning area on more than an accidental basis (Table 3.12). Information on distribution, habitat condition, and population trends for most of these species is limited. Only those species occurring in the planning area on more than an accidental basis are discussed below.

Table 3.12. BLM Alaska Sensitive Animal Species Present in the Bay Planning Area

Species Common Name	Species Scientific Name	Known or Potential Presence on BLM Lands
Canada Lynx	*Lynx canadensis*	Yes
Harbor Seal	*Phoca vitulina*	Yes
Northern Goshawk	*Accipiter gentiles laingi*	Yes
Tule White-fronted Goose	*Anser albifrons elgasi*	Yes
Marbled Murrelet	*Brachyramphus marmoratus*	Not Known
Dusky Canada Goose	*Branta Canadensis occidentalis*	Not Known
Gray-cheeked Thrush	*Catharus minimus*	Yes
Olive-sided Flycatcher	*Contopus cooperi/borealis*	Yes
Trumpeter Swan	*Cygnus buccinator*	Yes
Blackpoll Warbler	*Dendroica striata*	Yes
Townsend's Warbler	*Dendroica townsendi*	Yes
American Peregrine Falcon	*Falco peregrinus anatum*	Yes rare in the plan area
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	Yes
Harlequin Duck	*Histrionicus histrionicus*	Yes
Bristle-thighed Curlew	*Numenius tahitiensis*	Yes
Buff-breasted Sandpiper	*Tryngites subruficollis*	Yes-accidental
King Eider	*Somateria spectabilis*	Yes
Long-tailed Duck	*Clangula hyemalis*	Yes
Black Scoter	*Melanitta nigra*	Yes
Black Guillemot	*Cepphus grill*	Yes - offshore
Dovekie	*Alle alle*	Yes rare in the plan area
Red-throated Loon	*Gavia stellata*	Yes
Black Brant	*Branta bernicla*	Yes
Red Knot	*Calidris canutus*	Yes-but rare
Black-tailed Godwit	*Limosa limosa*	Yes-accidental
Surf Scoter	*Melanitta perspicillata*	Yes
McKay's Bunting	*Plectrophenax hyperboreus*	Visitors from St. Math. Is?
Marbled Godwit	*Limosa fedoa*	Not Known

Source: Armstrong 1995; Kaufman 2000; National Geographic Society 1987; Sibley 2000; Udvardy 1977; Seppi 1997, Peterson et al. 1991, Shaw et. al 2005; Whitaker 1980

Canada lynx. The Canada lynx (*Lynx Canadensis*) is the only indigenous wild cat in Alaska. Density, abundance, productivity and distribution of Canada lynx populations are dependent upon the cyclic fluctuations of snowshoe hare and to a lesser degree other small mammal and upland game populations. Canada lynx are now Federally-listed as a threatened species in the Rocky Mountains of the lower 48 states. For that reason, BLM Alaska considers the Canada lynx a sensitive species. At the same time,

they are considered a furbearer, legal to harvest. Lynx can be found in the planning area in forested habitat where snowshoe hare populations are present. Hare habitat features grasses, green vegetation, berries, conifers, aspen, alder, and willow. Lynx will be found where they can primarily hunt snowshoe hare, and to a lesser degree, other small animal populations. Lynx populations expand and contract in direct response to snowshoe hare population cycles (Whitaker 1980).

Harbor seal. The harbor seal (P*hoca vitulina)* inhabits the coastal waters and river mouths of Alaska, including the planning area. A population of seals resides permanently in the fresh water of Lake Iliamna. There are no harbor seal haulouts in the planning area; however, harbor seals may be found individually on the beaches in the Goodnews block. In the spring seals may follow salmon runs upriver for many miles, not returning to coastal waters until fall (Whitaker 1980).

Northern goshawk. The northern goshawk (*Accipiter gentilis liangi*) resembles the red-tailed hawk in shape but is gray and white in coloring. It inhabits taiga, the northern coniferous forests. It nests in a tall tree in dense coniferous forests. It migrates and winters in lowlands as far south as northern Mexico, and feeds mainly on grouse and smaller birds (Udvardy 1977).

Tule white-fronted goose. White-fronted geese, *Anser albifrons*, in Alaska nest mainly on the Yukon-Kuskokwim Delta, with smaller numbers in interior Alaska and the north slope. They are known to breed at Carter Bay in the Goodnews block of the planning area (Seppi 1997), and pacific flyway birds migrate through the Bristol Bay area en route to wintering grounds in the Central Valley of California (Bellrose 1980). White-fronted geese have declined in the Pacific flyway since the 1970's, but have rebounded to about 295,000 after the breeding season in 1993 (Rothe 1994).

Gray-cheeked thrush. The gray-cheeked thrush, *Catharus minimus,* uses a variety of habitats, including willow and alder thickets, upland and riparian deciduous forests, and conifer forests (McCaffery 1996. Nests are typically 5-6 meters above ground in willow, alder, and spruce. The species has been found breeding in riparian zones in the Goodnews block (Seppi 1997), and in the Alagnak and Illiamna blocks in Bristol Bay (USFWS 1997). This thrush is a shy bird that feeds on beetles, weevils, ants, caterpillars, cicadas, berries, and invertebrates, generally on the ground. Alaska is an important breeding ground for this bird, which migrates the longest distance of all the small thrushes to Columbia, Venezuela, Peru, and northwestern Brazil in South America (DeGraaf and Rappole 1995). Breeding bird survey data suggests a population decline in eastern North America (Sauer and Droege 1992), but it is considered common in south coastal Alaska and the Alaska Peninsula, during the breeding season and in fall migration (Eskelin and Dewhurst 1996).

Olive-sided Flycatcher. The olive-sided flycatcher, *Contopus cooperi/borealis,* inhabits and breeds in low densities in coniferous boreal and coastal forests of Alaska. Their North American breeding range extends into Canada and the lower 48 states. They migrate from Alaska in early August and winter primarily in South America. Their current density, population trends, and distribution on BLM lands in the planning area are not known; however, the species has been recorded in breeding bird surveys on BLM lands in the Alagnak and Iliamna blocks of the planning area (USFWS 1997), and in the adjacent Katmai National Park (USDI NPS 1996). Olive sided fly-catchers prefer to nest in spruce trees (Wright 1997) and are likely found in forested and riparian bottoms of the planning area. Breeding bird survey data provide strong evidence for population declines of the species over most of its breeding range (Handel et al. 1998).

Trumpeter Swan. The trumpeter swan (*Cygnus buccinator*) occurs primarily in the northeasternmost Kvichak blocks of BLM land in the planning area. They are normally found in forested areas but are casual breeders west of the taiga of interior Alaska (Hansen et al. 1971). Breeding swans prefer secluded wetland areas containing extensive areas of shallow lakes with abundant emergent vegetation. Adjacent waters and marshes are important for foraging. During a 1990 census they were found to number over 13,000 statewide (Mitchell 1994).

Blackpoll Warbler. The blackpoll warbler, *Dendroica striata,* also inhabits spruce forests of western Alaska, where it breeds. Habitat preferences include tall riparian shrubs, and coniferous or deciduous forest and in western Alaska in taiga/coastal tundra transition zones (McCaffery 1996). In August it migrates southward where it winters primarily outside the North American continent, in northern South America. It is largely insectivorous and prefers to nest low in spruce trees and occasionally on the ground. This species has been recorded breeding on BLM lands in the Goodnews block (Seppi 1997), and in the Alagnak and Iliamna blocks of Bristol Bay (USFWS 1997), and is considered a common breeder in these areas. Breeding bird survey data indicate a downward population trend in North America (Sauer et al. 1997).

Townsend's Warbler. Townsend's warbler, *Dendroica townsendi*, is a neotropical migrant found in summer in coastal locations in coniferous forests of Alaska, where it constructs a nest in a conifer at mid-story canopy and raises its young. It eats primarily insects and some seeds (Gough 2005). It departs Alaska in late August, and winters in Central America (Udvardy 1977). Its breeding habitat is largely restricted to mature forest with tall coniferous trees throughout its breeding range, and therefore is uncommon in the Bay planning area.

Arctic Peregrine Falcon. The Arctic peregrine falcon (*Falco peregrinus tundrinus)* can be found in low numbers throughout the planning area, nesting in areas with suitable habitat and migrating throughout the region. Falcons can be found in open country. Nesting habitat generally consists of bluffs or cliffs adjacent to water. Peregrines were listed as endangered in 1970, and the Arctic peregrine was delisted in 1994 (Federal Register 1994). Monitoring of Arctic peregrine indicates that populations have increased or remained stable since delisting (White et al. 2002).

Harlequin Duck. Harlequin ducks, *Histrionicus histrionicus*, are found in northeastern Siberia, the Kamchatka Peninsula, the Aleutian Islands and interior and south coastal Alaska (Bellrose 1980). Harlequins winter in the Aleutians and the Alaska gulf coast, coastal British Columbia, and as far south as Washington and Oregon in coastal nearshore areas. The harlequin duck is widely distributed throughout the mountains of southwestern Alaska (Petersen et al 1991, McCaffery and Harwood 1994) and is associated with pristine turbulent waters to nest and raise broods throughout their range (Bellrose 1980). In spring they prefer to nest on mountain streams, and especially inhabit the upper portions of drainages. Their nests are usually built very close to water, on the ground in dense vegetation, in tree roots, or in rock crevices. They eat the larvae of aquatic insects that are found in the highly oxygenated waters of swift mountain streams, the eggs of spawning salmon, and herring spawn. Much of their habitat is pristine; however, while they are on the coast they are vulnerable to oil spills in their intertidal habitats close to shore (Rosenberg, Patten and Rothe 2005). Harlequin ducks are known to occur in the Goodnews Bay (Seppi 1997) and Kvichak blocks of the planning area (USFWS 1992), and have been reported in all major rivers in the Togiak Refuge, directly adjacent to BLM lands in the Goodnews blocks (McDonald 2003). Baseline spring inventories of breeding pairs are scheduled for the Goodnews Bay and Kvichak and Alagnak blocks of the Bay planning area in May 2006.

Bristle-thighed Curlew. The bristle-thighed curlew, *Numenius tahitiensis*, is a large shorebird that inhabits mountainous tundra in the Bay planning area in summer, and island beaches in winter. It is one of the rarest American birds. Its breeding area is limited to small mountainous areas of western Alaska. Its nests are made on a depression and lined with tundra mosses.

King Eider. King eider, *Somateria spectabilis*, have a circumpolar range, occurring throughout the arctic lands of coastal Canada, Alaska, Siberia, Russia, Scandinavia, Spitsbergen, and Greenland (Bellrose 1980). In Alaska, king eiders winter south along the Aleutian chain and southern coast of the Alaska Peninsula, or as far north as the sea remains ice free. In spring they nest on ponds on Arctic tundra, and when they are not breeding, they can be found in coastal waters. Their nests are inland on tundra and consist of a down-lined scrape, covered with down when the female leaves the nest (Udvardy 1977). Large flocks of king eiders have been found in nearshore areas of Carter Bay in the Goodnews block during spring migration (Larned 1995). Nearshore areas in the shoals of Kvichak Bay are also recognized as a major king eider staging area in spring (Larned 1998) and a molting area in summer (Larned and

Tiplady 1998), directly adjacent to large blocks of BLM lands in the Kvichak and Nushagak watershed where breeding habitat exists and produce broods.

Long-tailed Duck. Long-tailed duck, *Clangula hyemalis,* are diving ducks that winter on upper Pacific coasts on inshore waters with shallow mussel banks and breed in Alaska on bays, lakes, tundra ponds and marshes. They nest near water on offshore islands along the coast or on tundra ponds and lakes. They eat aquatic invertebrates (mollusks, insects, crustaceans), fish, and some plant matter (Gough 2005; Udvardy 1977). Non-breeding birds have been documented in the planning area at Carter Spit (Seppi 1997) and in the Kvichak block (USFWS 1992).

Black Scoter. In Alaska, Black Scoters, *Melanitta nigra*, breed on the Yukon-Kuskokwim Delta and in Bristol Bay. They are considered a common breeder in the Carter Bay in the Goodnews block of the planning area (Seppi 1997), as well as in the Kvichak block in the Bristol Bay area (Seppi 1994). Black Scoters winter in nearshore areas along the Aleutian Islands and from the Gulf of Alaska to the Baja Peninsula (Udvardy 1977). Based on slight morphological differences, Pacific Coast birds come only from Alaska. In summer they breed and nest in tundra and boreal woodland settings that are interspersed with lakes or rivers.

Red-throated Loon. Red-throated loon (*Gavia stellata*) breed within the Bay planning area. They breed largely in coastal areas throughout the state, and winter throughout the Aleutian Islands and in nearshore areas south to Mexico. They were found to be a common breeder on coastal ponds on BLM lands in the Goodnews block at Carter Bay and in the Kvichak and Alagnak Block in Bristol Bay (Seppi 1994, 1997).

Black Brant. Brant or black brant, *Branta bernicla*, are marine birds that breed on coastal tundra in Alaska and Canada, where they build nests close to the water. They are never far from salt water, and most nest along the Yukon Kuskokwim Delta coast. They live in bays and estuaries in winter. They are found on circumpolar Arctic shores of Eurasia and North America. Brant that breed in Alaska winter on the Pacific coast from Vancouver Island to Baja California. Their chief food is eelgrass and sea lettuce. Brant are threatened by the steady loss of their winter habitats. Small numbers of brant were recorded on vegetated intertidal areas and mudflats in August during fall staging and migration at Carter Spit (Seppi 1997).

Surf Scoter. The surf scoter (*Melanitta perspicillata)* is found in coastal locations in much of Alaska and British Columbia. In the planning area, it breeds along the western coast of the Bering Sea as far south as the Goodnews block. Its distribution is not completely known. In the breeding season it inhabits tundra and forest bogs, where it lays its eggs in a down-lined scrape on the tundra. It can be found in coastal waters some distance from shore in the winter (Udvardy 1977).

8. Fire Management and Ecology

a) Wildland Fire and Fuels

The Wildland Fire and Fuels Management program emphasizes firefighter and public safety as the highest priority in all activities related to fire management and recognizes fire as an essential ecological process and natural change agent of many Alaskan ecosystems. However, within the planning area, fire has not historically been a dominant ecological agent.

(1) Fire Policy in Alaska

BLM participated with other Federal and State land management agencies and Native groups in completing 13 interagency fire management plans between 1980 and 1988. Plans for areas applicable to the Bay RMP are:

- Alaska Interagency Fire Management Plan, Kuskokwim-Iliamna Planning Area (1983)
- Alaska Interagency Fire Management Plan, Yukon-Togiak Planning Area (1984)
- Alaska Interagency Fire Management Plan, Kodiak-Alaska Peninsula Planning Area (1986).

These plans provide a cost effective, coordinated, statewide, landscape scale approach to fire suppression. Each plan contains a description of the local environmental and socioeconomic conditions, natural and cultural resources, fire history and behavior, and local subsistence activities. The plans provide for a consistent interagency approach to operational procedures and the identification and prioritization of values to be protected. The four management options (Critical, Full, Modified and Limited) defined in the plans were implemented at the completion of each plan and are flexible enough to allow different agencies to manage fire on their lands according to policies and mandates exclusive to their agencies. The common operational direction in these plans were consolidated in 1998 to provided unified guidance in a single document: the Alaska Interagency Wildland Fire Management Plan (AIWFMP)

In order to comply with the National Fire Plan and the 2001 Review and Update of the 1995 Federal Wildland Fire Management Policy (IFWFPR Working Group 2001), BLM Alaska amended all of its land use plans in July 2005. The Land Use Plan Amendment for Wildland Fire and Fuels Management for Alaska (BLM 2004d) identifies land use and resource objectives, wildland fire suppression options, and fuels (vegetation) management activities that achieve those objectives. Management options as defined in the interagency plans were incorporated. The amendment is applicable to all BLM-managed lands in Alaska. A BLM Fire Management Plan was completed in 2005 to meet national policy; it also is applicable statewide on BLM-managed lands and supports the interagency program and direction in the Land Use Plan Amendment.

(2) Fire Management

Fire is an essential renewing force in interior forest (taiga) ecosystems, ecosystems that are present in the planning area. Fire releases nitrogen and other essential nutrients from woody vegetation back into the soil, allowing for new plant growth. Depending on the characteristics of a fire, a burn can alter the vegetation composition of any vegetational community from late successional species to early successional or pioneer species such as alder and fireweed (nitrate-fixing plants) (USFS 2002). A well-managed fire implementation plan is beneficial to any ecosystem. Fire however is not a common change agent in coastal temperate forests or alpine tundra ecosystems.

Fire suppression strategies within the planning area are directly tied to the interagency program. The four management options (Critical, Full, Modified, Limited) defined during the 1980s planning effort have been assigned (Table 3.13) in collaboration with adjacent land managers, to all BLM lands (Maps 3.23a, 3.23b and 3.24). The management option classifications establish priorities for allocating fire-fighting resources and are based on values to be protected, resource management objectives, policies, and mandates. Fires are suppressed at minimum cost considering firefighter and public safety, benefits, values to be protected, and consistency with resource objectives. If a wildland fire is not contained by initial response forces, a Wildland Fire Situation Analysis is completed by the protection agency and field office staff to identify suppression alternatives and management constraints.

In addition to landscape scale management options, site-specific designation of Critical, Full, Avoid, and Non-sensitive have been established for structures, cultural, and paleontological sites, small areas of high resource value and Threatened and Endangered Species critical habitat in order for the field office staff to give protection agencies more specific guidance for small sites. BLM permits and leases that authorize structures on BLM lands should contain wildland fire management information. It is the individual's responsibility to take precautions in order to protect the permitted/leased site and personal property on that site from wildland fire intrusion. Unauthorized structures are not protected. BLM's Policy on Structure Protection can be found in Appendix E.

Table 3.13. Fire Suppression Classes

Option	Intent	Management
Critical	Protect areas where there is a threat to human life, inhabited property, designated physical developments, and structural resources designated at National Historic Landmarks	Highest priority for assignment of available suppression resources to exclude fire from the area/site
Full	Protect cultural and historical sites, uninhabited authorized structures, natural resource high-value areas, and other high-value areas that do not involve the protection of human life and inhabited property	Priority is below Critical for available suppression resources to suppress fires at the smallest reasonably possible acres.
Limited	Allow fires to burn under the influence of natural forces within predetermined areas to accomplish land and resource management objectives. Estimated costs of suppression efforts are also a factor.	Surveillance to observe fire activity and to determine is site-specific values or adjacent higher priority management areas are compromised. Site-specific actions when necessary, to protect human life and site-specific values.
Modified	Balance acres burned with suppression costs and accomplish land and resource objectives. Strategies are based on an annual conversion date.	Assignment priority of available suppression resources is below Full. When risks of large fires are high, the initial response to a fire is analogous to Full without the intent to minimize acres, but to balance acres burned with suppression costs. When the risks are low, the appropriate response is to a wildland fire is analogous to Limited.

Protection agencies implement the appropriate management response to a wildland fire based on the management option assigned. Under a Reciprocal Fire Protection Agreement between BLM and the State of Alaska, fire suppression on BLM-managed lands is delegated to the State of Alaska, Department of Natural Resources, Division of Forestry, Southwest Area Office. Other than suppression, fire and fuels management activities on BLM land including, but not limited to, fire trespass, prevention, education, prescribed fire, and hazardous fuels reduction are the responsibility of the AFO staff.

(3) Fuels Management

Fuels Management assists in achieving resource and land use objectives. Complete exclusion of wildland fires is not realistically feasible.

To date, the BLM has not expended funds within the planning area for fuels treatment to meet resource objectives. Prescribed fire and manual fuels reduction projects would be the most viable although mechanical projects are still a consideration. However, as reflected in the fire history of the planning area, wildland fires are uncommon due to the climate regime and the extent of wet tundra.

(4) Fire History

Fire history can be found in Maps 3.23a, 3.23b, and 3.24. Since the implementation of the interagency fire management plans statewide (1988) to the present (2006), there have been approximately 90 fires within the planning area. The largest was a lightning-ignited fire that burned 20,191 acres in Wood-Tikchik State Park. Nine fires have originated on BLM lands; 6 fires were less than 10 acres; 1 fire was reported to be 50 acres, 1 fire was 114 acres and the largest fire was 1,193 acres.

Alagnak Block. Since 1950, no large fires have been reported within this block. If a fire should occur it would be a wind driven fire due to the domination of tundra vegetation in this block.

Goodnews Block. No large fires have been reported on BLM-managed lands within this block. This block falls within two different vegetative classifications–Bering Tundra North to the west and Ahklun Mountains Tundra to the east. In the western portion of this block, vegetation ranges from wet grasses along the coast to woody plant material in a vegetation transition zone between the coast and the mountains. In the eastern portion of the block, Alpine tundra dominates the mountainous terrain. Black spruce may be found on ridges and hills, while a mixture of hardwoods and white spruce may be found on higher points along major rivers. The vegetation regime and maritime influence have kept fires from occurring on lands within the block.

Iliamna Blocks. Fire as an environmental factor is insignificant due to the maritime influence and tundra vegetation. Fire occurrence on BLM lands within the block is very low; when fires do occur they are generally fast moving and of low intensity. The majority of fires are small, human-caused, and associated with recreational activities. Fires have been ignited by lightning but these are not the norm.

The Iliamna Fire (#88), the largest fire in the planning area, was reported in 1957. The final fire size was 40,200 acres. No map is available; the point of origin was at latitude of 59 degrees 5 minutes and longitude 156 degrees.

Alagnak fire (A420), started and burned on Full Management Option land and burned 1193 acres on BLM land in 1990.

However, as the temperature rises with regional environmental change, plant communities are changing, allowing for the possibility of more frequent fires.

Chulitna River, Chekok Creek, and Gibraltar Lake Blocks. These small isolated blocks of land in the northeast corner of the planning area have not had any recorded fires. Although there is a pronounced maritime influence here, it is a transition zone where vegetation graduates from open tundra, mixed deciduous, and spruce forests, to other types of vegetation as the elevation rises on the slopes of the Aleutian Range.

Klutuk Creek Block. This planning block falls within the same vegetative classification as the other blocks within the general region. This block has had one fire on the border of this block and the Yellow Creek block. That fire is discussed in the Yellow Creek discussion that follows.

Koggiling Creek Block. This block is comprised of the same type of vegetation: tundra, grasses and dwarf shrubs. The area is influenced by a maritime weather pattern. One fire on BLM-managed lands has been reported in the Block.

Koggling Creek 2 Fire (B542), Point of origin was in Modified and burned 140 acres in 1997.

Kivichak Blocks. Fire is also insignificant due to a maritime weather pattern and tundra type vegetation. Fire records show that no fires have burned in this block since 1950.

Yellow Creek Block. There was one recorded fire incident in 1957.

The point of ignition for the Cormick Fire (005), was reported at latitude 59 degrees 31 minutes and longitude 157 degrees. The fire burned 4,500 acres.

This area is the same as the previous blocks with regard to vegetation: tundra, grasses and dwarf shrubs. Fires that would burn in these areas would spread rapidly and burn surface vegetation.

Interagency fire management practices within the planning area are directly tied to the AIWFMP. BLM-managed lands have been assigned an appropriate management option. These management options are Critical, Full, Modified and Limited. As the landscape changes, land managers are encouraged to review and update management option designations annually. The options are based on Intent, Policy, Objective, Operational Considerations and Operational Procedures, and are described fully within the AIWFMP. At present, Wildland Fire Use is permitted in the planning area.

9. Cultural Resources

a) Introduction

The cultural resource program is responsible for the identification, monitoring, and protection of all historic and prehistoric resources on BLM-managed lands. Cultural resources within the planning area are extremely varied in respect to age, cultural affiliation, function, and physical remains. While this chapter deals with the past, it is important to note that the Native peoples in this region still actively participate in a traditional way of life by hunting, fishing, gathering and sharing traditional foods with their families, community and Elders.

The planning area spans three linguistic groups: central Yup'ik, Alutiiq and Dena'ina (Map 3.25). The following sections present an overview of the prehistory and history of each group and the current status of cultural resource work on the BLM lands. A general overview is presented in Table 3.14 and a historical/cultural timeline for the planning area is presented in Table 3.15.

(1) Central Yup'ik Area Prehistory and History

Overview of Archaeological Data from the Region and the General Area

The oldest sites of human occupation in the area (6000-3000 B.C.) occur in two phases, both representing a focus upon caribou or large land mammal hunting. The earlier Paleoarctic is represented by a blade-making tradition; the later Northern Archaic contains diagnostic corner-notched projectile points (Ackerman 1980; Dumond 1987). A somewhat later tradition, the Arctic Small Tool tradition (2000-1000 B.C.) also appears to focus primarily upon land mammal hunting. This phase is distinguished by fine microblades and microblade cores.

In the larger region even older sites have been found that are believed to extend back to about 9500 B.C. These areas lie to the northwest in the vicinity of the Kisaralik River and Nukluk Mountain. The younger known sites of the Central Yup'ik considered in this plan are the oldest that occur here (Ackerman 1980).

The Norton tradition (300 B.C. – 1000 A.D.) marked a shift in subsistence focus. Settlements became more permanent and were located along the coast and rivers. Ackerman (1981) has found isolated Norton materials inland. Constructed house remains and the development of local pottery support this view. Ground stone net sinkers indicate that salmon resources were utilized in great amounts and were probably being preserved and stored as food for most of the rest of the year (Ackerman 1981; Dumond 1987; Kowta 1963; Larson 1950; Shaw 1986).

Table 3.14. Cultural Contexts for the Bay Planning Area

Dates	Location	Theme	Diagnostic Cultural Features, Artifacts
1000 – 1800 AD	Primarily coastal	Thule tradition	Kayaks, toggling harpoons, floats, dog traction, gravel tempered pottery
300 BC – 1000 AD	Along coast and major rivers, some isolated finds inland	Norton tradition	Constructed houses, fiber tempered pottery, first ground stone, net sinkers
2000 – 1000 B.C.	widespread	Arctic Small Tool tradition	Finely flaked small stone tools, microblades, microblade cores
3000 – 2000 B.C.	Coastal, river drainages	Archaic/Pacific Coastal	side-notched points, unifacial scrapers
6000 – 5500 B.C.	widespread	PaleoArctic/PaleoIndian tradition	Microblade technology
9500 – 7000 B.C.	Kisarilik River, Nukluk Mountain	Earliest Human Occupation of the larger Region	Narrow, wedge-shaped microblade cores, microblades, Donnely-like burins, blade-like flakes

Table 3.15. Timeline for Historic Period

Dates	Event
1867 to present	**American Era**
1912	Mt. Katmai erupts; Savonoski village abandoned
1904	Chinese Exclusion Act- marks beginning of local fishermen's unions efforts to be included in the commercial fishing industry
1886	Moravian church mission established in Nushagak
1883	1st cannery in Nushagak Bay
1868	1st U.S. government visit to Bristol Bay region in U.S. Revenue steamer *Wayanda*
~1767-1867	**Russian Era**
1835-6	Smallpox epidemic throughout region and beyond
1818-1819	First major trading post in Bristol Bay area built –Alexandrovsky Redoubt (Nushagak)
1799	Czar grants monopoly for fur trade to Russian American Co.
1798	Iliamna trading post destroyed
1796	Lebedev-Lastochkin company establishes a small trading post at Lake Iliamna
1767	First exploration of Bristol Bay

Historic People

Oswalt (1990) presents a breakdown of language subgroups for this area during the historic and late prehistoric periods. The Bristol Bay area was occupied by the Tuyuruaniut; the inland Wood-Tikchik Lake and north to the Kuskowim area was inhabited by the Kiatagmiut; the Quinaghak area on the eastern side of Kuskokwim Bay was occupied by the Caninermiut; and the Nushagak River drainage was occupied by the Aglemiut (Aglurmiut). These groups were by no means permanently fixed through time. Just prior to the period of Russian influence, the Aglemiut had moved to the Nushagak Bay and River as a result of warfare on the Yukon-Kuskokwim delta.

The Central Yup'ik during the historic period practiced a central based wandering lifestyle based upon permanent villages. Subsistence was focused on salmon fishing. Along the coast, sea mammal hunting provided a large part of the diet. In the interior, large land mammal hunting was very important. Other seasonal subsistence pursuits included waterfowl, fresh water fish, and berry gathering, as well as the pursuit of furbearers which, depending on species, were also eaten (VanStone 1967,1968, 1971).

Russian Period

The first Russian exploration into the Bristol Bay area is implied in the 1767 chart of Admiral Nagaev and a chart reflecting Poptap Zaikov's 1772-3 baidarka expedition from False Pass (Bailey and Orth 1990). In the 1790's, competing fur trading company employees explored the north coast of the Alaska Peninsula and Bristol Bay, ascended the Kvichak River to Iliamna Lake and traveled overland to Kamishak Bay (Solovjova and Vovnyanko 2002).

In 1799 the Russian Czar gave the Russian American Company a monopoly on the Alaskan fur trade. The first trading post in the planning area was established as a result of the 1818-1819 Korsakovsky exploration of the Nushagak River via Iliamna Lake. While Korsakovsky continued to explore up the coast to the mouth of the Togiak River and to Goodnews Bay, a work crew from his party stayed at the mouth of the Nushagak River and built Novo-Alexandrovsky Redoubt (Black 2004; VanStone 1988).

When the Russian American Company was awarded a monopoly over the fur trade, as a condition it was obliged to support the mission of the Orthodox Church in Alaska. The company paid for clergy, churches and schools. Early relations between the Russian clergy and the Native people were for the most part good; however, relations could be extremely tense as evidenced by the killing of Father Juvenal and his Russians and Alutiiq attendants in 1796 (Pierce1990).

The Aglemiut were displaced from the Yukon-Kuskowkim delta area by warfare shortly before the Russians arrived in the area. Because they were new to the Nushagak River area and the adult male population was so low from warfare, they turned to the Russian American Company for protection from the Kiatagmiut and others (Oswalt 1990; VanStone 1971). As a consequence of this relationship, many members of this group worked for the company. Small clusters of Native children throughout the area were educated in small Russian Orthodox schools set up at fur trading outposts. Marriages between Russian traders and Native women were sanctioned by both the church and the company throughout the region. Both Native and mixed Native-Russians became employees of the Russian American Company. Working within the fur trade gave Native people throughout the area their first exposure to a market economy.

The explorations of Bocharoff, Kvichak, Korsakovskiy,Vasiliev, Kolmakov, Lukin (some of these men of mixed Native/Russian creole class) and countless unnamed traders of the Russian American Company contributed a great deal not only to the Russian fur trade but to the general knowledge of the area. By 1867 the Russians had, for the most part, accurately mapped the region.

American Period

The sale of Alaska to the United States in 1867 marked the end to the Russian American Company. Its assets were sold to Hutcheson Kohl, a company based in San Francisco. Hutcheson Kohl later became the Alaska Commercial Company which to this day remains a major commercial source of western goods in the region.

The American government did not take an active interest in its new purchase for several decades—at least not in this area of Alaska. In 1868 Captain J. W. White in the United States Revenue steamer *Wayanda* made a cursory visit to the area, stopping long enough at Nushagak to make a description of the old Alexandrovsky Redoubt (VanStone 1967)

With the sale of Alaska to the United States, the Russian Orthodox Church was in a quandry. The Russian American Company supported the Russian Orthodox Church. The company's departure from

the area significantly undermined the church's base of support and amounts for a loss of missionary personnel. With fewer clergy some areas received fewer or no visits.

Into this perceived void stepped Sheldon Jackson, a Presbyterian who had been working in southeast Alaska since 1877. He undertook a series of public lectures during the early 1880's advocating the need to bring Alaska Natives into Protestant Christianity. His crusade influenced Moravian Church officials to send a mission to the lower Kuskokwim in 1884. Having established a mission on the Kuskokwim another was quickly thereafter established near Nushagak in 1886 (Oswalt 1990; VanStone 1979).

The Russians first looked at developing a commercial fishery from the abundant resources in Alaska but the commercial saltery never became viable. In the meantime canning technology continued to improve and by the 1870s canneries became more commercially viable. During this period commercial fishing developed on major rivers in California, Oregon, British Columbia and Southeast Alaska. By 1883 the first cannery in Nushagak Bay appeared at Kanulik. After that many more were established throughout the area. By 1908 there were 10 canneries in Nushagak Bay alone, and by the 1920s 25 were operating within Bristol Bay with floating canneries starting to make an appearance. Initially, salmon were caught from sailboats with gill nets. Power boats were introduced in 1922 but were quickly banned.

The blocking of river mouths with fish dams and over-harvesting methods resulted in poor returns for the commercial fishing industry as well as poor subsistence fishing. The Bureau of Fisheries tried to stem the tide of illegal and over-fishing, but was ineffective due to lack of enforcement. A 1918 program initiated a practice of installing stream guards on major salmon streams. These men lived in small huts at remote locations for the season. Subsequently the salmon markets dropped.

Native involvement in the commercial fishing industry was severely limited until after WWII. The canneries imported most of their labor for both the cannery operation and the fishing crews. The Chinese Labor Exclusion Act of 1904 and its extension reduced the number of imported Chinese workers, but canneries responded by importing Filipino and Mexican laborers. The organization of fishermen's unions began the fight for local inclusion in the commercial fishing industry. Wages from commercial fishing still makes up a significant portion of Native peoples' income in the region (Selkregg 1998).

For the next several decades Federal attempts at regulation of the commercial fishing industry were weak. During this time commercial fish traps were used by the big cannery companies which both effectively lowered the number of salmon reaching spawning grounds and shutting out local seine fishermen. Outrage by Alaskans against the big companies which were owned by outside interests fueled a campaign to have fish traps outlawed. The effort was only partially successful. Some traps were closed for conservation reasons. Meanwhile cold storage technology and improved transportation made it possible for the big companies to get relatively fresh fish to markets (Lichatowich 1999).

Unlike much of the rest of Alaska there were no gold stampedes of any significance. However, the presence of gold strikes in other areas, however, did result in a backwash of ever hopeful prospectors entering into this country. Small amounts of gold were found near the confluence of the Kakhtul and Mulchatna rivers in the late 1880s.

The significant mining story of the region began in 1926 by Walter Smith, a Native from Chagvan Bay. While prospecting near Goodnews Bay he encountered a strange dull grey heavy metal ore which turned out to be platinum. On this news a modest 8-10 miners entered the area and began prospecting (Lindstrom and Olson 2004). This was just the beginning of platinum mining in the Goodnews Bay area.

When Andrew Olsen and Walter Culver met on a train between Seward and Anchorage in the spring of 1933 the biggest platinum mine in the United States was born. Olson was on his way to Flat where he and his brother and partners operated a dragline operation. Culver was planning a prospecting trip to Goodnews Bay. By the spring of 1934 a dragline and elevated sluice box were on their way to Goodnews Bay. The operation was so successful that a dredge was in operation by 1937 (Johnson 1940).

Smith (1938) describes the Goodnews Bay mining company as "the outstanding development in the platinum-mining industry in Alaska, as well as the United States proper." Later during WWII when most gold mining operations were shut down the platinum mined at the Goodnews Bay Mining Company was listed as critical and the mine was one of few that continued to operate through the war.

Current Status

Most of the blocks of BLM land or Native-selected land within the planning area lie within the lands traditionally inhabited and used by the Central Yup'ik. Within the region a number of surveys have been conducted along the coast, major rivers and some of the lakes and upland areas. On BLM lands there has been limited permitted use except for mining in the Platinum area and wide ranging guiding operations. Few archaeological surveys have been done on BLM lands due to limited accessibility and resource development. BLM archaeologists have performed on the ground inspections of mining and permitted activities over the last several decades. Typically they inspect adjacent areas as time and logistics permit; recording properties as encountered.

The Bureau of Indian Affairs ANCSA program has recorded many properties while doing ongoing 14 (h)(1) inventories on Native-selected lands. During the late 1970s and early 1980s Robert Ackerman and his crews surveyed both BLM and USF&WS lands in the drainages of the Goodnews Bay area. Robert Shaw also surveyed BLM lands during this time period on Hagemeister Island and in the Goodnews Bay area. In 2004 a research permit was issued to the University Museum (University of Alaska, Fairbanks) for archaeological survey at Canyon Lake, an interior area of the Goodnews Bay region (Odess 2005).

(2) Alutiiq Area Prehistory and History

Overview of Archaeological Data from the Region and the General Area

The Paleoarctic tradition within the upper Alaska Peninsula dates to between 8000 B.C and 5500 B.C. It is best known from interior sites from the uplands of the Alaska Peninsula. The oldest sites are known from the upper Ugashik drainage located farther down the Alaska Peninsula and outside of the planning area (Dumond 1981). The tools recovered from these paleoarctic sites imply a life style based upon large land mammal hunting, presumably caribou. People during this period are thought to have been extremely mobile; living in skin tents and following game.

There is a 2500-year break between the Paleoarctic period and the Northern Archaic period. This may be the time when interior hunting people settled the coastal areas and learned a maritime subsistence lifestyle as evidenced by the Ocean Bay 1 sites found along the coastal areas of Kodiak Island, the Alaska Peninsula, the east side of the Kenai Peninsula and the Prince William Sound area (Steffian 2001). Ocean Bay tradition peoples developed many specialized tools for maritime subsistence. Continuing relatively smoothly from the Ocean Bay tradition is the Katchemak tradition, in which dwellings became larger and more permanent, maritime subsistence became more refined, the carving of bone and stone became an art form, and ceremonial life became more elaborate. The region at this time appeared to be a crossroads for cultural contact as seen archaeologically by the appearance of ground slate and oil lamps from this region appearing in a wide arc. At the same time toggling harpoons from the north, labrets from the Northwest coast and pottery types from Siberia made their appearance here (Crowell and Luhrmann 2001).

Historic Native People

From excavations on Kodiak Island, archaeologists believe that the Alutiiq descended smoothly from the end of the Katchamak tradition (Jordan and Knect 1988). The Thule migrations from the north may have displaced Alutiiqs, especially within the plan area on the north side of the Alaska Peninsula. Dumond's (1987) work shows prehistoric Alutiiq occupation on the upper course of the Nakek River and on the Savonovski River for approximately 4,500 years, with a focus for the first 500 years on hunting (most likely caribou) and fishing during the last 4,000 years.

Over time the late prehistoric Alutiiq most likely moved down the river drainages to the coast. The later migrations of the Central Yup'ik group, the Aglemiut, most probably displaced Alutiiq people living near the mouth of the Naknek River. By historic times the Alutiiq living within the plan area were living in the Naknek Lake/Savonoski drainage area (Crowell and Lurhmann 2001).

Russian Period

The Russian presence within this area essentially reflects what occurred within the Central Yup'ik area. The Russian fur trade for this part of Alaska was administered from Three Saints Bay on Kodiak Island in 1784. However, the trading post was located at the mouth of the Nushagak River at Alexandrovsky. Redoubt had the most contact with people of this area. It was established during the 1818-1819 exploration of Bristol Bay and the coastal areas to the north.

American Period

In 1867 Alaska was sold to the United States. American influence on the Alaska Peninsula came slowly. The first substantive American contact came with missionaries who arrived in the late 1880s. This was followed by the establishment of various commercial fisheries which were developed soon after.

On June 6, 1912 Novarupta erupted, sending more than 5 ½ cubic tons of debris into the air. This was a significant historical event for this region and it also leaves a datable stratigraphic mark upon undisturbed historic and prehistoric sites of this region. The ash fall at the village of Savonoski was so massive that the people moved down river to the mouth and established New Savonoski.

Current Status

There are no BLM lands within the area traditionally inhabited and used by the interior Alutiiq. Fairly extensive surveys and excavations have occurred along the length of the Naknek drainage.

(3) Dena'ina Area Prehistory and History

Overview of Archaeological Data from the Region and the General Area

The Iliamna - Lake Clark area is not a well known area archaeologically. What little survey work that has been done in this area has been concentrated around the lake shores and specific areas of projected construction (Kodack n.d.; Yarborough 1986). This work essentially documents the late prehistoric occupation of the area. Smith and Shields (1977) added some sites but not much time depth. They give some suggestions for older site locations at slightly higher levels than present day lake shores and caves and also suggest that water fluctuations may have destroyed information for some periods. Inventory in this area otherwise has not been as actively pursued as more accessible, less heavily vegetated areas. In spite of this situation there are indications from the broader region that this area has long been inhabited.

The best evidence so far for time depth comes from Yarborough's 1986 survey of the eastern terraces of the Tazimina River. He found a microblade core fragment and a retouched flake. As can be seen from the more recent historic sites and the continuity of a subsistence lifestyle still practiced today, this is an area with bountiful resources.

Historic Native People

The Dena'ina living in the Iliamna and Lake Clark area as well as those of the upper Mulchatna and Stony rivers are grouped together as the Interior Society. This is one of three societies within the Dena'ina. The Interior Society has a subsistence focus upon salmon. They also rely upon large land mammals, waterfowl, fresh water fish, and berries in season. The group around Iliamna Lake harvests seals since

this is one of the few freshwater lakes in the world with a resident seal population. The Iliamna group also travels to Cook Inlet to hunt beluga (Townsend 1965; 1981).

All societies maintained winter villages from which they set forth seasonally to collect and hunt the foods they depended upon. Until the middle of the 19th century villages tended to be hidden to foil attacks. After this period winter villages were located along the shores of rivers and lakes. By 1906 Dena'ina houses in the Iliamna-Lake Clark area were all above ground structures although the Iliamna Eskimo still had semi-subterranean houses (Townsend 1981; VanStone and Townsend 1970).

Russian Period

By the 1790s it was obvious to the Russians plying the fur trade in the coastal waters of Alaska that the marine mammal fur market was declining. A shift toward land mammal furs took place and exploration of the interior became more attractive (Solovjova and Vovnyanko 2002; VanStone 1988). Valsily Kvichak explored the Kvichak River and north along the coast as far as the Kuskokwim perhaps even to the Yukon as seen in composite maps drawn by Kobelev in 1779 (Oleksa 1990). One of the competing Russian fur trading companies, the Lebedev-Lastochkin company, began actively operating in the Iliamna area in 1796 (Solovjova and Vovnyanko 2002).

A year later a party from the largest competitor, Shelikov's company, visited the Iliamna artel (a small fortified settlement). Medvednikov and Kashavarov visited the Iliamna artel with a small party and described it as containing a barracks, several Dena'ina-style bark houses and a stockade complete with a guard and sword. A man named Tokmanov was in charge of fifteen Russians and Kamchatkans. All of them were married to Native women and had children (Solovjova and Vovyanko 2002).

Around this time Vasily Ivanov, heading a group of Russians and Dena'ina, explored to the north of Iliamna. Because only secondhand accounts of this trip and its route survive, it is not known but it is believed that they went across Iliamna, Lake Clark, up the Mulchatna to either the Stoney River or Holitna River and down the Kuskowim as far as Ohagamiut then portaged across to the Yukon (Solovjova and Vovyanko 2002; VanStone 1988). In 1798 the Iliamna artel was destroyed by Natives and it was not until 1821 that another Russian trading post was established in the area (Vanstone and Townsend 1970).

During Korsakovsky's 1818 trip he left some of his party at the mouth of the Nushagak to build Alexandrovsky Redoubt and ascended the Kvichak to Iliamna where he met Eremy Rodionov who offered to lead a party north to Lake Clark and the upper reaches of the Mulchaltna River. This trip was very similar to that reported for Ivanov. The September return trip brought the travelers back to Iliamna then overland to Cook Inlet and back to Kodiak (VanStone1988). This travel route between Iliamna and Cook Inlet was not surprising considering the Iliamna Dena'ina ties with Cook Inlet Dena'ina. After the Russians established themselves in the Cook Inlet area, trade with the interior Dena'ina was conducted through Cook Inlet Dena'ina middlemen as well as directly with posts around Cook Inlet and the Kenai Peninsula (Townsend 1981; VanStone and Townsend 1970).

American Period

As elsewhere in this region, the American period started slowly. The 1867 purchase of Alaska did not immediately result in much attention or change in the lives of the people living in this area. In the 1880's commercial fish traps set at the mouth of Kvichak River resulted in so little escapement that people at Nondalton faced starvation and had to rely on "backup" drainages for fish like the Kuskokwim River (Ellanna and Balluta 1992). Other shortages resulted because of similar blockages on other rivers connecting with Iliamna and Lake Clark (Townsend 1981). A reindeer herd was established at Iliamna in 1905 to help the economy. Some Dena'ina became herders but this endeavor was never very successful and herding all but disappeared by the 1940's (ibid). Like the Central Yup'ik and Alutiiq, the Dena'ina were eventually able to participate in the commercial salmon fishing industry during the 20th century after breaching the barriers to local employment. Their continued participation in that industry is an important part of the local cash economy today.

Current Status

Very little BLM land or Native-selected land lies within the area traditionally inhabited and used by the Dena'ina. There has been limited permitted use except for wide ranging guiding operations for these isolated parcels. Little on the ground inventory has been done for these smaller parcels due to the high costs to access such remote parcels coupled with the lack of ground disturbing projects at these locations. Smith and Shields performed a survey on primarily NPS lands in the Lake Clark area in the late 1970s but also found sites on adjacent small BLM parcels.

10. Paleontological Resources

a) Introduction

The paleontology program is responsible for the identification, evaluation, monitoring, and protection of fossil resources on BLM lands.

An inventory of known paleontological resources on selected BLM lands was contracted in 1986 (Lindsey 1986). This study was done from available literature. Two BLM land blocks lie within the current planning effort. Area 1 encompasses the BLM block lying within the Dillingham, Iliamna, Naknek and Mt. Katmai quadrangles. Lindsey's Area 2 encompasses BLM lands within the Goodnews Bay quadrangle. An examination of the Alaska Paleontological Database (alaskafossil.org) shows no scientifically significant discoveries more recently reported for BLM lands within the planning area.

While none of these finds has been assessed as scientifically important, any earthmoving projects should be assessed with on the ground inspections.

b) Nushagak/Iliamna/Naknek Region

Lindsey's (1986) Area 1 encompasses the BLM blocks lying within the Dillingham, Iliamna, Naknek and Mt. Katmai quadrangles. While Lindsey reported that no fossils have been reported from this area, the extensive Quaternary deposits present the potential for future finds. Mammoth remains were excavated by archaeologists in secondary context in Naknek although none is known from BLM lands (Dumond and VanStone 1995).

c) Goodnews Bay Region

Lindsey's Area 2 encompasses BLM lands within the Goodnews Bay quadrangle. Small, poorly preserved Permian brachiopods and a Jurassic bivalve are both reported for the Gemuk group. While these fossils may be useful to determine the age and stratigraphy of the Gemuk Group, no special management of these resources is recommended. Findings of Jurassic age radiolaria and fragmentary ammonites have also been reported for the Goodnews Bay and Hagemeister Island quadrangles (Hoare and Conrad 1978).

11. Visual Resources

a) Visual Resources Management Introduction

Scenic quality is an essential component of most recreation activities. In Alaska, the opportunity to experience a natural environment that has been, for the most part, undisturbed by modern human influence, creates a romantic image that appeals to recreationists across the globe. The wide-open spaces, and relatively few public roads throughout the state make recreating in Alaska an appealing

destination. BLM uses Visual Resource Management (VRM) on BLM-managed lands within the Bristol Bay planning area to manage the quality of the landscape. Management objectives include minimizing potential impacts to visual resources resulting from development activities.

The visual resources of BLM-managed lands within the Bristol Bay planning area were inventoried and classified in accordance with procedures outlined in BLM Handbook 8410-1 (BLM 1986). This involved identifying the visual resources through a photo inventory process and use of data collection sheets, and then assigning the areas to Visual Resource Inventory classes. These classes do not establish management direction, but are used by management to ultimately establish VRM Management classes that will be codified in the final Bay RMP. VRM Inventory classes are assigned through the inventory process while VRM Management classes established in the final RMP.

The four different VRM classes (the same for both Inventory and Management Classes) identify the objectives for managing visual resources on BLM lands. The class assignments take into consideration the value of the visual qualities of the existing landscape and anticipated future land uses, and define the maximum amount of landscape alteration and surface disturbance that can occur.

BLM evaluates visual values based on a rating system that looks at:

- Scenic Quality: the visual appeal of a piece of land,
- Sensitivity Level: the levels of use and public concern for the scenic qualities of the land, and
- Distance zones: the relative visibility of the landscape from access routes and observation points.

Based on these factors, lands are placed in one of four visual resource inventory classes. Inventory classes II through IV (the lowest) are assigned based upon the combined scores from the three factors, while class I is reserved for lands previously designated by Congress or administratively to preserve a natural landscape, such as a Wilderness area or a wild portion of a Wild and Scenic River.

During planning, BLM assigns VRM classes. These define the visual objectives that BLM intends to achieve for its lands. The objectives for VRM classes are:

Class I Objective. The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II Objective. The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III Objective. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV Objective. The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

b) Description of Bay Visual Resources

Visual resources on BLM lands in the planning area are concentrated in three geographic areas that tend to demonstrate similar scenery: a Goodnews Bay Block in the west, a Nushagak/Kvichak Block in the central portion and an Illiamna Block in the east.

Goodnews Block.

The Goodnews Bay Block consists of large tracts of selected and unselected BLM lands located in the Goodnews River and Arolik River watersheds including coastal plains, slopes and mountains on the Bering Sea to the west and river plains and the Ahklun Mountains to the east. These low mountains and hills can be rather steep and rugged, or support gentle, tundra-clad slopes that increase in elevation towards the northeast, often containing cirques and other glacial features, rock outcrops, talus slopes and cliffs. Shrubs and tundra dominate the block while trees are generally lacking, except in the broad riverine bottoms and along various tributaries where alder and willow predominate. Expansive tundra-covered coastal plains bisected by sinuous west-flowing rivers including Indian and Cripple Creek bound the Pacific Coast western side of the Goodnews Block. Much of this BLM land is adjacent to the 700,000 acre Togiak National Wildlife Refuge, portions of which are managed as designated wilderness by the US Fish and Wildlife Service. Remnants of commercial gold and platinum placer mining activities are occasionally visible near Goodnews Bay to the south.

Nushagak/Kvichak Area

The Nushagak/Kvichak Area, in the central portion of planning area, contains selected and unselected BLM lands in the middle watersheds of the Nushagak, Kvichak, and Alagnak Rivers, reported to be some of the most productive salmon fishery and spawning waters in the world. The land between these rivers and that situated to the west and east, is a vast patchwork of lowland wet tundra, broad low ridges of successive ancient moraine deposits supporting scattered stands of dwarf birch and black and white spruce, sand blows, and thousands of pothole lakes and tributary streams. The land is rich in moose and salmon, rainbow trout and seasonal caribou. The BLM lands in this region bound the Alagnak Wild River and Katmai National Park and Preserve, both administered by the National Park Service, and a small portion of the Becharof National Wildlife Refuge.

Iliamna Area

The Iliamna Area incorporates mostly Native-selected and State-selected lands north, south, and east of Illiamna Lake, and contains the highest mountains and most stunning scenery in the planning area. This includes rocky, snowcapped mountains towering 4,000 feet above short valleys that drain to Illiamna Lake, with heavier white spruce forests and frequent outcrops of glacially smoothed rock below the dry tundra slopes above tree line. BLM lands in this block share boundaries with Lake Clark National Park and Preserve as well as State of Alaska and Bristol Bay Native Corporation lands. Based upon Alaska Native selections and the State of Alaska's priority list for conveyance, the vast majority of BLM lands in this block, including the high mountains and ridges, are likely be conveyed out of BLM ownership. Virtually all lands in the Illiamna Block are slated to be conveyed.

c) Condition and Trend

High quality visual resources are in ever greater demand nationally and internationally as commercial, residential, and industrial development associated with growing populations impacts these resources. The quality of visual resources is a critical element in an observer's impression of a landscape and is in great demand by the local residents as well as the many individuals and users who fly over and recreate on public lands in Alaska.

The quality of visual resources directly impacts the quality of a resident's everyday life as well as a given visitor's overall Alaskan experience. Visual resources are therefore very important to the residents, to the

visitors who recreate in the planning area, and to the many commercial businesses that serve them. Both the numbers of visitors, sportspeople, and rafters that are drawn to the area's wildlife, topography, and scenery and the local commercial enterprises that transport, lodge, and guide them are linked to this demand.

Much of the land in the planning area consists of wildlife refuges and national and state park lands administered by the U.S. Fish and Wildlife Service, National Park Service, and Alaska State Parks. Although the annual visitation statistics fluctuate, all agencies are experiencing increases in visitation over the long term according to their public statistics, and predict it will continue to increase, as greater numbers of national and international travelers discover and visit these public lands. Travel forecasts by the Alaska travel industry also continue to predict increases in Alaska tourism as more and more visitors are attracted to Alaska's wild lands to hike, fish, hunt, and especially, sight-see.

Outside visitation varies widely over the planning area, but tends to concentrate in the central and eastern salmon and rainbow-rich watersheds of the Nushagak, Kvichak, Alagnak, and Naknek Rivers. The Alagnak River Wild River and adjacent Katmai National Park and Preserve draw over 50,000 sightseers, fisherman, and float enthusiasts annually. Numerous fishing and hunting lodges operate along these drainages, and many more flying services based in Dillingham, King Salmon, Illiamna, Anchorage, and other locations provide transportation to fishing, hunting, and rafting locations throughout the planning area. The quality of visual resources is extremely important to the financial health of these local businesses, outfitter-guides, and transporters who cater to the needs of area visitors.

Local residents in the planning area express a strong appreciation for the quality of the unaltered visual landscapes that surround them and often speak in terms of the recreational and spiritual benefits they gain from these natural landscapes. The majority of the residents in the planning area practice subsistence lifestyles and travel the land year-round, harvesting natural products including berries, salmon, moose, and caribou, accessing trapping and fishing sites, and conducting social and business activities. Travel patterns concentrate along the main waterways, both summer and winter, and the heaviest used lands tend to be closely associated with the river corridors. In the snow season, residents also utilize an extensive system of winter trails, well-marked with tripods, reflectors and GPS locations, to travel between villages and throughout the area for school and church events, business and family needs.

The quality of visual resources as viewed from the air are especially significant on an area-wide scale as virtually all recreational users and many local citizens access the country by aircraft. This includes both scheduled commercial flights between communities with larger airports including Illiamna, King Salmon, Bethel, and Dillingham, as well as service to smaller villages who all maintain gravel airstrips. Private pilots and transporters annually fly thousands of flights into the bush supporting flightseeing, recreational and subsistence activities. Alaska Fish and Game harvest records for moose, bear and caribou hunts in the BBPA from 1983-2002 indicate that aircraft delivered 46% of these hunters into the field.

Visual resources in the planning area are essentially pristine. With the exception of ATV tracks radiating out from villages, vestigial summer scars of overland snowmachine routes, occasional airstrips, infrequent abandoned mining operations and various lodges, fishing camps, boats and aircraft along the waterways, the visual resources in the planning area are virtually undisturbed from their natural state. Although difficult to quantify, the vast majority of residents and visitors in the planning area share an appreciation for these natural, uniquely Alaskan, visual landscapes.

d) Visual Resource Management Classes

The 1981 Southwest Management Framework Plan (MFP) addresses VRM considerations, but covers only a portion of the actual land within the planning area. Objective VR-1 states "Allow only very limited visual change in areas designated "Wild" portions of Wild and Scenic Rivers." These areas are to be designated VRM Class I which provides for primarily natural ecological changes in visual resources, but does not preclude limited management activities.

The MFP VR-2 objective is to "Maintain the visual quality of the planning area." The rationale further states that "The planning area is virtually undisturbed by human activities. Any major development would be highly visible from aircraft. Development should be designed for minimum impact to visual resources and to reduce unnecessary surface disturbance."

The MFP multiple-use recommendation calls for evaluating all proposed management activities using the visual resource management contrast rating system and encouraging activities that are compatible or designed to be compatible with the character of the natural landscape.

Current management practices require that a specialist analyze the visual resource impacts of proposed actions on a case-by-case basis. BLM's policy is to minimize impacts to visual resources and place stipulations on permits to accomplish this goal. To date, most VRM actions in the planning area have been applied to communication tower permits and have addressed mitigation issues related to structure heights and color schemes.

Identifying and monitoring visual resources in the planning area is extremely difficult and costly due to the vast size and remoteness of the land, and the scattered nature of BLM holdings. BLM staff often learn about developing and existing conditions through conversations with pilots, SRP holders, land managers from other agencies, and local residents and visitors.

Current demands on visual resources beyond the expectations of visitors and adjacent land management agencies have the potential to degrade pristine VRM values. Unlimited and unregulated OHV traffic, increases and expansion in lodge construction and visitation, increases in transporter and charter trips to the area, and utility and infrastructure development associated with human development all have potential to affect VRM throughout the planning area.

There currently are no new mineral development proposals for BLM lands in the planning area. However, the development and associated infrastructure of new mining activities may affect visual resources in the planning area. Future exploration and development of deposits may also affect the visual landscape.

The planning area holds limited potential for commercial timber sales although no permit requests have been received in the last ten years. Free use permits for domestic fuel wood and house log use are authorized by 43 CFR 5511-2.1, but also have not been requested in the past ten years. NEPA documentation for either uses would address VRM elements on a project specific basis and include VRM stipulations as appropriate.

An analysis of wildfire history in the planning area from 1950-2004 shows limited wild-land fire activity compared to other Alaska locations. Smoke management, fireline construction, and other impacts of suppression activities have the potential to affect visual resources and visual resource impacts and will be taken into consideration in the event of large wild land fire events.

The impacts of climate change on visual resources in Alaska have already been recognized. Shrubs and small trees are colonizing former tundra landscapes above the traditional northern limit of tree growth, and an increased incidence of wildfire frequency and intensity seems to be occurring. The future effects of climate change on visual resources in the planning area may be widespread and profound, but with the exception of fire, these impacts may not necessarily reduce the quality of the visual landscape.

C. Resource Uses

1. Forest Products

The Alaska forest resource program is essentially custodial management. No commercial demand exists for forest products from BLM lands in the planning area. Most lands with forest resources are located in remote areas with poor to non-existent access (Maps 3.9 a-d). Many of the timber stands on BLM lands are several hundred miles from the nearest road. State and Nationwide program goals seek to protect and enhance forest health and provide forest products commensurate with public and industry demand, which in the planning area is very low to nonexistent.

2. Livestock and Reindeer Grazing

a) Livestock Grazing

Livestock Grazing and Range Management includes the management of vegetative forage, animal husbandry and associated facilities on public lands used for domestic livestock including cattle, sheep, horses, mules, goats, pigs, and turkeys. Bison, yak, llama, moose, caribou, elk and other exotic or native species are not considered livestock for the purpose of public land grazing.

Currently there are no BLM livestock grazing leases, permits or special land use or recreation permits for grazing in the planning area. If there is a need in the future for a livestock grazing permit, BLM has the authority to issue such a permit in accordance with the provisions of the Alaska Livestock Grazing Act, 43 U.S.C. 316, 316a-316o. Small scale and casual use commercial and recreational demand for livestock use and grazing associated with big game hunting or other pursuits does not presently occur in the planning area. There is no current demand for livestock forage and grazing privileges on BLM-managed lands in the planning area, nor has there been any during the past 20 years.

There are no grazing management guidelines for the planning area that relate to livestock class, range suitability criteria, range standards, seasons of use, livestock preferences and palatability of plant species, or ability of plant communities to maintain species composition, productivity, ecosystem function, or viable grazing systems. The suitability, capability, compatibility, distribution and quantity of plant resources available for livestock grazing have never been assessed and evaluated.

Also lacking for BLM lands in the planning area is a forage allocation procedure that takes into account the mix of wild and potential domestic species for Bay area ecosystem maintenance. Lands suitable for livestock grazing on a sustained yield basis have not been formally evaluated for compatibility and suitability in the planning area. Although preliminary vegetation studies and land-cover mapping for the planning area have been done, no ecological site survey has been completed within the planning area.

Management recommendations addressing grazing management in the Southwest Management Framework Plan (1981) for the Goodnews Bay block only called for a range inventory to determine carrying capacity and to provide seasonal grazing for domestic livestock including reindeer and musk oxen on a local level where there was public demand and where it was compatible with other uses considered in that plan (BLM 1982). The remainder of the planning area is not covered in any previous BLM land use plan, activity plan or special plans.

The Alaska Department of Fish and Game's 2004 Bristol Bay Regional Management Plan does not address livestock or reindeer grazing. Neither the Togiak, Becherof/Alaska Peninsula Plan, nor the Maritime National Wildlife Refuge Plan allow livestock or reindeer grazing. The Maritime NWR has had conflicts with feral livestock and reindeer in island settings outside of the planning area. The grazing of

livestock, including reindeer, is not an allocated use in the Lake Clark National Park and Preserve, the Katmai National Park and Preserve, or the National Wild and Scenic Rivers System units in the planning area. Military land use plans for the planning area do not include grazing as a compatible use.

Requests for livestock grazing permits for BLM lands will be evaluated on a case-by-case basis. Grazing by saddle and pack animals may be authorized on a case by case basis.

b) Reindeer Grazing

Reindeer grazing, which at one time was a widespread activity in Alaska, is no longer practiced in the planning area. Historically, reindeer grazing was introduced in the 1890s in portions of the planning area but it did not continue beyond the 1950s. No interest or inquiry regarding reindeer grazing on or adjacent to BLM lands in the planning area has occurred in the past decade or more. Future requests for reindeer grazing permits will be evaluated on a case-by-case basis.

3. Minerals

a) Leasable Minerals

(1) Regional or National Demands

Oil and Gas

Maps 3.27 and 3.28 provide the geology and mineral terranes for the planning area. Commercial demand for the oil and gas resource from the Federal domain within the planning area is expected to be low during the life of the plan. Oil and gas resource demand for local energy needs may increase as technological advances are made and if the economics of developing local energy resources is more beneficial than shipping diesel fuel into villages. Exploration and development is driven largely by the price of oil and gas.

Outside of the village communities, the planning area is remote, has no production of oil and gas, and little or no infrastructure. A large accumulation of oil and gas is necessary to justify the exploration and development of remote areas within the planning area. Unless a large deposit of oil and gas is identified in these areas, the likelihood of development of oil and gas is low. There is, however, a possibility of interest in developing small oil and gas deposits for local use if a prospect is found close to a Native village. In addition, the State of Alaska is in the process of licensing approximately 329,000 acres adjacent to BLM lands in the planning area. The State's licensing activity may provide additional knowledge of oil and gas reserves in the area. Prospects for oil and gas exploration and development in the planning area are presently uncertain.

Coal and other Leasable Minerals

There are no known occurrences of any type of coal on Federal lands in the planning area and there are no existing coal leases. The local demand for these resources is not likely to change during the life of the plan.

There are few occurrences of potential geothermal resources in the planning area. Katmai Pass Hot Springs are located in the Katmai National Park within the Mt. Katmai A-4 quadrangle and is located on the boundary of the Bay RMP. The springs are located in Katmai Pass between two volcanoes (Mt Mageik and Mt Cerberus). There are several other volcanoes, including Novarupta within a five mile radius. Data from USGS Professional Paper 492 does not give actual temperature of the springs, but rather classifies it as hot (over 50° C). The hot spring is associated with volcanic lava. Deposits of ocher (used as a pigment) and sulfur are known to occur here (Waring, 1965).

Mt. Katmai Hot Springs are located about seven miles to the west-northwest of the Katmai Pass Hot Springs within Katmai National Park–just outside the planning area. The springs are associated with volcanic lava and tuff and are classified as hot. Several springs and fumaroles are present (Waring 1965). Fumaroles, mud pots, hot springs, and a mud geyser have been noted in the Mt. Katmai crater (Motyka 1977).

In the mid-1980s, the National Park Service received a proposal on conducting a drilling investigation of the 1912 eruption of Novarupta Volcano. Scientists chose Novarupta because their research objectives required a volcanic site of recent eruptive activity with a relatively simple geologic structure, and Novarupta is probably the only known location where a vent of a large explosive eruption is preserved without the collapse of its structure. Since the site was located within the National Wilderness Preservation System, Congressional approval would be necessary (Norris 1996). Sandia Laboratories conducted field investigations and geophysical surveys in 1989 to determine a proposed drill site (US DOE 1991). Upon completion of the surface phase, it was determined two core holes would target the vent and one would target the ash-flow sheet (Motyka 1993).

The goal of the project was indirectly geothermal as the holes would test the rate at which magma cooled below the surface as well as the mineralization associated with the magma. Precise gravity and magnetic measurements were taken at 150 points near Novarupta to pinpoint the size, shape, and location of the vent. The holes would reach a total depth between 700 and 4,000 feet. Drilling would wait until the NPS had issued an EIS (which was originally scheduled to be completed in 1991). Various political developments slowed progression, and the EIS was rescheduled for completion by 1994. Sandia had their plan of drilling operations prepared for 1995. However, just before the drift EIS was released in 1993, the Department of the Interior's Secretary's office convinced the Interagency Coordinating Group to withdrawal the proposal. The project was officially abandoned in spring of 1994 (Norris 1996).

Geothermal leasing is not permitted within a unit of the National Park System as per 43 CFR 3201.11. However, development potential of these geothermal resources within the Katmai National Park would have to be approved by the National Park Service, which is highly unlikely during the life of the plan.

There are no occurrences of potential phosphates, oil shale, or sodium resources in the planning area.

(2) Local Dependence on Public Lands

Currently, there is no local dependence on Federal Lands within the planning area for leasable minerals resources.

There has been no oil and gas leasing in the planning area to date (Map 3.29). Leasing on BLM lands in the planning area cannot occur until the completion of the land use planning process. Leasing on U.S. Fish and Wildlife Service (USF&WS) refuge land has been deferred by the USF&WS until they make a determination in their land use plan as to whether leasing is compatible with the purposes for which the unit was established (see ANILCA section 1008.(a)). The National Park Service allows for leasing in their planning units only when drainage is occurring and, then, only with a "No Surface Occupancy" stipulation. There are no Forest Service lands in the planning area.

Geophysical operations may be conducted regardless of whether or not the land is leased. Notices to conduct geophysical operations on BLM's surface estate are received by the field office. Administration and surface protection are accomplished through close cooperation with the operator and BLM. Surface use restrictions, if needed, are applied as conditions of approval to address surface resource concerns.

There currently are no coal leases within the planning area. Unless an area is specifically closed to exploration, all unleased BLM lands subject to leasing under 43 CFR 3400.2 are open to coal exploration. Leasing would not occur until a site-specific screening process has been carried out along with an appropriate environmental analysis.

Geothermal leasing is not permitted within a unit of the National Park System as per 43 CFR 3201.11. Development of geothermal resources within the Katmai National Park requires National Park Service approval, which is unlikely.

There are no leases on the Federal estate for other minerals in the planning area. Unless an area is specifically closed to exploration, all unleased BLM lands subject to leasing under 43 CFR 3503 are open to prospecting.

b) Locatable Minerals

(1) Mineral Terranes

The Bay planning area is underlain by eleven Mineral Terrane units whose geologic settings are considered highly favorable for the existence of metallic mineral resources (Resource Data, Inc. 1995) (Map 3.28). Specific mineral deposit types and associated commodities are more likely to exist within each terrane based on a terrane's particular geologic nature. Just because a specific geologic terrane is more likely to contain certain mineral deposit types does not necessarily mean that economic deposits exist within that rock unit. Unmapped areas are generally evaluated as having poor to only moderate mineral potential.

An analysis of the eleven mineral terranes, identified within the planning area, indicate potential for 17 mineral deposit types containing a number of different mineral commodities (Schmidt and others, 2007).

The areas underlain by intermediate granitic rocks (IGI), granodiorite and quartz diorite are favorable for copper, gold and molybdenum deposits. Areas underlain by felsic granitic rocks (IGF), granite and quartz monzonite are favorable for tin, tungsten, molybdenum, uranium and thorium deposits. Areas underlain by undivided granitic rocks (IGU) are favorable for uranium, thorium, rare-earths, tin, tungsten, molybdenum, copper and gold deposits.

Areas underlain by mafic intrusive rocks (IMA) (gabbro locally includes mafic-rich intermediate rocks), are favorable for copper and nickel deposits with byproducts of platinum and cobalt. Areas underlain by ultramafic rocks (IUM), peridotite and dunite, are favorable for chromium, nickel, and platinum group metal deposits with byproduct cobalt. Areas underlain by undivided felsic volcanic rocks (VFU), rhyolite and quartz latite are favorable for copper, lead, and zinc deposits with byproduct silver and gold. Areas underlain by undivided mafic volcanic rocks (VMU), basalt, are favorable for copper and zinc deposits with byproducts of silver and gold. Areas underlain by ophiolite terrane (VOP), pillow basalt and associated mafic and ultramafic intrusives with minor chert and other pelagic sediments, are favorable for copper, nickel, and chromium deposits with byproduct platinum group metals and gold.

The areas underlain by undivided sedimentary and mafic volcanic rocks (VSM), basalt and associated sediments are favorable for copper and zinc deposits with byproducts of silver and gold. Areas underlain by graywacke and shale (SGS), interbedded graywacke and shale with minor volcanic rocks, are favorable for gold or a variety of metallic deposits. Coal-bearing sandstone and shale (SCB), coal-bearing continental sandstone, shale, and conglomerate, are favorable for coal deposits and vanadium.

(2) Geologic Units

The geologic units contained within the planning area are arranged in parallel belts oriented in a northeastern direction (Map 3.27). The area is not as well mapped as other parts of the state, and contains very little detailed geologic information. Many of the geologic maps for this region are old and have not been updated. For some areas, detailed geological maps, geophysical and geochemical work have been accomplished by private industry and the information is not publicly available. The following descriptions of the surface geology are taken from Beikman (1980). Subsurface geology for much of this region is largely unknown.

The oldest rocks within the planning area are a narrow belt of highly metamorphosed Precambrian rocks consisting of schist, gneiss, and small amounts of amphibolite and marble, which are at the far western boundary of the planning area near Quinhagak.

Adjoining to the east is a belt of partly metamorphosed Mesozoic volcanic and volcaniclastic rocks that surround the Goodnews Bay and Upper-Wood/Tikchik Lakes regions, known as the Gemuk Group. Within this unit are a few large bodies of Devonian limestone.

Continuing to the east is a thick belt of partly-metamorphosed stratified sedimentary rocks which are mostly of marine origin. Predominant in this belt is the Cretaceous Kuskokwim Group consisting of greywacke and shale. Dominant a little further to the east is a thick sequence of undifferentiated metasedimentary Cretaceous and Jurassic rocks, consisting of argillite, shale, greywacke, quartzite, conglomerate, lava, tuff, and agglomerate. This unit is separated from the Kuskokwim Group by large northeast trending faults. In places these rocks are highly metamorphosed to the amphibolite facies. North of Togiak extending to the Lower Wood/Tikchik Lake system is a block of Middle Jurassic rocks consisting of argillite, greywacke and conglomerate. North of Lake Iliamna is a block of Lower Jurassic rocks consisting of sandstone and argillite interbedded with volcanic flows and pyroclastic rocks. On the far eastern side of the planning area is a long belt of Upper Jurassic rocks of the Naknek Formation, which consists of sandstone, siltstone, shale and conglomerate.

North and south of Lake Iliamna is a Northeastern trending belt of Tertiary mafic volcanic rocks. There is also a thin belt of these rocks near Togiak. There is a small volcano/vent within this belt that has been active within historic times.

Interspersed through the planning area are a large number and variety of intrusive rocks. These are of particular interest as much of the known and potential mineralization within the area is associated with these rocks. The western portion of the planning area contains a large number of relatively small Tertiary felsic intrusive bodies. These are the probably the source of the gold found at Wattamuse Creek, and a possible source for silver, arsenic, antimony and copper mineralization. Nearby are small bodies of Jurassic mafic intrusives, and other Tertiary felsic intrusives that are mapped as a separate unit. North of Lake Iliamna Upper Cretaceous intermediate intrusive rocks are the probable host for the Pebble Copper deposit. Along the far western planning boundary within the Alaska Range is a long northeastern trending belt of Jurassic intermediate intrusives.

Within the Goodnews Bay region are a number of Jurassic ultramafic rocks, consisting of gabbros, hornblendites, dunites and other undifferentiated ultramafic rocks. These rocks are the probable source of the placer platinum found in the Salmon River and associated drainages.

The south-central portion of the planning area is dominated by Quaternary deposits of alluvium, glacial moraines, lake, aeolian, and beach deposits. These deposits generally grow thicker as one moves away from mapped bedrock geologic units. Additionally, most stream valley floors will be filled with Quaternary and Holocene alluvium.

(3) Minerals Occurrence, Potential, and Administration

Map 3.30 provides information about mineral occurrences for the planning area and Maps 3.31, 3.32 and 3.33 show the mineral potential for the planning area.

(4) History and Development

Pebble Copper-Gold-Molybdenum Deposit Area.

Within the northeast portion of the area is the Pebble deposit, a world-class copper/gold/molybdenum porphyry. The deposit is hosted in a north-east trending belt of Cretaceous intrusive rocks ranging from pyroxenite to granodiorite, hosted within Jurassic-Cretaceous andesitic siltstone and argillite. First

discovered in 1987, over 88,000 meters of exploratory drilling has occurred. The deposit is currently in the mine planning stage. Hundreds of square miles of State mining claims have been staked on and surrounding this deposit, which is located on State patented lands. The Pebble deposit contains inferred resources of 2.74 billion tons of ore, with 26.5 million ounces of gold, 16.6 billion pounds of copper, and 900 million pounds of molybdenum. These numbers are expected to change as further drilling and exploration occurs.

As of February, 2007, inferred resources at the Pebble Deposit are:

- 1.0% copper equivalent cutoff, total 1.4 billion tonnes grading
- 1.29% copper equivalent, containing 24.6 billion pounds of copper
- 20.9 million ounces gold
- 1.2 billion pounds of molybdenum.

Northern Dynasty has stated that the combined resources at the Pebble Deposit constitute one of the most significant metal accumulations in the world. In 2007, the company plans to focus efforts on Pebble East with an estimated 250,000 feet of drilling to further expand the resource and upgrade the classification of known mineralization (Northern Dynasty news releases, January 23 and February 20, 2007).

BLM will not have major involvement in the planning and permitting of the development of this deposit. However, the huge size of this deposit has created intense interest in finding other mineral deposits in this area with a potential of affecting BLM lands and resources in this portion of the planning area. A large claim block has been staked on Federal public lands to the southwest of the Pebble deposit on top of a suspected buried granitic intrusive, that may contain similar mineralization.

Lode Deposits

There are numerous known lode deposits within the planning area that have never seen mineral production, including deposits of gold, copper/gold, tin/tungsten, and iron/titanium. None of these deposits are located on BLM lands. Kasna Creek is a stratiform copper/lead/zinc skarn deposit located in the northeastern part of the planning area. There are reported reserves of 10 million tons of ore that grade more than 1% copper. To the east is Sleitat Mountain, a large high-grade tin/tungsten deposit, hosted in 59 million year old granite and hornfels. Inferred resources are for 64,000 to 106,000 tons of tin located within 29 million tons of ore. Within the north-central part of the planning area is Kemuk Mountain, a magmatic iron/titanium deposit hosted in Cretaceous pyroxenite. There are inferred reserves of 2.4 billion tons of ore that average 15-17% iron, and 2-3% titanium.

Just north of the northwest portion of the planning area is Shotgun, a gold/copper quartz stockwork and breccia deposit hosted in Late Cretaceous ryolite. There are inferred resources of 980,000 ounces of gold contained within 36 million tons of ore. The ore is reported to be amenable to recovery by cyanide leaching. Just to the north-east of the planning area is Johnson River, a massive sulfide gold deposit hosted in volcanoclastic, pyroclastic and volcanic rocks of the Talkeetna Formation. The deposit has drilled out reserves of over a million tons of ore grading at 0.32% gold, 0.24% silver, 0.76% copper, 1.17% lead, and 8.37 % zinc.

Redtop Mercury Mine

The Redtop mercury mine is an abandoned mine located on top of Marsh Mountain near the village of Aleknagik, on BLM lands. The cinnabar is located in pods and veins in greywacke along right lateral faults and shear zones. Approximately 60 flasks of mercury were produced between 1953 through 1959, with some additional work occurring in the 1960's. It is unknown how much cinnabar ore remains.

Approximately 1,500 feet of underground workings were dug on two levels. The entrance to one mine adit has collapsed. The other was closed by BLM in 2002 for the purpose of public safety. An abandoned mill containing a grinding circuit is located on the property along with several other

abandoned structures. An associated retort millsite was located at the foot of Marsh Mountain along the Wood River, but has since been removed by BLM. An old road connects the mine with the village.

Goodnews Mining Camp

The Goodnews Bay platinum mining operation is the only currently active operation on Federal mining claims within the Planning Area. The claimant for the Goodnews claims is currently attempting to resume mining operations. The bucket-line-dredge reportedly became operational during the summer of 2003, but is not actively mining. The deposit is one of the largest known platinum deposits in North America. Platinum is considered a critical and strategic mineral.

Placer platinum mining has historically occurred at the Salmon River near the Goodnews Mining Camp and associated side drainages including McCann Creek, Dowery Creek, Squirrel Creek, Platinum Creek, Clara Creek and Fox Gulch. From 1928 to 1982 an estimated 646,312 troy ounces of platinum were mined from the Salmon River and its tributaries. Early open cut placer mining was conducted by small draglines/sluice-boxes in the side drainages. In 1937 a large bucket-line-dredge with 8 cubic foot buckets was brought in to mine the Salmon River. The dredge operated continuously through 1976, and more sporadically through 1982. Additionally, the bench gravels on the east side were mined by a large dragline.

Much of the drainage is covered with tailings that extend to within a mile of the beach. Little to no reclamation of these tailings occurred as the mining predated current reclamation requirements. This resulted in poor re-vegetation and stream channels that occasionally disappear underground into the tailings. This has affected salmon spawning in this drainage. The claimant re-established fish passage in the early 1990's, but reportedly the passage dries up during periods of low water.

There is an inferred 60 million cubic yards of deeply buried platinum remaining that was too deep for the dredge to reach. There is also an unknown amount of platinum left in the existing tailings. Most bucket-line-dredges operate with estimated 50-60% recovery efficiency at best.

On surrounding Native-managed lands is potential platinum lode mineralization which is the suspected source of the Goodnews Bay Platinum Mine placer deposits. Both Red Mountain and Suzie Mountain have seen exploration drilling in the past.

Gold Placer Deposits

Placer gold mineralization has been identified and mined in the past but these operations were small and have been inactive for many years. Placer gold mining has occurred in the headwaters of the Arolik River and the Wattamuse/Slate Creek area, near BLM lands north of Goodnews Bay. The largest gold placer operation within the planning area occurs in Wattamuse Creek and associated drainages and has produced an estimated 30,041 troy ounces of gold between 1917 and 1947.

Additional placer mining has occurred at Trail Creek, a tributary of the Togiak River, at American Creek, north of Naknek Lake, and at Portage Creek and Bonanza Creek, north of Port Alsworth. None of these deposits are on or near BLM lands. Numerous other placer gold occurrences that have never been mined have been identified through out the planning area.

(5) Resource Allocation

Locatable minerals on Federal lands are allocated through the location of mining claims. Prospecting or exploration can take place without a claim, although an unclaimed discovery would be pre-empted by location of a valid claim. A mining claim carries a property right for the claimant and an inherent right to carry a surface patent. Removing that property right on a properly located and maintained mining claim requires buying the right, condemnation proceedings, or conducting a validity examination to challenge and contest the validity of the claim. If the claim is improperly located or the claimant fails to follow certain legal requirements, BLM can find the claim abandoned or void, effectively eliminating that claim.

By law, all public lands are open to mineral entry (mining claim location) unless specifically segregated or withdrawn. Map 3.37 shows those areas that are currently open to mineral entry. Currently, 152,746 acres of land are open to locatable mineral entry. Withdrawals currently constrain mineral development on many lands within the planning area, including many currently unselected lands.

To facilitate the conveyance of State and Native land entitlements under ANCSA and ANILCA, most of the public lands in the planning area were withdrawn from mineral entry. Land withdrawals were issued and remain on all State-selected and Native-selected lands. The purpose of a withdrawal from mineral entry is to prevent mining claim locations from clouding title to the lands which are selected. This was accomplished by a series of withdrawal actions through Public Land Orders issued in the early 1970s. Currently, 1,327,553 acres out of 2,503,822 acres of BLM lands within the planning area are State-selected or Native-selected. No mineral entry or mining will occur on these lands until either conveyance occurs, or the selection is relinquished back to BLM and the withdrawal lifted. Mineral entry or mining on conveyed lands is under the control of the new landowner.

Many of the land withdrawals are on public lands that were not State- or Native-selected, or on lands where selections have been relinquished. The withdrawals have prevented the staking of new mining claims and effectively eliminated mineral exploration, as there is no incentive for private industry to explore for minerals they cannot stake and develop. The consequence has been that for much of the public land within the planning area, the mineral industry has not been able to respond to new mineral models, geologic information, or changes in market conditions to help meet market demand for minerals.

Since the 1970s, the only opportunity to explore and develop mineral resources on public lands within the planning area is on non-withdrawn lands, or pre-existing mining claims where there is an established grandfathered right. There are a few unselected blocks of non-withdrawn lands open to mineral entry. As a result of mining claimants losing interest in maintaining claims because of holding fees, changing market conditions, missed paperwork deadlines, or receiving mineral patent to their claims, the number of active Federal mining claims has steadily decreased over the years. There also has been an active effort by the State to encourage mining claimants on State-selected lands to convert from Federal to State management.

BLM has allowed limited and targeted mineral exploration on Native-selected lands in order to allow the Native corporations to have the best information possible in which to prioritize their selections. The Native corporations have developed partnerships and operation agreements with private mining companies to explore Native and high potential Native-selected lands. Mineral exploration has been authorized under BLM lands and realty regulations (43 CFR 2920). However, mineral development of these lands can not occur until after the land has been conveyed to the respective Native corporation. Between 1990 and 2005, the only authorized mineral exploration on Native-selected lands within the planning area occurred during the mid-1990s near the Goodnews Bay Mining Camp in Southwest Alaska. The target mineral was lode platinum. Mineral exploration on State-selected lands occurs with State concurrence.

(6) Mining Claims and BLM Management

The AFO currently has approximately 1,000 active Federal mining claims, of which approximately 241 are located within the planning area within two contiguous claim blocks. All mining claim locations within the planning area have been digitized based on claimant submitted maps, and have been entered into a Geographic Information System (GIS) database. BLM has made the database available to the public over the internet through an agreement with the State.

Within the planning area, one concentration of claims is located along the Salmon River near Goodnews Bay and the second is in an area southwest of Lake Iliamna. The principal problem in managing regulatory compliance of these claims is their remote location. The Lake Iliamna claims are completely inaccessible by road. The Goodnews Bay claims are connected to the village of Platinum by a maintained gravel road that traverses the claim block, allowing for local access to the beach south of Red

Mountain. The road is used by local villagers as well as the mining claimants. Since the claims predate a 1955 change to the mining law, the claimant could exclude the public from crossing his claims. A small airstrip is also located on the claims. The Goodnews claims have been subjected to mineral survey.

The 63 unmined claims near Lake Iliamna, north of Levelok in the area north of the Kvichak River tributary, have been recently staked for suspected copper/gold mineralization. These active claims were staked in 2000 by BHP Minerals International and recently TNR Resource Ltd. acquired 70% interest. These claims have not been subjected to mineral survey.

Several abandoned mines are located within the planning block, including the Redtop mercury mine on Marsh Mountain north of Dillingham, and several small gold placer mines off the Goodnews River. There are 3,256 State mining claims of which 182 are located on State-selected lands. No active Federal or State mining claims are located on Native-selected lands.

Because mining claimants have the right to prospect for locatable minerals and locate mining claims on public lands under the 1872 Mining Law and without governmental approval, BLM's management is minimal until ground disturbing activities or occupancy commence.

Field Office personnel use an interdisciplinary approach to approving a Plan of Operations under 43 CFR 3809 regulations. Plans of operation are required for any activity that requires access across a wild and/or scenic river corridor that will disturb greater than five acres or has a cumulative disturbance greater than five acres. A Notice must be provided prior to mining areas less than five acres. There are additional requirements under the 43 CFR 3715 regulations for any mining activity on a mining claim requiring occupancy. An environmental assessment or environmental impact statement must be prepared prior to approval of any plan of operation or occupancy on any mining claim. There is currently only one plan of operations under these regulations for the planning area. Plans must be approved prior to any mining by the applicant and a reclamation bond must be provided.

BLM compliance officers conduct inspections of mining operations or occupancies on Federal claims. Currently, all operations are inspected at least once each year. The primary concern of the compliance inspector is that the miner is operating appropriately and that reclamation work is acceptable. During each compliance visit an inspection record is completed that describes the inspector's observations of the operation. If any problems or violations exist at the mine site, the compliance inspector discusses them with the operator, sets a time frame for correction, and issues a notice of noncompliance where necessary. The mine site is revisited to ensure that corrective actions have taken place.

Mining claim recordation, adjudication and statewide program policy are BLM State Office functions. BLM Alaska's State Office processes Notices of Intent to perform annual assessments and holding fees and maintains all mining claim files.

c) Salable Minerals (Mineral Materials)

Salable minerals disposition is addressed under the Materials Act of July 31, 1947, as amended by the Acts of July 23, 1955, and September 28, 1962. These acts provide for disposal of certain mineral materials through a contract of sale or a free-use permit. The Materials Act of 1947, as amended, removes petrified wood, common varieties of sand, stone, gravel, pumice, pumicite, cinders, and some clay from location and leasing. These materials may be acquired by purchase only and are referred to as salable minerals.

Significant quantities of salable minerals known to be present in the Bay planning area include, but are not limited to, sand and gravel aggregate, silica sand (abrasives), dimension and decorative stone, and common or bentonite clay. Production value of mineral materials sales were about $500,000 for FY 2001 statewide, and the trends indicate increases in yearly sale activity.

There are currently no mineral material contracts or free-use permits issued by BLM within the planning area. Many of the sites in the planning area are roadside material sites owned by municipalities or the State.

4. Recreation Management

a) General Recreation

Recreation opportunities are quite diverse within the planning area. Recreational activities/resources managed by BLM include rivers, sport fishing, motorized and non-motorized boating, camping, hiking, skiing, commercial recreation activities (guides and outfitters), sightseeing, wildlife viewing, and traditional recreation activities. The recreation program is also responsible for visual resources and Off-Highway Vehicle (OHV) management. Currently, there are no special area designations within the planning area.

Tourism is a leading industry in Southwest Alaska, and provides an economic base for the region both directly, in the form of guided hunting and fishing, and indirectly through the many services provided (i.e. lodging, food, transportation), particularly in the "hub" communities. Demands on recreational resources are focused on guided and self guided hunting and fishing opportunities. In response, local dependence on public lands is increasing in order to accommodate the additional commercial and non-commercial recreation demands of visitors. It should be noted that due to the extreme remoteness of the planning area, the opportunities for recreation are limited and expensive due to access difficulties and lack of amenities such as hotels and restaurants.

Changes in technology and a trend toward visitation to areas that were previously remote and inaccessible creates a potential for adverse impacts to recreation and other resources that may require heightened management attention. Without that attention BLM lands identified as a Semi-Primitive Motorized opportunity may develop into areas more appropriately categorized as a Roaded Natural opportunity.

Guided tourism for fishing and hunting during the peak season (June – September) is limited by a lack of accommodation and guides, many of which are booked years in advance. This industry has proven to be quite resilient to national and international crises and thus is expected to increase.

Law enforcement and compliance with permitted activities is difficult or non existent on BLM lands due to the large land base, remote location and expensive access. Many trespass issues or resource abuses including un-permitted commercial use are discovered by chance or reported by the public long after they have occurred. Back country or remote area use is particularly difficult to manage.

b) Special Recreation Permits

There are currently four BLM Special Recreation Permits (SRPs) authorized to operate on BLM-managed lands and waters within the planning area. These permits are issued to commercial big game hunting and fishing guide services. Currently the State of Alaska Division of Occupational Licensing lists more than 200 licensed guides in the planning area. Environmental Assessments (EAs) are conducted to assess the condition of natural resources and establish specific management parameters for these commercial guiding operations. Post use reports for SRPs are supplied with each authorization and are requested for submission to BLM within 30 days of completion of permitted activity. These numbers are recorded within the Recreation Management Information System (RMiS), a national database designed to track recreation use statistics.

For commercial operations, attempts are made to perform compliance checks annually or when designated camps are in use. Use seasons vary according to when hunting seasons are prescribed. Compliance exams are sometimes conducted in the company of a BLM law enforcement ranger.

Permittees are checked to make sure permits are in their possession and that they are operating according to the stipulations and conditions established under the permit

There is limited information available regarding non-commercial dispersed recreation activities. Information on commercial use is derived from tourism surveys, BLM SRPs and types of business licenses held by permittees, all of which are components used in making comprehensive recreation management decisions.

Law enforcement and compliance with permitted activities is difficult or non existent on BLM-managed lands due to the large land base, remote location and the expense of access. Many trespass issues or resource abuses including un-permitted commercial use are unreported or unknown, discovered by chance, or reported by the public long after they have occurred. Back country or remote area use is particularly difficult to manage.

c) Recreation Opportunity Spectrum

A Recreation Opportunity Spectrum (ROS) is a framework for classifying and defining different classes or types of outdoor recreation environments, activities, and experience opportunities. The BLM approach to ROS analysis evaluates a land area's physical, social and managerial parameters to describe the existing conditions that define a land area's capability and suitability for providing a particular range of recreational experience opportunities. For example, some recreationalists seek an undeveloped setting emphasizing solitude and self-reliance, while others seek an experience with more comfort, security, and social opportunities. An ROS framework helps provide managers guidance to ensure that recreational opportunities are provided for a wide range of users.

Recreation opportunity classes describe conditions that range from high density urban environments to primitive settings. Along this continuum, physical, social, and managerial conditions will vary. Physical conditions for the urban classification include areas with relatively easy access and a high degree of human alteration, such as buildings, roads, and power lines. In contrast, the physical environment classification is remote and relatively free of human alteration. The social environment varies from settings with abundant opportunities for solitude to areas where other people are nearly always within sight and sound. The managerial environment is the degree and type of management actions taken to control visitation. Urban/developed sites may have more on-site aids such as interpretive and directional signing whereas at primitive sites, less interpretation is desired or necessary.

(1) Definition and Examples of Recreation Opportunity Spectrum Classes

The current ROS classification for BLM lands within the planning areas is “Semi-primitive motorized.” The setting of a Semi-primitive motorized ROS classification is described as:

> An area characterized by a predominantly unmodified natural environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. Area is accessible to specialized OHVs but is generally not accessible to most four-wheel drive vehicles. Sights and sounds of the road system may or may not be dominant. Some portions of the area may be distant from road systems, but all portions are near motorized trails. Vegetation and soils are predominantly natural but localized areas of disturbance may exist. Local traditional subsistence use is evident but environmental impacts are minimal. An example of this area is the Upper Arolik River watershed.

(2) Recreation Opportunity Spectrum (ROS) Prescription Tables

Table 2.8 describes all six of the BLM ROS classes. Table 3.16 provides the physical, social and administrative management controls and service settings for the ROS class which best represents the Bay planning area.

Table 3.16. Semi-Primitive Motorized Recreation Opportunity Spectrum Prescriptions

Management Criteria	Current Condition Description		
	Remoteness	**Naturalness**	**Facilities**
Physical Criteria - Resources and Facilities	Moderate opportunity for solitude and self reliance Adjacent to or easily accessible to access points or trail systems Human improvements may be within distant sight or sound.	Naturally appearing landscape, modifications not readily noticeable Trails are evident but not dominant to landscape	Recognized Motorized trails (may have seasonal or other restriction) that may be maintained
	Social Encounters	**Evidence of use**	
Social Criteria - Visitor Use and Users	Moderate possibility of visual or direct social encounter. Likely to be of similar recreational interest Group size (<5)	Footprints, motorized vehicle tracks, airstrips, engine noise Increased frequency of camp sites and tracks deeper into the back country	
	Visitor Services	**Management Controls**	**User Fees**
Administrative – Management Controls and Service Settings	Maps with locations of known trails identified and regulations associated with those trails Guided opportunities depending upon services requested	Visitor controls in areas that have specific restrictions Potential use limits Enforcement presence rare but available	None (Fees associated with Commercial Use Permit Required)

(3) Summary

BLM-managed lands are quite fragmented, making it difficult to provide and apply long-term recreation management prescriptions unique to a specific area. As a consequence, the ROS applications are fairly general.

Because a large portion of the BLM lands within the planning area are selected for conveyance, many recreation management prescriptions are made cooperatively with neighboring land management agencies, private landowners and the public.

d) Recreation Opportunity Regions

Four areas have been identified as either requiring different management prescriptions or are simply physically different due to the large area covered by the Bay planning effort. Regionalizing provides a better opportunity to apply accurate management recommendations to an area's specific issues of concern.

These areas are as follows:

(1) Alagnak River Region

This region includes BLM lands south of the Kvichak River. The Alagnak Wild River, a portion of the Alagnak River, designated as a wild river by Title VI, Section 601(25) and 601(44) of ANILCA, preserves the free-flowing condition of the river and protects the river and its immediate environments for the benefit and enjoyment of present and future generations. The river corridor and lands within the designated wild river boundary (1/2 mile either side of the river) are managed by the National Park Service (NPS). BLM manages significant portions of land outside this corridor boundary. Close coordination with the NPS is important to provide for public opportunity and protection of the recognized resources.

The Alagnak River is the most popular fly-in fishery in southwest Alaska and has experienced a significant increase in use over the last several years. The increasing sport fishery on the river is a topic of concern to many local residents.

The meaning of Alagnak in Yup'ik is "making mistakes" because "the channel is always changing, causing mistakes and getting lost." Prehistoric people who lived along the Alagnak River left the remains of their camps and villages, ranging in age from as early as 8,000 years ago to the 18th century. The occupations include small scatters of stone tools, small settlements (up to four houses), and large late prehistoric villages with up to 69 houses. Historically there were many villages and cabins at various locations on the Alagnak River, including villages such as Alagnag'llug, Lockanok, and "Sleepy Town." The last historic settlement on the river was abandoned by the 1960s. Apparently, the Alagnak River was not only used by Yup'ik people from the Kvichak River but also from the Nushagak and even Yukon and Kuskokwim drainages, a testament of its rich subsistence resources during the historic period. The descendents have since moved to Kokhanok, Igiugig and Newhalen. Many people still return to the area for subsistence purposes (USDI NPS 2004). Discussion of specific resources within this region (OHV, rivers, visual, ROS) will be discussed in their own sections.

(2) Goodnews Bay Region.

BLM lands in the Goodnews Bay area are surrounded by the Togiak National Wildlife refuge and are far removed from other parcels of BLM land. Thus, it is important that this area be examined to meet demands and unique recreation opportunities.

Again, this region is known for its world class fishing opportunities. Getting to this region can be difficult and expensive. Small charter flights can be obtained from Dillingham and Bethel. There are no commercial aircraft providers in Goodnews Bay.

Unique physical characteristics of this area are the dramatic visual relief of the numerous mountains in the area, the many clear-water streams and the coastal influence. Discussion of specific resources within this region (OHV, rivers, visual, ROS) will be discussed in their own sections.

(3) Iliamna Lake Region.

The BLM-managed portion of the upper Iliamna Lake region has world class recreational values, primarily sport fishing and hunting. This area in particular is experiencing increasing competition between commercial and public recreation and traditional subsistence users (ADNR, 2004a).

The BLM lands in this region include small fragmented parcels, providing little opportunity for effective recreation management. The Upper Iliamna River area, while containing many selections for conveyance, is a significant recreation management concern due to increased use and potential development scenarios. Commercial providers under BLM permits (hunting and fishing) as well as private and subsistence users frequent the area.

This area is physically unique to the rest of the planning area as it runs from the dramatic Chigmit mountain range to the shores of Iliamna lake. Specific resources within this region (OHV, rivers, visual, ROS) will be discussed in their own sections.

(4) Kvichak/Nushagak Region

This area has been separated from the Alagnak River region due to its special status. This region includes all the BLM lands north of the Kvichak River and all drainages of the Nushagak River. The Kvichak and the Nushagak rivers are the dominant feature of this region. BLM lands in this region are very diverse and provide ample recreation opportunities, primarily fishing and hunting, to both riverine and upland users. A recreation management plan was completed for the Nushagak region in 1990 by the Alaska Department of Natural Resources, Alaska Department of Fish and Game and the Bristol Bay Coastal Resources Service Area. This plan identified recreation management prescriptions for specific units within the Nushagak drainage. This plan will attempt to mirror those management guidelines and recommendations. The Kvichak River basin contains one of the largest and most important salmon fisheries in the world. This river is the pipeline for all salmon fisheries of the Iliamna and Lake Clark watersheds. Discussion of specific resources within this region (OHV, rivers, visual, ROS) will be discussed in their own sections.

5. Travel Management

a) Travel Management Overview

Very few roads exist within the Bay Planning Area. Most of the villages in the planning area are isolated and roads between neighboring villages do not exist. There are more trails than roads within the planning area.

b) Roads & Trails

Existing, proposed, and recognized routes are covered in this section.

(1) State-recognized RS 2477 Routes

Under Revised Statute 2477, Congress granted a right-of-way for the construction of roads, trails, or highways over unreserved public land. Although the R.S. 2477 provision was repealed in 1976 by FLPMA sec. 706, a savings clause preserved any existing R.S. 2477 rights-of-way. The State of Alaska recognizes these routes. These routes must be adjudicated or asserted through a process (43 CFR §1864) that will occur outside of this planning process. Only a court of jurisdiction can determine the validity of an R.S. 2477 claim. Within the planning area, these routes are based on historical or traditional trails. Because of lack of regular maintenance or use, many of the mapped State-recognized R.S. 2477 routes may no longer exist on the ground.

(2) 17(b) Easements

Section 17(b) of ANCSA provided for the reservation of easements across Village and Regional Native Corporation lands to provide public access to publicly owned lands or major waterways, generally for the purposes facilitating transportation, however, easements *are also reserved for* utility purposes, air, light and visiblity easements or easements to guarantee international treaty obligations. BLM is responsible for identifying and reserving 17(b) easements during the conveyance process. The management of these easements lies with BLM or, under a Memorandum of Understanding, the appropriate Federal land manager (e.g., USFWS, NPS). BLM retains management responsibilities of easements reserved to access State lands, but is able to transfer jurisdiction of a 17(b) easement to the State of Alaska or to one of its political subdivisions (DOI Departmental Manual, Part 601, Chapter 4.2., March 1980).

Road Right-of-Way. One road right-of-way exists in the planning area. It is for the road that connects the villages of King Salmon and Naknek. Ownership of the right-of-way was transferred to the State of Alaska under an omnibus road act shortly after statehood.

Waterways. The waterways of the major rivers in the planning area are important transportation routes in both winter and summer. During the ice-free months, private and commercial boats from villages and lodges utilize navigable waterways to access rich hunting and fishing areas throughout the watersheds for subsistence and recreation. Frozen waterways and adjacent wetlands also serve as winter transportation routes for snow machine traffic to upriver villages and hunting sites.

Air Routes and Air Strips. Established commercial air service in the planning area is available to Dillingham, King Salmon, Good News Bay, and Illiamna. These towns and other villages in the planning area are also generally accessed by charter services and private aircraft. Transporters licensed by the State of Alaska deliver fisherman, hunters, river users and others to remote sites throughout the planning area, landing on gravel bars, sand blows, waterways, private runways, and regulated and unregulated airstrips. No BLM authorized airstrips exist in the planning area.

c) Off-Highway Vehicle Management

Advances in technology, coupled with a rise in popularity and demand, have required BLM to address impacts caused by OHVs on BLM lands. To comply with BLM regulation 43 CFR 8342.1, all BLM lands must be categorized with one of following designations:

- "Open" – OHVs may travel anywhere; cross-country travel is permitted.
- "Limited" – OHVs are restricted to certain areas or specific trails, with restrictions that can include vehicle weight, type of vehicle, seasonal limitations, or travel restricted to designated trails.
- "Closed" – no OHV activity is allowed.

Currently all regions within the planning area are open to OHV use (Maps 3.35 a, b, c, and d).

As stated under "Designation Criteria, "all designations shall be based on the protection of the resources of the public lands, the promotion of the safety of all the users of the public lands, and the minimization of conflicts among various uses of the public lands . . ." (43 CFR 8342.1).

The current State of Alaska policy on casual (non-permitted) OHV use on State lands is outlined in the Alaska Administrative Code (AAC) at 11 AAC 96.020, "Generally Allowed Uses on State Land," and 11 AAC 96.025 "Conditions for Generally Allowed Uses." Use of highway vehicles with a curb weight up to 10,000 lbs. or recreational-type vehicles (OHVs) with a curb weight of less than 1,500 lbs. is allowed on or off an established road easement if use off the road easement does not cause or contribute to water quality degradation, alteration of drainage systems, significant rutting, ground disturbance, or thermal erosion. To prevent damage to wetlands, stream banks, and other areas with poorly drained soils, and erosion and wildlife disturbance or displacement, and to provide access to public lands, the Alaska Department of Natural Resources (DNR) may designate certain State lands as "Special Use Lands." This State designation may result in regulation of OHV and other uses to protect specific resource values (ADNR 2004c).

OHV use on BLM lands within the planning area is minimal and does not appear to have increased in recent years. This use pattern is likely a result of the remote locations of most BLM lands and a preference for other modes of access (ADF&G 2004).

OHV use on established trails as well as overland travel is very important to local users, commercial operators, and recreationists. Established trail systems are not well known and efforts are ongoing to identify and understand the location and use characteristics of these trails. Overland trails are much more difficult to identify. Most important is to understand destinations and general routes.

ANILCA provides for OHV use for subsistence purposes (Sec. 811) and for ingress and egress to inholdings on conservation system units, national recreation areas, national conservation areas, and those public lands designated as wilderness study (Sec. 1110). Currently there are no closures on BLM lands within this study area.

BLM-managed 17(b) easements play a role in providing public access across Native corporation and Regional corporation lands. 17(b) easements allow public use and access to Federal and State lands for the purposes of recreation, hunting, transportation, utilities, docks, and other such public uses. OHV use on 17(b) easements as well as any established trail, may be subject to a variety of limitations, including type, seasonal and weight restrictions, depending on the frequency and type of trail use and the potential for resource damage. A large number of 17(b) easements exist within the planning area, although a formal inventory has not been conducted.

There are no BLM planning documents for the majority of the Bay planning area. A Management Framework Plan for the Southwest Planning Area was signed in November 1981, but only a small portion of that plan area, the Goodnews Block, overlaps the planning area. The Bay area is surrounded by many National Refuges and Preserves (Togiak, Yukon Delta, Lake Clark, Katmai, Becharof) as well as State Parks (Wood Tikchik). BLM will follow the existing OHV prescriptions (if any) of these special areas as closely as possible.

In accordance with the provisions of FLPMA, 43 CFR 8340 and the National Management Strategy for OHV Use on Public Lands, BLM management practices are to inventory and document OHV trail development and provide interim management until official decisions regarding OHV use designations are implemented. This inventory data provides a “snapshot” of the current status of resources. Regular monitoring is critical to understanding current use, identifying cumulative impacts, and the effective development of mitigation measures to protect resources.

The NEPA process is used to evaluate all proposed authorizations. Proposed actions involving OHV use are carefully analyzed on a case-by-case basis to ensure minimal impact to visual, cultural, and other biological resources.

Due to the size, remoteness and large geographical distances between the planning area and BLM's Anchorage Field Office, many of the lands are rarely visited. This results in a limited understanding of current OHV use levels, use areas and important access routes. For the purposes of this planning effort, BLM has solicited the help of local users to better understand OHV use in the planning area.

6. Renewable Energy

Renewable energy resource potential, with an emphasis on clean energy sources, is a recent and prominent consideration in modern resource management planning. Currently there is no demand for renewable energy development on BLM lands within the planning area, although some alternative energy sources have been investigated. In the 1990s Sandia Laboratories investigated the feasability of thermal energy resource development in the Aleutian Range in the Katmai National Park. Development did not occur partly as a result of remote character of the resource. One family in the planning area has utilized wind energy to generate electricity for personal use for the last 15 years.

In cooperation with the National Renewable Energy Laboratory (NREL), BLM assessed renewable energy resources on public lands in the western United States (BLM and DOE 2003). The assessment, which did not include Alaska, reviewed the potential for concentrated solar power, photovoltaics, wind, biomass, and geothermal resources on BLM, BIA, and USDA Forest Service lands in the west.

a) Photovoltaics (PV)

Photovoltaic (PV) technology makes use of semiconductors in PV panels (modules) to convert sunlight directly into electricity. Criteria used for determining potential include amount and intensity of sunlight received per day, proximity to power transmission lines, and environmental compatibility. To date, the BLM has not authorized any PV facilities for commercial power production, nor has any interest been expressed by industry in developing such facilities on BLM lands, which tend to be somewhat remote to villages that would use the power.

b) Wind Resources

Interest in developing wind energy in Alaska is increasing. The Alaska Energy Authority and rural utilities are considering developing wind power projects at many villages. There is an ongoing program to assess wind energy resources in western and southwestern Alaska and to develop a high-resolution wind map for this area. Development of this map will increase understanding of Alaska's wind resource and will allow communities to more easily apply for U.S. Department of Energy (DOE) wind energy funding programs. In February 2005 the Governor of Alaska established a Rural Energy Action Council to report on short-term proposals to reduce the cost of energy in rural Alaska. One issue addressed by the Council is accelerated development of wind turbine generator installations.

The potential to use wind as a supplemental energy source for local communities within the planning area is high. Most of the communities in the planning area rely on diesel-powered generating stations. The cost of generating electricity in this manner is very high. Using wind turbines along with diesel generation can save significant amounts of fuel.

The potential of a large wind farm on BLM lands or elsewhere within the planning area is low. The population in the planning area is relatively low and infrastructure to move electricity outside of the region does not exist. The best sites are near the coast and to be effective need to be close to communities. Most of the land around villages is owned by Native corporations, and BLM manages very little land along the coast. That which it does manage, the proposed Carter Spit ACEC, is not a viable site for windmills because of the large migratory bird population in the area in the spring, summer, and fall.

c) Biomass

Biomass technology utilizes organic matter waste products for production of paper and pulp, value-added commodities, and bio-energy or bio-based products such as plastics, ethanol, or diesel. There is some interest in biomass development in Alaska. The State has sought DOE funding to investigate fish oil and diesel blends, conversion of wood residues to fuel grade ethanol, conversion of fish and wood waste to Btu gas, and replacement of oil-fire boilers with wood-fired boilers to reduce energy costs in rural communities.

Although there are no known biomass projects in the planning area, BLM is currently experimenting with a biomass demonstration project used to provide energy for the Campbell Creek Science Center in Anchorage. In this case, the fuel used is spruce bark beetle-killed trees. The energy generated is used to heat the Science Center building and two storage sheds of over 10,000 ft^2 by means of an in-floor radiant heat system.

The National Energy Policy recommends development of a strategy to encourage the use of biomass from public lands as a source of renewable energy. The potential for the use of biomass from public lands within much of the planning area is very limited. An average of 17% of the planning area is forested. This number rises to up to 33% in the Lake Iliamna – Alagnak River region, where there are currently large areas of beetle-killed spruce trees. While the probability of the development of a biomass

project on BLM lands in the planning area seems remote, a viable project might be started in the Lake Iliamna – Alagnak River region. There is no known market in the planning area at this time.

7. Lands and Realty

There are two primary objectives of the lands and realty program. One objective is to implement the actions contained in the FLPMA. The second objective is to facilitate the transfer of lands to the State of Alaska, ANCSA Native corporations and individuals through the various entitlement Acts.

The lands and realty program manages land use under the authority of multiple statutes, regulations and guidance, such as FLPMA, the Recreation and Public Purposes Act (R&PP), and the Mineral Leasing Act (MLA).

Land ownership in the Bay planning area is influenced by three main entitlement Acts, the Native Allotment Act of 1906, the Alaska Statehood Act, and the ANCSA. Although millions of acres of land have been conveyed to individual Alaska Natives, Native corporations, and the State of Alaska, there is still much land that will be conveyed out of Federal ownership in the near future.

Lands that are selected by Native corporations or the State that are within the boundaries of a Conservation System Unit (CSU) are interimly managed by the Federal agency that administers that CSU. BLM has an adjudicative role in conveying land within CSUs, but not surface management responsibilities. Alternatives for management of CSU lands are not addressed within the scope of this planning document.

Conservation System Unit (CSU)

A Conservation System Unit, or CSU, as defined by ANILCA Section 102(4), is any unit in Alaska of the National Park System, National Wildlife Refuge System, National Wild and Scenic Rivers Systems, National Trails System, National Wilderness Preservation System, or a National Forest Monument including existing units, units established, designated, or expanded by or under the provision of this Act, additions to such units, and any such unit established, designated or expanded hereafter.

a) Discretionary Land Uses

(1) Land use authorizations

Land use authorization means any authorization to use the public lands under 43 CFR §2920. Land use authorizations are used to permit activities when other land actions cannot be used, such as a right-of-way or R&PP lease.

The only type of land use authorization currently authorized in the planning area is a Permit, which authorizes an applicant to use public lands for specified purposes, normally involving little or no land improvement, construction or significant monetary investment. Permits do not convey a possessory interest in land and are normally issued for three years or less and may be renewed at the discretion of the Authorized Officer.

Leases authorize uses of public lands involving substantial construction, development, or land improvement and the investment of large amounts of capital amortized over time. A lease conveys a possessory interest and is revocable only in accordance with its terms and the provisions of 43 CFR

§2920.9–3. Leases are issued for a term which is consistent with the time required to amortize the capital investment.

Easements may be used to assure that uses of public lands are compatible with non-Federal uses occurring on adjacent or nearby land. The Authorized Officer determines the term of the easement. An easement granted under this part may be issued only for purposes not authorized under Title V of the Federal Land Policy and Management Act or section 28 of the Mineral Leasing Act.

(2) Rights-of-Way

A Right-of-Way grants an applicant the right to use specific public land to build such things as roads, communication facilities and power lines. Generally, Rights-of-Way are issued for long-term projects that require significant investment. Rights-of-Way are a possessory interest in land. Usually, Rights-of-Way are issued for a maximum of 20 year terms with the option to renew.

(3) Withdrawals

Withdrawals are formal actions that set aside, withhold, or reserve Federal lands by administrative order or statute for Federal purposes. The effect of a withdrawal is to segregate and close Federal land to the operation of all or some of the public land laws and/or one or more mineral laws; transfer total or potential jurisdiction of Federal land between Federal agencies; or dedicate Federal land for a specific Federal purpose.

Agency Withdrawals (other than ANCSA § (d)(1)). These withdrawals are for administrative sites, power sites, and military purposes. Two water power withdrawals, six military withdrawals, and nine administrative site withdrawals, approximating over 38,500 acres, lie within the planning area. Creating, modifying, renewing or revoking withdrawals for other Federal agencies is forecast to continue to be a recurring function of BLM. As populations grow throughout the region, pressures placed on resources will escalate and may affect requests from Federal agencies for withdrawals or demands for withdrawal review may increase from state or local governments. Maps 3.36 and 3.36a-d show withdrawals within the planning area.

ANCSA 17(d)(1) withdrawals. ANCSA §17(d)(1) withdrawals are a series of public land orders (PLOs) issued from 1972 to 1975 that placed a protective withdrawal on Federal lands for the purpose of study and review to determine the proper classification and "to ascertain the public values in the land…" The intent of the withdrawals was to limit appropriation of the lands in order to complete inventories of resources and assessment of values which meet public needs (Map 3.37) within the planning area affected by (d)(1) withdrawals). In the 1980s studies and assessments were completed, and opening orders were issued on some lands covered by ANCSA §17(d)(1). Table 3.17 describes the ANCSA 17(d)(1) withdrawals within the planning area.

Table 3.17. Effect of ANCSA §17(d)(1) Withdrawals on Federal Public Lands

PLO	Description
5174	Withdrew lands for village or regional deficiency selections under the authority of Section 11(a)(3) of ANCSA. Each of these PLO's contained a paragraph in which a withdrawal under Section 17(d)(1) was also placed on the same lands. Lands were withdrawn from selection by the State, not open to location and entry under the mining laws, nor leasing under the mineral leasing act. Section 906(j) of ANILCA and PLO 6092 opened most 17(d)(1) withdrawals to State Selections.
5179	Withdrew approximately 80 million acres of land in aid of legislation for creating or adding to conservation system units under the authority of Section 17(d)(2) of ANCSA, which had a termination provision. A second paragraph added–a 17(d)(1) withdrawal to the same lands, and did not have a termination provision. Lands were withdrawn from selection by the State, not open to location and entry under the mining laws, nor leasing under the mineral leasing act. PLO 5657 opened many lands to State Selection except in Umiat and portions of Kateel River Meridians.
5180	Placed a 17(d)(1) withdrawal on approximately 47 million acres including the lands in the transportation and utility corridor withdrawn by PLO 5150. Lands were withdrawn from selection by the State, not open to location and entry under the mining laws (except locations for metaliferous minerals), nor leasing under the mineral leasing act. PLO 5180 was amended by PLO 5418 which placed a 17(d)(1) withdrawal on all unreserved land and any lands which may become unreserved in the future. PLO 5657 opened many lands to State Selection.
5181	Placed a 17(d)(1) withdrawal on lands for classification and study as possible additions to the National Wildlife Refuge System. Closed lands to all forms of appropriation under public land laws, including selections by the State of Alaska under the Alaska Statehood Act, 72 Stat. 339 and from location and entry under the mining laws and from leasing under the Mineral Leasing Act.
5184	Placed a 17(d)(1) withdrawal on lands originally withdrawn under section 11 of ANCSA for selection by the village corporations, and all of those lands lying between 58º N. and 64° N. Latitude, and west of 161º W. Longitude that were not withdrawn for any part of the National Wildlife Refuge System. These areas are withdrawn from all forms of appropriation under public land laws, (except State Selection) and from location and entry under the mining laws and from leasing under the Mineral Leasing Act. All of those lands withdrawn under section 11 lying between 58º N. and 64° N. Latitude, and west of 161º W. Longitude that were not withdrawn for any part of the National Wildlife Refuge System are withdrawn from all forms of appropriation including State Selections. Set aside for study and review by the Secretary of the Interior for the purpose of classification or reclassification of any lands not conveyed pursuant to section 14 of said Act.
5186	Withdrawal for classification and protection of the Public Interest in lands not selected by the State. Lands are not open to location and entry under the mining laws (except locations for metaliferous minerals), nor leasing under the mineral leasing act. Lands are available for State Selection.

(4) Recreation and Public Purposes Act

Under the Recreation and Public Purposes Act (R&PP), state and local government agencies, municipal utilities, and non-profit entities can acquire public land (at less than fair market value) through a patent or lease. There have been three patents issued under the R&PP Act within the planning area, but no lands are currently under lease. The patents were issued for two church sites and a church camp (Map 3.38). These patents contain a reverter clause requiring BLM concurrence of any change in use and ownership; otherwise the land would revert back to the United States. Considering the evolving land ownership pattern near populated areas in the planning area (conveyances out of Federal ownership), a demand for land under the R&PP is not anticipated.

(5) Land Tenure Adjustment

When all of the conveyances under the entitlement acts are complete, there will be a broken/scattered land ownership pattern in some areas. Land and resource management will be difficult for owners of large tracts of lands in the area. It is likely that landowners may want to consolidate their lands through land exchanges, disposal, or acquisitions. BLM does not anticipate acquiring lands within the planning area during the life of this plan (except through exchange).

The preferred method of land tenure adjustment would be through land exchange. BLM may consider FLPMA sales on a case-by-case basis. No proposals for sales are identified in the planning area (Map 3.39).

(6) Trespass Abatement

Unauthorized uses are activities that do not substantially alter the physical character of public lands and resources. Unauthorized occupancies are activities resulting in full or part time human occupancy or use. Unauthorized development issues arise from activities which disturb the earth's surface or physically alter the character of the land or vegetation. Collectively, the above activities are termed trespass situations.

When presented with a trespass situation, BLM has three options to resolve the situation: removal of the trespasser (which could include taking possession of structures or improvements and utilizing them for Federal purposes), authorization of the trespass activity, or sale of the land to the trespasser. Each situation is handled on a case-by-case basis, according to BLM regulations and policies.

(7) Subsurface Estate

When the Federal government patents land to individuals it does so under a variety of land laws. Many laws, such as homestead laws[2] or the R&PP Act, require BLM to reserve the subsurface or mineral estate. BLM may reserve all mineral rights; or perhaps one of several rights, such as oil and gas rights only

To complete this management plan, Master Title Plats were reviewed and all patents with reservations of subsurface rights were inventoried. Subsurface data were searched on October 18, 2004. Within the planning area, Federally-reserved subsurface interests such as oil and gas, all minerals, and coal were identified through a reading of each patent (Map 3.40).

b) ANCSA 17(b) Easement Identification and Management

BLM identifies ANCSA 17(b) easements for travel across Native lands to access publicly owned lands[3], major waterways, and for travel between communities on lands that will be conveyed to Native corporations. If the easement is reserved to access lands managed by the U.S. Fish & Wildlife Service or the National Park Service, management responsibilities of the easement will be formally transferred to those agencies after the lands are conveyed. BLM manages those easements providing access to BLM–managed lands and State of Alaska lands (Appendix F).

[2] Homestead Laws were repealed with the passage of FLPMA in 1976, except the repeal did not go into effect in Alaska until 1986.

[3] Publicly owned lands means all Federal, State, or municipal corporation (including borough) lands or interests therein in Alaska, and submerged lands as defined by the Submerged Lands Act.43 CFR §2650.4-7(b)

ANILCA 906(e) Topfilings

Section 906(e) of ANILCA allows for future "TOP FILINGS" by the state of Alaska. Basically, the state may file a future selection application or amendment for lands which are not, on the date of filing of the application, available within the meaning of §6(a) or (b) of the Alaska Statehood Act. For instance, lands could be withdrawn (i.e. not available) under section 11(a)(3) of ANCSA to allow for selections by ANCSA corporations. In that case, the state filing would not be a valid right, but would be a potential future interest in the land. At the time the village entitlement was fulfilled, and over selections rejected, the state's topfiling would fall into place and attach to the land, becoming a valid selection.

c) Detailed Descriptions of Planning Blocks

This section is separated into 10 different sections with distinct levels of detail and focus for each section. Sections 1-2 are designed to provide a general analysis of areas near Dillingham/Aleknagik, and King Salmon/ Naknek/South Naknek. In these areas BLM manages land in the interim, but is expected to not manage lands after the conveyance process is completed. Sections 3-10 are in depth discussions of individual planning blocks where BLM will retain large tracts of land beyond the finality of the conveyance process. These planning blocks are: Alagnak, Goodnews Bay, Iliamna East, Iliamna West, Koggiling Creek, Klutuk Creek, Kvichak, and Yellow Creek. (Maps 3.2-3.4)

(1) Dillingham/Aleknagik Vicinity

In the area generally located near Dillingham and Aleknagik, BLM is the interim manager of 66,597 acres of land (Map 3.41). Within this area, all lands are selected for conveyance by Native Corporations and the State of Alaska, or they have been applied for as Native Allotments. Native Corporations have selected 32,367 acres; Native Allotment applications exist and in some cases overlap other selections on 831 acres; and 34,231 acres of land are selected by the State of Alaska. Almost all lands that have not been prioritized by Native Corporations have been prioritized by the State of Alaska. However, it is anticipated that BLM will manage 1,295 acres after the conveyance process is completed. According to the best available information, there are four areas with small tracts of land that are not prioritized by either the State or Native Corporations. The areas near Aleknagik comprise two sections, 7 and 18 (1,228 acres) in T. 10 S., R. 53 W., located about 13 miles east of Aleknagik, which will likely remain in Federal ownership at the conclusion of the conveyance process. These sections will be surrounded entirely by lands owned by a Native Corporation and the State of Alaska and should be considered for land tenure adjustment, such as a land exchange, with either entity or disposal through sale. There is also the former Red Top Mine mill site, U.S. Survey 12403, lots 1 & 2, (5 acres) near Aleknagik that will likely remain in BLM ownership for the foreseeable future. This small site located within sec. 32 in T. 10 S., R. 55 W. BLM is conducting HAZMAT response actions at the site, which should result in Interim Cleanup status being granted by the Alaska Department of Environmental Conservation. Once Interim Cleanup status is attained the site could be considered for exchange or disposal by sale with the caveat that Institutional Controls will be in place. There are also two areas near Clarks Point that will remain in BLM ownership and should be exchanged or disposed of by sale. The areas are in section 8, lots 1 & 2 (46 acres) in T. 14 S., R. 55 W.; and in sections 6; section 7, lots 1, 2 and 3; and section 18, lots 1, 2 and 3 (25 acres) in T. 15 S., R. 55 W (Refer to Map 3.39).

Within this area, BLM has patented two separate tracts of land under the R&PP Act:

- The Seventh Day Adventists received a patent in 1972 (Patent # 50-73-0080) to 10 acres of land for a church camp located on Lake Aleknagik. The land is described as U.S. Survey 4931; located within T. 9 S., R. 57 W., sec. 26. The case is serialized as A-048645.
- The Catholic Archbishop of Anchorage received a patent in 1984 (Patent # 50-84-0403) to 1.8 acres of land for a church site located in Clarks Point. The land is described as U.S. Survey 4992, Tract B; located within T. 15 S., R. 56 W., sec. 36. The case is serialized as A-052661 (Map 3.38). BLM is

responsible for ongoing compliance management of these parcels to ensure they are used for the purposes for which they were patented.

There are two withdrawals within the vicinity of Dillingham. One is for the benefit of the U.S. Department of Health and Human Services, Alaska Area Native Health Services, Public Health Services, serialized as AA-58074, and encompasses 87.47 acres. The second is for the Federal Aviation Administration, serialized as A-58836 and encompassing 95.94 acres. A third withdrawal existed at the time that the Draft Resource Management Plan was written. The area has since been transferred to the City of Dillingham. That withdrawal was serialized as A-52010, and encompassed 2.67 acres.

Within this area, there are no rights-of-way or land use authorizations.

(2) Naknek/King Salmon Vicinity

In the area generally located near Naknek, South Naknek and King Salmon, BLM is the interim manager of 18,183 acres of land (Map 3.42). Within this area, all lands are selected for conveyance to Native corporations or the State of Alaska, or claimed as Native Allotments. Native corporations have selected 17,833 acres. Native Allotment applications exist – and in some cases overlap other selections – on 181 acres, and 351 acres of land are selected by the State of Alaska. All lands not prioritized by Native corporations have been prioritized by the State of Alaska. BLM anticipates no Federal land retention in this area at the conclusion of the conveyance process.

Within this area, BLM has patented one tract of land under the R&PP Act. The Federation of Norwegian Lutheran Youth Peoples Society Inc. received a patent in 1962 (Patent # 1224794) to 1.73 acres of land for a church site located in Naknek. The land is described as U.S. Survey 3539, lot 3; located within T. 17 S., R. 47 W., sec. 3. The case is serialized as A-031707. BLM is responsible for ongoing compliance management of this parcel to ensure it is used for the purposes for which it was patented (Map 3.38).

Two rights-of-way have been issued in this area under FLPMA authority:

- BLM issued a right-of-way for a power line to the Naknek Electric Association in 1960. Serialized as A-051081, the right-of-way is 40 feet wide and 15.1 miles in length, encumbering 73.2 acres of land. The power line is located in T. 17 S., R. 45 W., T. 16 S., R. 46 W., T. 17 S., R. 46 W., and T. 17 S., R. 47 W. As lands were patented along the route of this line, the patents would have been made subject to this right-of-way. This right-of-way expires on July 10, 2008. If the lands remain under BLM's jurisdiction there will be an option to renew.
- BLM issued a right-of-way for a road to the Bristol Bay Borough in 1996. Serialized as AA-077688, the right-of-way is 50 feet wide and 1,110 feet in length, encumbering 1.26 acres of land. The road is located in T. 17 S., R. 45 W. This right-of-way expires on May 1, 2026, with an option to renew.

There are 10 withdrawals within the vicinity of Naknek, South Naknek and King Salmon. Four withdrawals are for the Federal Aviation Administration, serialized as: A-46709, encompassing 91.81 acres; A-50813, encompassing 5 acres; A-53428, encompassing 133.75 acres; and AA-65121, encompassing 1.58 acres. The National Park Service has one withdrawal serialized as A-42044, encompassing 11.43 acres. The National Marine Fisheries has one withdrawal serialized as A-72642, encompassing 6.29 acres. The U.S. Air Force has four withdrawals serialized as A-23000, encompassing 16.97 acres; A-31940, encompassing 15 acres; AA-82862, encompassing 1.2 acres; and AA-2838, encompassing 640 acres.

Within this area, there are no land use authorizations or areas identified for land tenure adjustment.

(3) Alagnak Planning Block

The Alagnak Planning Block is bordered by the Alagnak Wild and Scenic River on the Northeast, the Bristol Bay Fisheries Reserve (Kvichak River) on the west, the Katmai National Park and Preserve on the East, and Native or State land to the North and South (Map 3.43). The area contains about 328,603 acres. Once all selected lands have been conveyed in this planning block, it is anticipated that BLM will

manage approximately 153,085 acres of public land. Currently BLM is the interim manager of about 39,712 acres of land. Native corporations have priority selections on 1,858 acres, and the State of Alaska has priority selections on 8,901 acres. Within the life of this plan, prioritized land selections should be conveyed out of Federal ownership.

Photo 3.13. Bristol Bay Cellular Partnership Communications Site

Land Use Authorizations/Rights-of-Way

There is one right-of-way authorized in the Alagnak Planning Block in Section 33, T. 14 S., R. 41 W., Seward Meridian. Bristol Bay Cellular Partnership has maintained a communications site in that section since May 2000 under land use authorization AA – 081909 (Photo 3.13).

As these lands are on the State's selection priority list, they will likely be conveyed out of Federal ownership and jurisdiction over this right-of-way will be transferred. There are no Land Use Authorizations within this planning block.

Alagnak Planning Block 17 (b) Easements

Within the Alagnak Planning Block there are 4 easements. One is a site easement, one is a proposed 25 ft. wide trail, one is a 25 ft. existing trail, and one is a 25 ft. existing winter trail. Table 3.18 provides information regarding each easement within this planning block. Map 3.41 is an overview map of the ANCSA 17(b) easement reservations in this planning block.

Table 3.18. 17(b) Easements within the Alagnak Planning Block

Easement I.D.	Administrative Agency	Landowner IC/Pat#	Land Access	Easement Type	Location Information
bbleve013 EIN 8b C6 D9 Dillingham A-2	BLM	IC 193 Levelock Natives Limited	Public Land	1 acre site easement	Sec. 20 T.13 S., R.44 W.
N/A EIN 8c C4 Dillingham A-2	BLM	IC 193 Levelock Natives Limited	Public Land	Proposed 25-ft trail	Beginning in Sec. 20 T.13 S., R.44 W., southerly to public lands
bb / NA EIN 29d C5 Naknek D-3	BLM	50-91-0600 Paug-vik Inc. Ltd	Public Land	Existing 25-ft. trail	Beginning in Sec. 33 T.14 S., R.46 W. Easterly to public lands
bb / NA EIN 14 C3,D1,D9 Naknek D-3	BLM	50-91-0600 Paug-vik Inc. Ltd	.Public Lands	Existing 25-ft. trail. **Winter use**	Sec. 3 T.17 S., R.47 W., Northerly to Village of Levelock (transportation between communities)

Agency Withdrawals
There are no withdrawals within the planning block.

Recreation and Public Purposes Act Sites
There are no Recreation and Public Purposes Act Sites within the planning block.

Land Tenure Adjustment
There are no areas for Land Tenure Adjustment within the planning block.

Subsurface Estate.
There are approximately 692 acres of land where the United States has reserved an interest in "Oil & Gas" within the planning block. There are 1.19 acres of land where the United States has reserved an interest in "All Minerals" within the planning block (Map 3.40).

(4) Goodnews Bay Planning Block

The Goodnews Bay Planning Block is bound by the Togiak National Wildlife Refuge on the North, South and East and by the Kuskokwim Bay and the Bering Sea on the West. The area contains about 531,214 Acres (Map 3.44). Once all selected lands have been conveyed in this planning block, it is anticipated that BLM will manage approximately 136,030 acres of public land. BLM is currently the interim manager of about 130,655 acres of land. Native corporations have priority selections on 33,048 acres, and the State of Alaska has priority selections on 125,920 acres. Within the life of this plan, the prioritized land selections should be conveyed out of Federal ownership.

Land Use Authorizations/Rights-of-Way
No land use authorizations or Rights-of-Way are authorized in this Planning Block.

ANCSA 17(b) Easements
There are several easements reserved within the Goodnews Planning Block (Table 3.19).

Table 3.19. 17(b) Easements within the Goodnews Planning Block

Easement I.D.	Administrative Agency	Landowner IC/Pat.#	Land Access	Easement Type	Location Information
bb / NA EIN 1 C3,C5,D1,D9 M Kuskokwim Bay D-1	BLM	50-95-0437 Arviq Inc.	Public lands	Existing 25-ft trail Seasonal use **(winter)** Northwesterly to public land	Sec.19 T.12 S., R. 74 W., sm
bb / NA EIN 3 C3, C4, D1, D9 Goodnews A-8	BLM	IC 1660 Calista Corp.	State of Alaska	Existing 25-ft trail Southwesterly to Sec.10 T.8 S., R. 72 W. sm	Sec.31 T. 7 S., R.71 W., sm
bb / NA EIN 3a C3, C4,D1,D9 Goodnews B-7	BLM	IC 1660 Calista Corp.	State of Alaska	Existing 25-ft **(winter)** trail from Sec.27 T.8 S., R.72 W.southwesterly to Sec. 27 T.8 S., R. 72 W. sm	Sec. 27 T.8 S., R. 72 W., sm
bb / NA EIN 3b C3, C4, D1, D9 Goodnews B-7	BLM	IC 1660 Calista Corp.	State of Alaska	Existing 25-ft **(summer)** trail from Sec. 10 T.8 S., R. 72 W. southwesterly to Sec. 27 T.8 S., R. 72 W. sm	Sec10 T. 8 S., R.72W., sm
bb / NA EIN 4 C3,C4, D1,D9 Goodnews B-6	BLM	IC 1660 Calista Corp.	Public Land	Existing 25-ft trail. **Winter** Northeasterly to intersect w/EIN 6a, C4,D9 **Proposed** a 50ft. trail in Sec.15 T.10 S.,R.71W. sm to 1 acre site EIN 6 C4, D9	Sec.21 T.10 S., R.71 W., sm
bb / NA EIN 15 C4, D1 Goodnews B-6	BLM	Easement not with the Conveyance Document		1-acre Site Easement EIN C4, D1 identified to be reserved when land is conveyed. Existing trail EIN 15a C4, D1	

Map 3.43 depicts three trails located in T. 8 S., R. 72 W., Seward Meridian. They are reserved in IC 1660. They are all 25-foot wide trails. EIN 3a C3, C4, D1, D9 is limited to use in the winter only. EIN 3b C3, C4, D1, D9 is limited to summer use only. All allow for transportation from public lands (BLM-managed lands on the South) to public lands (the Togiak National Wildlife Refuge on the North). The State has a priority selection on lands to the south and Calista Corporation has a priority selection on some of the lands to the north. Ultimately, the trail system will provide access from State Lands to the Togiak National Wildlife Refuge.

Map 3.44 depicts three trail easements and two site easements. Trail EIN 4 C3, C4, D1, D9 was reserved in IC 1660 and provides access from the village of Goodnews Bay to State Public lands in Section 25, T. 9 S., R. 71 W., Seward Meridian. The trail crosses both Native-selected and Native-conveyed lands. The selected lands are priority selections for Calista Corporation. The trail is 25 feet wide from south to north until it intersects with EIN 6a, C4, D9 in Section 15, T. 10 S., R. 71 W., Seward Meridian where it changes to a width of 50 wide until it reaches State lands in Section 25, T. 9 S., R. 71 W., Seward Meridian.

Easement EIN 6a, C4, D9 is a proposed easement reserved in IC 1660 which is 50 feet wide and proceeds from trail easement EIN 4 C3, C4, D1, D9 in Section 15, T. 10 S., R. 71 W., Seward Meridian southeasterly to site easement EIN 6 C4, D9. Approximately one half mile of this easement has yet to be reserved.

Trail easement EIN 15a C4, D1 has yet to be reserved as well. It proceeds from site easement EIN 15 C4, D1 in Section 23, T. 10 S., R. 71 W., Seward Meridian southwesterly to BLM lands. The easement crosses Section 26, of T. 10 S., R. 71 W., Seward Meridian which was originally selected by Goodnews Bay or Mumtrak Village. That selection however, is no longer a priority selection nor is the section on the State's priority conveyance list. Therefore, the section will likely remain in the Federal Public Domain and the trail will be at least a mile to a mile and a quarter shorter than originally proposed. Section 23, T. 10 S., R. 71 W., Seward Meridian, the beginning of the trail and the location of its attendant site easement, is a priority selection by Calista Corporation and will likely be transferred out of Federal ownership.

Map 3.44 depicts one of the two trails mentioned at the beginning of this discussion. It is part of a trail that goes from Goodnews Bay to Bethel. It is a winter trail, but more importantly it is part of an inter-community trail system that ought to be preserved. Here, EIN 1 C3, C5, D1, D9, M was reserved in Patent 50-95-0632, dated September 27, 1995. The subsurface estate is owned by Kuitsarak, Inc. The trail is 25 feet wide and its use is limited to winter transportation.

Map 3.44 depicts systems out of the Village of Goodnews Bay through Native-conveyed lands to two areas of State Conveyed lands. The northeastern portion of the system was discussed under Map 3.44. The main trail discussed under Map 3.44 and described as EIN 4 C3, C4, D1, D9 was again reserved under Patent 50-95-0632, dated September 27, 1995. The trail is 25 feet wide and its use is limited to winter. Those portions of land it crosses which remain in the Federal ownership are priority selections for Goodnews Bay and Mumtrak Villages.

EIN 11 C5 is a site easement on the left bank of the Goodnews River in Section 2, T. 11 S., R. 72 W., Seward Meridian. Its purpose is to accommodate a change in mode of transportation from water to ground. Its purpose is related to EIN 11a C5, a proposed trail easement that provides access to a block of land locked State Land, Sections 1, 12, 13 and 24 in T. 11 S., R. 72 W., Seward Meridian. Both easements were reserved in Patent 50-95-0632, dated September 27, 1995. Both easements are on lands owned by Kuitsarak, Inc.

EIN 12 C5 intersects EIN 4 C3, C4, D1, D9 in Section 3 of T. 12 S., R. 73 W., Seward Meridian. It provides access to a large block of State owned land to the west. It was reserved in Patent 50-95-0632, dated September 27, 1995.

There is one new trail to add to this discussion. See Map 3.44: EIN 3 C3, C4, D1, D9. EIN 3 C3, C4, D1, D9 is reserved in Patent 50-95-0632, dated September 27, 1995. It is an existing trail and it is 25 feet

wide. While it appears to begin on BLM land in Section 20, T. 12 S., R. 74 W., Seward Meridian, the lands are a priority selection of Calista Corporation. The trail proceeds north from Section 20, T. 12 S., R. 74 W., Seward Meridian to public lands in Section 2, T. 11 S., R. 74 W., Seward Meridian. The trail is designed to proceed further if the lands to the north of Section 2, T. 11 S., R. 74 W., Seward Meridian are conveyed to the Native community. Calista Corporation has a priority selection on Sections 13, 22, 23, and 24 of T. 10 S., R. 74 W., Seward Meridian. The State claims a priority selection on Sections 26 and 35 of T. 10 S., R. 74 W., Seward Meridian and Section 3 of T. 11 S., R. 74 W., Seward Meridian. The northern portion of the trail system will therefore fall on both State and Native owned lands. The left or western portion of the branch in the trail system is demarcated as EIN 16 C4, D1 and has yet to be reserved in any conveyance.

Map 3.44 depicts the last of the ANCSA 17(b) easements in the Goodnews Planning Block. EIN 3 D1, D9 and EIN 6 C3, D1 were both reserved in Patent 50-95-0437, dated August 15, 1995. EIN 6 C3, D1 is a sixty (60) foot wide road easement. It goes from the South Spit at Platinum and the Platinum Airstrip south to the Goodnews Mining Camp. EIN 3 D1, D9 is an existing trail easement from Platinum to Goodnews Bay.

Agency Withdrawals
There are no withdrawals within the planning block.

Recreation and Public Purposes Act Sites
There are no Recreation and Public Purposes Act Sites within the planning block.

Land Tenure Adjustment
Section 18, T. 9 S., R. 72 W., appears to be BLM lands that do not have a State or Native selection on them. The area encompasses 605 acres and because it would be isolated public land at the completion of the conveyance process, it would be suitable for land tenure adjustment, such as a land exchange or sale.

Subsurface Estate
The Federal government has no subsurface estate within the Goodnews planning block (Map 3.40).

(5) Iliamna East Planning Block

The Iliamna East Planning Block occupies an area east of the Kvichak Block, adjoining the Iliamna West Planning Block in which both the East and West Planning Block takes in Lake Iliamna. The area contains about 1,283,817 Acres (Map 3.45). Once all selected lands have been conveyed in this planning block, it is anticipated that BLM will manage approximately 55,156 acres of public land. BLM is currently the interim manager of about 263,457 acres of land. Native corporations have priority selections on 46,366 acres, and the State of Alaska has priority selections on 164,631 acres. Within the life of this plan, the prioritized lands should be conveyed out of Federal ownership.

Land Use Authorizations/Rights-of-Way. There are no land use authorizations or Rights-of-Way in this Planning Block.

ANCSA 17(b) Easements. There are 39 ANCSA 17(b) site and trail easements in the Iliamna East Planning Block area. There are 27 one-acre site easements and three ½ acre site easements. There are six proposed 25 ft. wide trail easements, and one 25 ft. existing trail easement. One easement is for a 50 ft. existing trail, and there is an easement for an airstrip measuring 250 ft. x 1,500 ft. These easements are shown in Map 3.45, and details are provided in Table 3.20.

Table 3.20. 17(b) Easements within the Iliamna East Planning Block

Easement I.D.	Administrative Agency	Landowner IC / Pat #	Land Access	Easement Type	Location Information
bbilia001 EIN 24 C5, D1 N Lake Clark A-6	BLM	Kijik Corporation IC 300 Easement not identified in a conveyance document	State Conveyed	A one acre site easement starting at Long Lake accessing proposed 25-ft trail to the Chulitna River.	Sec.31 T.1N., R.33W., sm
bbilia001 EIN 4a D1 Lake Clark A-6	BLM	Kijik Corporation Patent No. 50-94-0485 Easement not identified in a conveyance document	State Conveyed	Existing 25-ft trail for public purpose and access. Northwesterly to public lands	Sec.30 T.2S., R. 32W., sm
bbilia003 EIN 12b D9 Lake Clark A-6	BLM	Kijik Corporation IC 300	Public Land	One acre site	Sec.11 T.1S. R.34W., sm
bbilia005 EIN 12e C5 Lake Clark A-5	BLM	Kijik Corporation IC 300	Public Land	Proposed 25-ft trail for public purpose and access. Southerly to public lands	Sec.16 T.1N., R.32W sm
bbilia005 EIN 13a D9 Lake Clark A-5	BLM	Kijik Corporation IC 300	Public Land	One acre site	Sec.16 T.1N., R.32W., sm
bbilia007 EIN 20 C5, D1, N Lake Clark A-5	NPS	Kijik Corporation PA No. 50-94-0485 Easement not identified in a conveyance document	Public Land	Trailhead for 25-ft proposed trail accessing public land and periodic site on the Chulitna River.	Sec.5 T.1N., R.31W., sm
bbilia009 EIN 22 C5, D1, N Lake Clark A-5	NPS	Kijik Corporation PA No. 50-94-0485 Easement not identified in a conveyance document	Public Land	Trailhead for 25-ft proposed trail accessing isolated public land.	Sec.16 T.1N., R.31W., sm
bbilia011 EIN 10kE Lake Clark A-5	NPS	Kijik Corporation IC 300	Public Land	Proposed 25-ft trail for public purpose and access. Northwesterly to public lands.	Sec.5 T.1S., R.31W., sm

Easement I.D.	Administrative Agency	Landowner IC / Pat #	Land Access	Easement Type	Location Information
bbilia015 EIN 16 L Lake Clark A-5	NPS	Kijik Corporation IC 300	Public Lands	Existing bush airstrip, 250' width and 1500' length used to access public lands.	Sec.18 T.1N., R.30W., sm & Sec. 13 T.1 N., R. 31 W., sm
bbilia016 EIN 16b L Lake Clark A-5	NPS	Kijik Corporation IC 300	Chulitna River	One acre site	Sec.18 T. 1 N., R.30W., sm
bbilia018 bb / NA EIN 102 C5 Lake Clark A-4	NPS	Kijik Corporation IC 1337	Lake Clark NP	½ acre site	Sec.11 T.2S., R.30W., sm
bbilia020 EIN 27 C-5 Lake Clark A-4	NPS	Kijik Corporation IC 1337	Lake Clark NP	½ acre site	Sec.11 T.2S., R.30W., sm
bbilia022 EIN 100 C4 Iliamna D-5	NPS	Kijik Corporation IC 1337	Lake Clark NP	One acre site	Sec.26 T.2S., R.31W., sm
bbilia024 EIN 26b C5, D1, N Iliamna D-5	NPS	Kijik Corporation IC 300 Easement not identified in a conveyance document	Lake Clark NP	One acre site	Sec.28 T.2S., R.32W., sm
bbilia026 EIN 27a D1 Iliamna D-5	NPS	Iliamna Natives Ltd IC 1341.	Lake Clark NP	One acre site	Sec.9 T.3S., R.31W., sm
bbilia028 EIN 27 D1 Iliamna D-5	NPS	Iliamna Natives Ltd. IC 1339	Lake Clark NP	One acre site	Sec.8 T.3S. R.31W. SM

Easement I.D.	Administrative Agency	Landowner IC / Pat #	Land Access	Easement Type	Location Information
bbilia031 EIN 17a D1 Iliamna D-5 17 D1	Selected PD Proposed	Applicant AA6685-0	Lake Clark NP	Proposed trail accessing isolated public land. Site easement	Sec.8 T.3S., R.32W. SM
bbilia032 EIN 11a C5 Iliamna D-5	NPS	Iliamna Natives Ltd. 50-94-0481	Lake Clark NP	One acre site	Sec.27 T.3S., R.32W., sm
bbilia034 EIN 12a C5 Iliamna D-5	NPS	Iliamna Natives Ltd. 50-94-0481	Lake Clark NP	½ acre site	Sec.22 T.3S. R.32W., sm
bbilia035 EIN 15c D9 Iliamna D-5	BLM	Iliamna Natives Ltd. 50-94-0481	Public Land	One acre site	Sec.1 T.5S. R.32W., sm
bbilia037 EIN 11d D1, D9 Iliamna D-5	BLM	Iliamna Natives Ltd. IC 402	Public Lands	One acre site.	Sec.31 T.3S. R.32W., sm
bbilia039 EIN 22 E Iliamna D-6	BLM	Iliamna Natives Ltd. IC 402	State Conveyed	One acre site	Sec.28 T.4S. R.33W., sm
bbilia041 EIN 4a C4 Iliamna C-6	BLM	Alaska Peninsula Corporation IC 283	Public Land	One acre site Sec. 17 and/or Sec.20 T.5 S.,R.33W. sm at end of EIN 4b D9	Sec.17 T.5S. R.33W., sm
bbilia045 EIN 3e D9 Iliamna C-6	BLM	Alaska Peninsula Corporation IC 283	Public Land	One acre site	Sec.13 T.6S., R.35W., sm
bbilia046 EIN 5B D1, D9, L Iliamna C-6	BLM	Alaska Peninsula Corporation IC 283	Public Land	One acre site	Sec.28 T.5S., R.33W., sm

Easement I.D.	Administrative Agency	Landowner IC / Pat #	Land Access	Easement Type	Location Information
bbilia047 EIN 6a D9 Iliamna C-5	BLM	Iliamna Natives Ltd. IC 402	Public Land	One acre site	Sec.15 T.5S., R.33W., sm
bbilia051 EIN 24a D3 Iliamna D-5	BLM	Iliamna Natives Ltd. IC 649	Public Land	One acre site	Sec.12 T.5 S., R.33W., sm
bbilia052 EIN 24b D3 Iliamna D-5	BLM	Iliamna Natives Ltd. IC 649	Major Waterway – Slopbucket Lake	One acre site	Sec.12 T.5S., R.33W., sm
bbkokh001 EIN 12b D9 Iliamna C-5	BLM	AK Pen Corp IC 357	Navigable Water	One acre site	Sec.35 T.7S., R.31W., sm
bbkokh002 EIN 12k D9 Iliamna C-4	BLM	AK Pen Corp IC 357	Public Land	One acre site	Sec.34 T.7S., R.30W., sm
bbkokh004 EIN 23 E Iliamna B-4	BLM	AK Pen Corp IC 357	Public Land	One acre site	Sec.24 T.8S. R30W., sm
bbkokh006 EIN 8a D9 Iliamna B-5	BLM	AK Pen Corp IC 357	Public Land	One acre site	Sec.5 T.9S., R.31W., sm
bbkokh008 EIN 22 E Iliamna B-5	BLM	AK Pen Corp IC 357	State Conveyed	One acre site	Sec.7 T.9S., R.31W., sm
bbkokh010 EIN 24 C5 Iliamna B-5	BLM	AK Pen Corp IC 1042	State Conveyed	One acre site	Sec.2 T.10S., R.32W., sm

Easement I.D.	Administrative Agency	Landowner IC / Pat #	Land Access	Easement Type	Location Information
bbkokh012 EIN 25 C5 Iliamna B-5	BLM	AK Pen Corp IC 1042	State Conveyed	One acre site	Sec.31 T.9S. R.32W., sm
bbkokh014 EIN 4a D9 Iliamna B-5	BLM	AK Pen Corp 50-92-0730	Public Land	One acre site	Sec.35 T.8S., R.33W., sm

Agency Withdrawals
There are two Agency withdrawals within the planning area. One is for the Federal Aviation Administration, serialized as AA-721 and encompasses 709 acres. The second withdrawal is for the Department of Interior, serialized as AA-6497, encompassing 13,951 acres (Map 3.45).

Recreation and Public Purposes Act Sites
There are no Recreation and Public Purposes Act Sites within the planning block.

Land Tenure Adjustment
These areas are potential disposal, acquisition or land exchange sites:

Chulitna River, located in secs. 21 to 23 and sec. 28, T. 1 N., R. 32 W.; approximately 2,560 acres are lands recommended for exchange. A village selection application, AA-6686-K, still remains on secs. 29 to 32, but secs. 31 and 32 are not prioritized for conveyance, are anticipated to remain in Federal ownership and would be appropriate for exchange. Total acreage for these lands is 3,836 acres (Map 3.45).

Some land will remain in Federal ownership after the conveyance process is completed in the area near Chekok Creek, located in Tps. 2 and 3 S., R. 30 W. The south half of this township is on the State's priority list. Lands located outside the boundary of Lake Clark National Park and Preserve and not conveyed to the State should be considered for exchange or sale. Total acreage would be 8,935 acres (Map 3.45).

Subsurface Estate
The Federal government has reserved oil and gas interests on several Native allotments and all minerals on at least one Native allotment.

(6) Iliamna West Planning Block

The Iliamna West Block occupies an area east of the Kvichak Block, and west of the Iliamna Lake, adjacent to the Village of Igiugig. The Iliamna West Block is located approximately 12 miles northwest of King Salmon, Alaska. The area contains about 549,182 Acres (Map 3.46). Once all selected lands have been conveyed in this planning block, it is anticipated that BLM will manage approximately 236,850 acres of public land. BLM is currently the interim manager of about 19,657 acres of land. A Native Corporation has a priority selection on 640 acres, and the State of Alaska has priority selections on 15,491 acres. Within the life of this plan, the prioritized lands should be conveyed out of Federal ownership.

Photo 3.14. Iliamna West Block Communication Site

Land Use Authorizations/Rights-of-Way. There are no land use authorizations or Rights-of-Way are authorized in this Planning Block.

ANCSA 17(b) Easements. There are six ANCSA 17(b) site and trail easements in the Iliamna West Planning Block area. There are two 1 acre site easements. There are three proposed 50 ft. wide trail easements, and one 50 ft. existing trail easement. These easements are shown in Map 3.46, and details are provided in Table 3.21.

Table 3.21. 17(b) easements within the Iliamna West Planning Block

Easement I.D.	Administrative Agency	Landowner IC / Pat#	Land Access	Easement Type	Location Information
bb / NA EIN 19b C4 Iliamna B-8	BLM	Igiugig Native Corp 50-89-0710	Public Lands	1 acre site	Sec. 15 T.10 S., R.38 W., sm
bb / NA EIN 6C D9 Iliamna B-8	BLM	Igiugig Native Corp 50-89-0710	Public Lands	1 acre site	Sec. 14 T. 10 S., R.40 W., sm
bb / NA EIN 19a C4 Iliamna B-8	BLM	Igiugig Native Corp 50-89-0710	Goes to Public Land	Proposed 50-ft trail. southerly to public lands	Sec.15 T.15 S.,R.38 W., sm
bb / NA EIN 11 D9 Iliamna B-8	BLM	Igiugig Native Corp	Goes to Public Land	50- ft proposed trail.	Sec. 18 T.10 S., R. 39 W., sm
bb / NA EIN 11a C4 Iliamna B-8	BLM	Igiugig Native Corp	Goes to Public Land	50-ft trail	Sec. 7 T.10 S., R. 39 W., sm
bb / NA EIN 18a C4	BLM	Igiugig Native Corp 50-89-0710	Public	Proposed 50-ft trail. Easterly to Sec.33 T.11 S., R.37W. sm	Sec.36 T.11S.,R.38 W., sm

Withdrawals
There is a withdrawal for the U.S. Air Force, serialized as A-32838, encompassing 335.37 acres. The Air Force is currently remediating the site for return to the public domain, however, the State of Alaska has a priority selection on the land they may be conveyed out of Federal ownership during the life of the plan.

Recreation and Public Purposes Act Sites
There are no Recreation and Public Purposes Act Sites within the planning block.

Land Tenure Adjustment
These areas are potential disposal (sale) or land exchange sites:

This area is located about 14 miles southeast of Iguigig; it is in T. 11 S., R. 37 W., secs.2, 3, 4, 9, 10, and portions of sec. 16 and 21. This area is State-selected but not prioritized for conveyance, and is anticipated to remain in Federal ownership. Total acreage for these lands is 3,533 acres; it would be appropriate for sale or exchange. A second site is located in T. 11 S., R. 35 W., sec. 1, 323 acres, noted as Katmai Boundary. The Katmai Boundary parcel would be appropriate for sale or exchange. If no willing acquiring party is identified, management by the National Park Service through an agreement would be appropriate (Map 3.39).

Subsurface Estate
There are approximately 2,702 acres of land where the surface estate has been conveyed and the United States has reserved an interest in “Oil & Gas” within the planning block (Map 3.29).

(7) Koggiling Creek Planning Block

The Koggiling Creek Planning Block occupies an area west of Levelock, and east of Dillingham. The southern boundary of the planning block is formed by Kvichak Bay and Kvichak River (Map 3.47). The Lower Nushagak River and the Keefer Cutoff form a broad nearly level river valley that cuts through the western side of the planning block. The area contains about 543,671 Acres. Once all selected lands have been conveyed in this planning block, it is anticipated that BLM will manage approximately 183,399 acres of public land. Currently BLM is the interim manager of about 54,043 acres of land. Native corporations have prioritiy selections on 19,125 acres, and the State of Alaska has priority selections on 11,321 acres. Within the life of this plan, the prioritized lands should be conveyed out of Federal ownership.

Land Use Authorizations/ Rights-of-Way
There is one land use authorization in the Koggiling Creek Planning Block. BLM issued a communications site right-of-way on April 12, 1991 to Bristol Bay Cellular Partnership serialized as AA-74046. The right-of-way expires on April 11, 2016, and may be renewed. The granted use is for an H-1 repeater site, occupying .08 acres, located within the W½ NW¼ NE¼, E½ NE¼ NW¼, sec. 9, T. 16 S., R. 50 W., S.M. The improvements located on the site are a 40 foot tower with two 12 ft. diameter microwave antennas located at the top of the tower. A small electronics shelter is located near the base of the tower. This land is selected by the Bristol Bay Regional Corporation (Map 3.47). There are no other land use authorizations within this planning block.

ANCSA 17(b) Easements

Within the Koggiling Planning Block there are 9 site and trail easements. There are four one acre site easements, 4 proposed 25 ft. wide trail easements, and one 25 ft. existing trail easement. These easements are shown in Map 3.46, and details are provided in Table 3.22.

Table 3.22. 17(b) easements within the Koggiling Creek Planning Block

Easement I.D.	Administrative Agency	Landowner IC / Pat #	Land Access	Easement Type	Location Information
bbdill079 EIN 1 D1, N Dillingham A-5	BLM	BBNC IC 1658	Public lands	One acre site	Sec. 20 T.12 S., R.50 W., sm
bbdill080 EIN 1a D1, N Dillingham A-5	BLM	BBNC IC 1658	SOA	Proposed 25-ft trail from EIN 1 D1,Northwesterly to public lands in Sec 18 T.12 S., R.50W. sm	Sec. 20 T.12 S., R.50W., sm
bbdill081 EIN 2 D1, N Dillingham A-5	BLM	BBNC IC 1658		One acre site	Sec. 34 T.12S., R.50W., sm
bbdill082 EIN 2a D1, N Dillingham A-5	BLM	BBNC IC 1658	SOA	Proposed 25-ft trail from EIN 2 D1, N easterly to public lands in Sec. 35 T.12 S.,R.50 W. sm	Sec. 34 T.12 S., R.50 W., sm
bbnakn001 EIN 29 C5	BLM	Paug-vik inc. 50-91-0600	SOA	Existing 25-ft trail westerly to public lands	Sec. 25 T.14S., R.47W. sm
bbnakn083 EIN 8b C5 Naknek D-6	BLM	Choggiung Limited 50-93-0519	SOA	Proposed 25-ft trail from EIN 8a C5 westerly to public lands	Sec. 14 T.14 S., R 51 W., sm
bbnakn084 EIN 8a C5 Naknek D-6	BLM	Choggiung Limited 50-93-0519	N/A	One acre site	Sec. 14 T14 S., R51W., sm
bb / NA EIN 2 D1, C5 Naknek D-5	BLM	BBNC 50-88-0370	Public land	One acre site	Sec. 25 T.16 S., R.50 W., sm
bb / NA EIN 2a C5 Naknek D-5	BLM	BBNC 50-88-0370	BLM	Proposed 25-ft trail from EIN 2 D1,C5 through sec.25 & 26 T.16 S.,R.50 W. to public land at southern boundary sec.23	Sec. 25 T.16S., R.50W., sm

Agency Withdrawals

There are no withdrawals within the planning block.

Recreation and Public Purposes Act Sites
There are no Recreation and Public Purposes Act Sites within the planning block.

Land Tenure Adjustment
There are no areas for Land Tenure Adjustment within the planning block.

Subsurface Estate
The Federal government has retained mineral rights on several Native allotments (Map 3.34)

(8) Klutuk Creek Planning Block

The Klutuk Creek Planning Block is located south of the Village of Koliganek and north of the Village of New Stuyahok. The Block is east of the Wood Tikchik State Park. The confluence of the Mulchatna and Nushagak Rivers is within this area. The area contains about 1,169,064 Acres. Once all selected lands have been conveyed in this planning block, it is anticipated that BLM will manage approximately 142,135 acres of public land (Map 3.48). BLM is currently the interim manager of about 38,631 acres of land. Native corporations have priority selections on 20,705 acres, and the State of Alaska has priority selections on 5,096 acres. Within the life of this plan, the prioritized lands should be conveyed out of Federal ownership.

Land Use Authorizations/Rights-of-Way
There are no land use authorizations or Rights-of-Way in this Planning Block.

ANCSA 17(b) Easements
There are a total of 18 17(b) site and trail easements within the Klutuk Planning Block. There are nine one-acre site easements and nine proposed 25-ft wide trail easements. These easements are shown in Map 3.48, and details are provided in Table 3.23.

Table 3.23. 17(b) Easements within the Klutuk Planning Block

Easement I.D.	Administrative Agency	Landowner IC / Pat #	Land Access	Easement Type	Location Information
bbekwo002 EIN 30 C4, Dillingham D-4	BLM	Koliganek Natives Ltd. IC 228	Public Lands	One acre site	Sec.36 T. 3 S., R.48W., sm
bb/NA EIN 30a,C4 Dillingham D-4	BLM	Koliganek Natives Ltd. IC 228	Public Lands	Proposed 25-ft trail from EIN 30 C4, westerly to public lands.	Sec. 36 T.3 S., R. 48 W., sm
bbekwo003 EIN29 C4, Dillingham D-4	BLM	.Koliganek Natives Ltd. IC 228	Public Lands	One acre site	Sec.18 T.4 S., R.47W., sm
bb/NA EIN29a,C4 Dillingham D-4	BLM	Koliganek Natives Ltd. IC228	Public Lands	Proposed 25-ft trail from EIN 29 C4, easterly to public lands.	Sec. 18 T.4 S.,R.47 W., sm

Easement I.D.	Administrative Agency	Landowner IC / Pat #	Land Access	Easement Type	Location Information
bbekwo005 EIN28 C4, Dillingham D-4	BLM	.Koliganek Natives Ltd. IC 228	Public Lands	One acre site	Sec. 23 T.4 S., R. 47 W., sm
bb/NA EIN28a,C4 Dillingham D-4	BLM	Koliganek Natives Ltd. IC228	Public Lands	Proposed 25-ft trail from EIN 28 C4, southerly to public lands.	Sec. 23 T.4 S., R.47 W., sm
bbekwo008 EIN25 C4, Dillingham C-3	BLM	Koliganek Natives Ltd.. IC 228	Public Lands	One acre site	Sec.21 T.5 S., R. 45 W., sm
bb/NA EIN 25a,C4 Dillingham C-3	BLM	Koliganek Natives Ltd. IC 228	Public Lands	Proposed 25-ft trail from EIN 25 C4 westerly to public lands	Sec. 21 T.5 S., R.45 W., sm
bbekwo012 EIN33 C4, Dillingham C-5	BLM	Stuyahok Ltd. IC 290	Public Lands	One acre site	Sec(s). 6 fractionally, Sec. 7 fractionally T. 6 S., R. 46 W., sm
bb/NA EIN33a,C4 Dillingham C-5	BLM	Stuyahok Ltd. IC 290	Public Lands	Proposed 25-ft trail from EIN 33 C-4 easterly to public lands.	Sec(s). 6 fractionally, Sec. 7 fractionally, T.6 S., R. 46 W., sm
bbekwo010 EIN 32 C4 Dillingham C-4	BLM	Stuyahok Ltd. IC 290	Public Lands	One acre site	Sec.6 T.6 S., R. 46 W., sm
bb/NA EIN32A,C4 Dillingham C-4	BLM	Stuyahok Ltd. IC 290	Public Land	Proposed 25-ft trail from EIN32 C4 westerly to public lands.	Sec.6 T. 6 S., R. 46 W., sm
bbekwo014 EIN 119 D1,M Dillingham C-5	BLM **x**	BBNC 50-92-0709	Public Lands	One acre site	Sec. 14 T.7 S., R. 46 W., sm

Easement I.D.	Administrative Agency	Landowner IC / Pat #	Land Access	Easement Type	Location Information
bb/NA EIN 119a D1, M Dillingham C-5	BLM x	BBNC 50-92-0709	Public Lands	Proposed 25-ft trail from EIN 119 D1,M	Sec. 14 T.7 S., R.46 W., sm
bbekwo023 EIN 16 C4, Dillingham B-5	BLM	Ekwok Natives Ltd. 50-92-0738	Public Lands	One acre site	Sec. 33 T.9 S., R.50 W., sm
bb/NA EIN 16a C4 Dillingham B-5	BLM	Ekwok Natives Ltd. 50-92-0738	Public Lands	Proposed 25-ft trail from EIN 16 C4 northerly to public lands	Sec.33 T.9 S., R.50 W., sm
bbekwo025 EIN 14 C4 Dillingham B-5	BLM	Ekwok Natives Ltd. 50-92-0738	Public Lands	One acre site	Sec. 31 T.9S., R.50 W., sm
bb / NA EIN 14a C4 Dillingham B-5	BLM	Ekwok Natives Ltd. 50-92-0738	Public Lands	Proposed 25-ft trail from EIN 14 C4 southwesterly to public lands.	Sec. 31 T.9S., R.50 W., sm

Agency Withdrawals
There are no withdrawals within the planning block.

Recreation and Public Purposes Act Sites
There are no Recreation and Public Purposes Act Sites within the planning block.

Land Tenure Adjustment
There are no areas for Land Tenure Adjustment within the planning block.

Subsurface Estate
There are approximately 2,491 acres of land where the subsurface in Oil and Gas has been reserved (Map 3.29).

(9) Kvichak Planning Block

The Kvichak Planning Block generally is located on each side of the lower portion Kvichak River. BLM-managed lands within the block are generally located off of the major rivers, with legal access provided by proposed trails reserved as 17(b) easements. The area contains about 362,756 Acres. Once all selected lands have been conveyed in this planning block, it is anticipated that BLM will manage approximately 92,263 acres of public land (Map 3.49). BLM is currently the interim manager of about 46,191 acres of land. Native corporations have priority selections on 5,114 acres, and the State of Alaska has priority selections on 33,477 acres. Within the life of this plan, the prioritized lands should be conveyed out of Federal ownership.

Land Use Authorizations/Rights-of-Way
There are no land use authorizations or Rights-of-Way in this Planning Block.

ANCSA 17(b) Easements

There are a total of 12 17(b) Easements within the planning block. Five are one acre site easements; four located along the Kvichak River and one located along the Alagnak River. Five easements are 25-ft. wide easements for proposed trails to provide access to public lands. Two of the easements are for 25-ft. existing winter trails that provide for travel between communities. These easements are shown in Map 3.49, and details are provided in Table 3.24.

Table 3.24. 17(b) easements within the Kvichak Planning Block

Easement I.D.	Administrative Agency	Landowner IC / Pat #	Land Access	Easement Type	Location Information
bbleve002 EIN 1b D9, C6 Dillingham A-2	BLM	Levelock Nat. Ltd. IC 193	Public lands	One acre site	Sec. 19 T.11S., R.43 W., sm
bb / NA EIN 1f D9, C6 Dillingham A-2	BLM	Levelock Natives Ltd. IC 193	Public lands	Proposed 25-ft trail. Northerly to public lands	Sec. 19 T.11S., R.43 W., sm
bbleve004 EIN 1c D9, C6 Dillingham A-2	BLM	Levelock Natives Ltd. IC 193	Public Lands	One acre site	Sec.36 T.11S., R.44W., sm
bbleve006 1d D1,D9,L Dillingham A-2	BLM	Levelock Nat. Ltd IC 193.	Public lands	One acre site	Sec. 4 T.12S., R.44W., sm
bb / NA EIN 1g C6,D1,D9,L Dillingham A-2	BLM	Levelock Nat. Ltd. 193	Public lands	Proposed 25-ft trail from EIN 1c C6,D1,D9, L / Sec. 36 T.11 S.,R.44 W. sm	Sec. 36 T.11S., R.44W., sm
bb / NA EIN 1h D1,D9,L Dillingham A-2	BLM	Levelock Nat. Ltd. 193	Public lands	Proposed 25-ft trail from EIN 1d D1,D9, L / Sec.13 T.12 S.,R.45W.	Sec.4 T.12S., R.44W., sm
bbleve008 EIN 2e C4 Dillingham A-3	BLM	Levelock Nat. Ltd. 193	Public lands	Proposed 25-ft trail. Northerly to Public lands	Sec.33 T.13S., R.45 W., sm

Easement I.D.	Administrative Agency	Landowner IC / Pat #	Land Access	Easement Type	Location Information
bb EIN 12b E Dillingham A-2	BLM	Levelock Nat. Ltd. 193	Public lands	Proposed 25-ft trail. Northerly to public lands	Sec.31 T.11S., R.44W., sm
bbleve001 EIN 13 E Dillingham A-2	BLM	Levelock Nat. Ltd. 193	Public lands	Existing 25-ft winter trail. Parallels Kvichak River thru selection Winter use	Sec. 13 T.11S., R.43W.. sm
bbleve010 EIN 14 E Dillingham A-3	BLM	Levelock Nat. Ltd 193	Public lands	Existing 25-ft winter trail on L.H. side of river across from Village of Levelock, southerly to public land in Sec. 6 T.14 S., R.45W., sm Winter use	Sec. 27 T.12 S., R. 45 W., sm
bbleve008 EIN 15a C5 Dillingham A-2	BLM	Levelock Nat. Ltd 193	Public lands	One acre site	Sec. 31 T.11S., R 44W., sm
bbleve011 EIN 16 C5 Dillingham A-3	BLM	Levelock Nat. Ltd 193 x	Public lands	site	Sec.33 T.13 S., R.45W., sm

Agency Withdrawals
There are no withdrawals within the planning block.

Recreation and Public Purposes Act Sites
There are no Recreation and Public Purposes Act Sites within the planning block.

Land Tenure Adjustment
There are no areas for Land Tenure Adjustment within the planning block.

Subsurface Estate
The Federal government has retained mineral rights on several Native allotments (Map 3.34).

(10) Yellow Creek Planning Block

The Yellow Creek block is located east of New Stuyahok and west of Ekwok. The Nushagak River runs northwest and the Kvichak River runs southeast of the planning area. New Stuyahok is located within the Bristol Bay Recording District and on the Nushagak River, just 12 miles upstream from Ekwok. The area contains about 573,056 acres. Once all selected lands have been conveyed in this planning block, it is anticipated that BLM will manage approximately 266,812 acres of public land (Map 3.50). Currently, BLM is the interim manager of about 76,536 acres of land. Native corporations have priority selections on

11,488 acres, and the State of Alaska has priority selections on 42,035 acres. Within the life of this plan, the prioritized lands should be conveyed out of Federal ownership.

Land Use Authorizations/Rights-of-Way
There are no land use authorizations or Rights-of-Way in this Planning Block.

ANCSA 17(b) Easements
There are a total of five 17(b) easements within the Yellow Creek Planning Block. There are four one-acre site easements, and one 25-ft existing trail easement. These easements are shown in Map 3.50, and details are provided in Table 3.25.

Table 3.25. Yellow Creek 17(b) Easements

Easement I.D.	Administrative Agency	Landowner IC / Pat #	Land Access	Easement Type	Location Information
bb / NA EIN C4 Dillingham B4	BLM	Easement not noted in conveyance document x	public lands	One acre site	Sec. 21 T.9S., R 48 W., sm
bb / NA EIN 37 E Dillingham B4	BLM	Ekwok Natives Ltd. 50-92-0738	public lands	One acre site adjacent to EIN 38E left bank of Nushagak R.	Sec. 11 T.10 S., R.49W., sm
bb / NA EIN 10 B C4 Dillingham B5	BLM	State of Alaska x	public lands	One acre site	Sec. 25 T.10 S., R.50 W. sm
bb / NA EIN 13 E Dillingham A3	BLM	Levelock Natives Ltd. 50-89-0751	public lands	Existing 25-ft trail. From east end sec.13 southwesterly to public lands in Sec.34 T.13 S.,R.46 W. sm	Sec. 13 T.11S. R.43W., sm
bb / NA EIN 119 D1, M Dillingham C3	BLM x	Easement not noted in conveyance document	public lands	One acre site	Sec. 14 T.7 S. R.46W., sm

Agency Withdrawals
There are no withdrawals within the planning block.

Recreation and Public Purposes Act Sites
There are no Recreation and Public Purposes Act Sites within the planning block.

Land Tenure Adjustment
This area is a potential disposal (sale) or land exchange site. Due to conveyance patterns the following area will become isolated public lands. The area is located in secs. 5, 6, 7, 8, 17, 18, and 19, T. 11 S., R. 44 W, S.M. Neither the State nor an ANCSA corporation has selected the lands and they would be appropriate for exchange or sale. Total acreage for these lands is 4,415 acres (Map 3.39).

Subsurface Estate
There is no identified subsurface estate retained by the Federal government (Map 3.40).

D. Special Designations

1. Areas of Critical Environmental Concern

a) Background

Areas of Critical Environmental Concern (ACECs) are an administrative designation unique to BLM. BLM regulations (43 CFR Part 1610) define an ACEC as an area "… within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards." While an ACEC may emphasize one or more unique resources, other existing multiple-use management can continue within an ACEC so long as the uses do not impair the values for which the ACEC was designated. Section 202 (c)(3) of FLPMA mandates that BLM give priority to the designation and protection of ACECs in the development and revision of land use plans. BLM Manual 1613 describes the process followed to nominate ACECs and to evaluate areas for their suitability for ACEC designation. Currently there are no designated ACECs within the planning area.

b) Nominated Areas

During scoping, BLM actively solicited nominations and comments from the public regarding areas that should receive consideration as ACECs. Two nominations were received from the public and BLM specialists (Maps 2.31 and 2.32):

- Carter Spit ACEC – Nominated by BLM specialists.
- Bristol Bay ACEC – Nominated by the Alaska Coalition, the public, and BLM specialists.

Based on interdisciplinary review, the following areas met both the relevance and importance criteria and will move forward for additional consideration within the Alternatives examined in this Environmental Impact Statement. For more specific information on specific measures proposed for these areas, see the detailed Alternative comparison tables in Chapter II.

(1) Carter Spit ACEC

The Carter Spit area has known cultural resources and also has high potential for previously undiscovered resources given its geographic setting on the coast within prime hunting areas for marine and terrestrial game and fish. Historic sites are located within the proposed Carter Spit ACEC, including *Neqlercuryaraq,* a lake located on the southeast portion of Carter Spit, *Taqiikatarmiut*, located within the northwest portion of the ACEC at the mouth of Cripple Creek and *Maqallarliq,* located at the base of an unnamed spit in Jacksmith Bay. Archaeological surveys have not been conducted in the area.

The main waterways and tributaries of Cripple Creek and Jacksmith Creek provide habitat for economically important subsistence, commercial and recreational fisheries. This area is part of the Kuskokwim Bay ADF&G Fisheries Management Area. The rainbow trout stocks which inhabit the area are considered "world class" with high catch rates and large rainbow trout.

Several wildlife-related resources and considerations of species diversity justify protection of the habitats in the Carter Spit ACEC. Carter Bay and the coastal areas provide molting and staging habitat for Steller's eiders, a threatened species under the Endangered Species Act (Shaw et al. 2005). Many migratory birds and BLM sensitive species use the area for staging and migration in fall including black brant, black scoters, blackpoll warblers, bristle-thighed curlews, grey cheeked thrush, harlequin ducks, king eiders, long-tailed ducks, red-knot, hudsonian godwit, red-throated loon, surf scoter, white-fronted geese and harbor seals (Seppi 1997). The area is also remarkable for its wide variety of vegetation, and

several rare plant species have been documented in the area (Lipkin 1996, Parker 2005). The coastal estuaries and watersheds have concentrations of breeding shorebirds and waterfowl, including several trans-oceanic shorebird species.

Subsistence activities serve local communities, through egging and spring waterfowl hunting, fishing, seal and Beluga whale hunting. Brown bears, a subsistence and sport hunted species, concentrate in coastal areas in the spring to forage for vegetation and feed on marine mammal carcasses. They later concentrate on coastal salmon streams to catch salmon.

The Jacksmith Creek watershed is a fresh water source for the Togiak National Wildlife Refuge Coastal Wetlands and the Jacksmith Bay/Carter Spit estuary and mudflats. The islands in Carter Bay and the coastal estuaries, while not in BLM jurisdiction, are dependent upon the terrestrial watersheds within the ACEC for fresh water and the nutrient input which maintains the estuary tidal flat ecosystems adjacent to BLM lands.

An unnamed creek that drains an unnamed lake south of Carter Creek and empties into Carter Bay was particularly noted during scoping as being an important water body deserving of protection as the only source of fresh water in that area.

(2) Bristol Bay ACEC

The Bristol Bay ACEC, taken as a whole, provides habitat for the Mulchatna caribou herd, spawning and rearing habitat for five species of salmon and numbers of freshwater fish, year round habitat for moose, and a summer fisheries forage base for brown bears. The northeast portion of the ACEC has concentrations of nesting trumpeter swans (Gibson and Maley 2003) and the remainder of the ACEC has nesting tundra swans (Wilk 1987). The widespread wetland habitats in the Bristol Bay ACEC, considered separately, have moderate productivity; however, taken all together the area ranks high in statewide waterfowl productivity. Waterfowl hatched and reared here are harvested throughout the Pacific flyway. Sensitive species in the region include trumpeter swans, white-winged and black scoters, black-poll warblers, rusty blackbirds (not on the Special Status Species list), and bald eagles. These BLM lands, though discontiguous, provide movement corridor and seasonal habitats for caribou, including calving areas and important winter range. Five plant species noted by the Alaska Natural Heritage Program as rare are located in the Bristol Bay ACEC (Batten and Parker 2004). Tidal mudflats that are not BLM lands but are adjacent to the Bristol Bay ACEC in Kvichak Bay and Nushagak Bay are recognized as a shorebird migration stopover site of regional importance under the Western Hemisphere Shorebird Reserve Network (WHSRN 2005). These migratory shorebirds may also use the shores of the many lakes in the region during migration.

BLM lands in the Bristol Bay ACEC are almost exclusively situated away from the major rivers draining the Bristol Bay region; however, the headwaters of many of the streams emptying into these rivers are located in the Bristol Bay ACEC, and are important to the terrestrial watersheds within the ACEC and elsewhere for fresh water, nutrient input, and habitat for a world-class red salmon fishery, and for spawning and rearing the wide variety of other fish species found here.

Residents of the region are dependent upon this area for commercial, subsistence, and sport fishing, and for subsistence and sport hunting. The Bristol Bay ACEC offers an area for guided sport hunting and fishing in a remote, pristine setting.

2. Wild and Scenic Rivers

An assessment of comparative resource values for river segments within the planning area is ranked according to river eligibility. These rankings can be found in Appendix B. In order for a river to be eligible for designation as a component of the National Wild and Scenic River System, a river must be both free-flowing and possess one or more “outstandingly remarkable” characteristics described below. Rivers that

receive a value of 1 or 2 have an outstandingly remarkable value. Outstandingly Remarkable Value is defined as a unique, rare or exemplary feature that is significant at a comparative regional or national scale. The criteria used for ranking rivers, creeks, and tributaries are based on a numerical value of 1 to 5. The rating key used for the Wild and Scenic River Matrix is listed below:

1. Exemplary, one of the better examples of that type of resource at a national level.
2. Unique, a resource or combination of resources that is one of a kind at a regional level.
3. High quality at a regional and/or local level.
4. A common resource at the regional and/ or local level.
5. Unknown. A BLM resource specialists' team inventoried and assessed these water bodies, leading to a determination of the river's eligibility.

Below are the factors considered for each resource team specialist.

Fisheries. The Kvichak River, the largest sockeye salmon run in the world (Minard 1998), was the only river to receive a value of 1; however, the river is not in BLM jurisdiction. A value of 2 was assigned to rivers with existing high recreation and subsistence fishing for anadromous and resident fish species. A value of 3 was assigned to rivers with moderate recreation and subsistence fishing for anadromous and resident fish species. Rivers and creeks with no subsistence or recreational fishing were assigned a value of 4. The majority of the subsistence and recreational fishing activity occurs within the rivers that received a value of 2 or 3.

Recreation. The ratings provided were based on recreational and scenic qualities within the rivers, creeks, and tributaries. Rivers that are free-flowing with unique recreational features and accessible to large numbers were ranked with a value of 2. For example, the Kvichak River is a unique watershed with trophy rainbow trout fisheries. Scenic values are unique because of the river basin is widely used and all five salmon species appear here. Those rivers rated with a value of 3 received the ranking because of high populations of fish and usage.

Wildlife/Subsistence. Both Subsistence and Wildlife were grouped together for the purpose of this evaluation. Rivers and creeks ranked with a value of 1 represent anadromous fish runs, known bear or moose or caribou harvest, and include the main stem portion of the watershed, for example, the Alagnak River. A value of 2 was assessed where salmon runs and bear numbers were less than those in areas ranked with the number 1 and/or the extent of habitat were less than those areas ranked as 1. A value of 3 shows high quality habitat; but not unique in the region which only accounts for a small portion of the watershed within high elevations. All other rivers and creeks rated at a 4 since they are common on a local or regional basis, no salmon runs occur and there is no association with a higher order watershed.

Cultural/Historic. The ranking system used for these rivers, creeks, and tributaries was based on a numerical value ranging from 1 to 5. The criteria for evaluation of cultural resources on proposed wild & scenic rivers within the Bay RMP are listed below.

A value of 1 recognizes an observable settlement pattern of cultural sites (either eligible for listing on National Register of Historic Places individually or as a group), and/or sites exhibiting evidence of two or more cultures using the area, and/or an area of religious or cultural significance for local population (TCP eligible). A rating of 2 recognizes that there is at least one site eligible for listing and a high potential for more.

Rivers and Creeks that rank as 3 suggest that no cultural resources are known for this segment, but there is high potential for cultural resource presence. Indicators of high potential for cultural resource presence include: well drained areas adjacent to salmon streams/rivers, inlets/outlets to lakes that do not freeze to bottom in the winter; overlooks where game herds would funnel through a natural constriction such as a valley. A value of 4 suggests that no cultural resources are known within such segments, but there is medium potential for them. A value of 5 indicates that no cultural resources are known within such segments, and there is low potential for them. Indicators of low potential for cultural resource presence include: poorly drained areas, areas not adjacent to trout or salmon streams, streams draining from lakes that freeze to the bottom in winter, and steep slopes of over 30 degrees.

E. Social and Economic

1. Public Safety

a) Abandoned Mine Lands

The BLM Abandoned Mine Lands (AML) Program is administered to meet Federal and State cleanup requirements. The AML Program addresses the mines as environmental and safety hazards on public lands (BLM 2004b). The AML program focuses on longer term clean up of mine related waste materials that may be considered hazardous to human health and the environment. If hazardous materials are present at abandoned mine sites they are most often considered non-time critical removal actions under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) rather than emergency removal actions. Typical hazardous materials found at the sites include petroleum hydrocarbons from diesel powered equipment and building heating fuel, lead acid batteries associated with heavy equipment and vehicles, asbestos insulation and lead paints used in mine building construction, and mine tailing wastes. The AML program also focuses on physical safety dangers from open shafts, adits, and pits.

b) Hazardous Materials Management

Hazardous materials are a broad category of substances or chemicals that humans bring onto or produce on Federal lands. Hazardous materials are defined by multiple Federal regulations, but may be summarized as follows: hazardous materials are substances or materials capable of posing an unreasonable risk to health, safety, and property. Some regulations list specific chemicals as hazardous, and evaluate other materials based on their characteristics: toxic, ignitable, corrosive, or reactive.

Hazardous materials which may be present on public lands are there because they were used or produced by recreational or industrial processes, included with illegally dumped household or industrial solid waste, used and generated by clandestine drug lab operations, or result from off-site releases that migrate onto public land. Authorized industrial processes on public land may include mineral exploration and production of oil, gas, metallic ores, and gravel or rock material for construction purposes.

BLM's objective is to be in full compliance with all Federal and State laws, regulations, and policies related to hazardous materials (Appendix A). The Hazardous Materials Management Program goals include:

- Protection of public health and safety from hazardous materials on public lands, including public land users, visitors, neighbors, employees and other publics.
- Compliance with applicable hazardous materials management and other laws and regulations at the Federal and State levels.
- Minimization of future hazardous material related liabilities and costs.
- Protection of natural resource(s) and the environment from hazardous materials.
- Coordination and mutual support with other Bureau programs that have hazardous materials roles, activities, or implications on public lands.

BLM manages hazardous materials in the planning area in a manner that is consistent with Federal, State, and local governmental requirements and constraints. The BLM Alaska Environmental Protection Program is responsible for identifying and protecting public lands and the users of those lands from the effects of hazardous materials and waste. The Environmental Protection Program is responsible for the:

- Inventory of public land for hazardous materials.
- Investigation and reporting of hazardous waste/materials sites.

- Assurance that conveyed lands to and by the Federal government do not contain known hazardous materials/wastes.
- Completion of cleanup of contaminated Federal sites.
- Support of legal actions to recover cleanup costs on hazardous waste sites.
- Point of contact for the emergency response plan (BLM 2005c).

(1) Affected Environment

Current management concerns related to hazardous materials on BLM lands in the planning area consist of one active hazardous materials site.

Red Top Mine and Mill Site (two geographically separate sites)

The Red Top Mine and Mill Site are located approximately two miles east-southeast of Aleknagik. The site consisted of a mercury lode mine on Marsh Mountain, and a mill site on the east bank of the Wood River. Cinnabar was first discovered on Marsh Mountain in 1941. Exploration and minor development continued until 1952. According to available information, from 1952 until about 1955 sixty flasks (1 flask equals 2.5 quarts or 76 pounds) of mercury was produced from ore extracted from Marsh Mountain. Cinnabar ore was transported from the mine to the mill facility built on the banks of the Wood River where the mercury was retorted (heated to a high temperature, separating and collecting the liquid). Mining ended by 1959, leaving an ore stockpile at the mill estimated to contain another 60 flasks of mercury. In the 1960s the stockpiled ore was high-graded and shipped to a retort facility in Anchorage. In 1985 BLM issued abandoned and void decisions for the Red Top Mine and Mill Site claims AA-012608. All of the Site lands, with the exception of the Mill Site, were Interim Conveyed to Aleknagik Natives, Ltd. in 1980. The legal description for the parcel that remains under BLM management is: Lots 1 and 2, USS 12403, Section 32, Township 10 South, Range 55 West, Seward Meridian. Lot 1 is 2.57 acres and Lot 2 is 2.39 acres.

BLM became aware of hazardous materials issues at the Site in 1992 and initiated cleanup. In coordination with the Alaska Department of Environmental Conservation site characterization, interim removal activities, and site remediation began in 1994. Work progressed in stages with some periods of inactivity. EPA placed the site on the Federal Agency Hazardous Waste Compliance Docket on June 27, 1997. In 1998 work was completed on a CERCLA based Emergency Removal Action at the retort site. The remaining stockpiled cinnabar and mercury contaminated soils were removed from the site along with a number of drums of Bunker C oil and oil impacted soils. BLM completed the CERCLA required Preliminary Assessment for the site on December 31, 1998. The materials were loaded on a barge, taken to Dillingham and shipped to approved disposal facilities. EPA notified BLM on September 10, 1999 that after evaluating the Remedial Action reports, the Hazard Ranking System score applied was not high enough for the site to be listed on the National Priorities List. The Docket now reflects a No Further Remedial Action Planned status for the site. The Site remains listed as an active cleanup site in the ADEC contaminated sites database. BLM is in the process of seeking closure from ADEC.

BLM land management activities regarding hazardous sites in the planning area are implemented by the BLM's Anchorage Field Office (AFO) (BLM 2005c). The AFO is also responsible for administering the Hazmat Program for the planning area. Typical hazardous materials and waste issues on BLM properties are found around abandoned mines, logging operations, abandoned military sites, illegal dumps, or due to accidental spills of hazardous materials. Hazardous materials may threaten the health and safety of public lands and its users directly or indirectly through the contamination of soil, surface water, or ground water. A summary of potential hazardous materials sources within the planning area is provided in Table 3.26. Abandoned mine operations and former military sites are the most common sites on BLM lands where hazardous materials impacts have been identified. Former mine claimants and military operations have left hazardous materials in the form of drums of chemicals, fuels, oils, solvents; as well as batteries, asbestos, heavy metal contaminated mine tailings, and fuel contaminated soils. Typically, the U.S. Army Corps of Engineers or other Department of Defense agencies provide funding, management, and cleanup operations of Formerly Used Defense Sites and other Department of Defense sites involving hazardous

materials and are not specifically listed in this document. However, BLM typically manages cleanups of abandoned mines and illegal dumping activities on non-DOD property where there have been hazardous material impacts.

Table 3.26. Activities and Associated Hazardous Materials

Potential Hazards	Examples
Hazardous materials associated with historic and active mine operations	Heavy metals leaching from tailings impoundments, chemicals associated with processing ore or used in laboratories (i.e. cyanide and/or xanthates); explosives such as dynamite, ammonium nitrate, caps, and boosters; heavy metals from mine tailings; asbestos; batteries, and petroleum hydrocarbons from mine operations (e.g., fuel, oil, and solvents); and PCBs from power generation/distribution systems.
Hazardous materials associated with historic and active logging operations	Asbestos; batteries; and petroleum hydrocarbons from logging operations (e.g., fuel, oil, and solvents)
Military operations	Unexploded ordinances; petroleum hydrocarbons from military operations (e.g., jet fuel, diesel fuel, gasoline, solvents); PCBs; asbestos; lead based paint; heavy metals; and batteries
Illegal dumping	Unauthorized drum dumping of waste fuels, oils, and PCBs; solid waste dumping; dumping of lead acid batteries; dumping of miscellaneous other chemicals; and lead-based paint or asbestos containing building materials.
Illegal activities	Drug labs, debris burn sites; illegal firearm activity (lead and heavy metal impacts)
Spillage of hazardous materials	Materials spilled from overturned trucks, cars, or train cars; spillage from pipelines
Oil and Gas activities	Hydrogen sulfide gas, oil spills; petroleum hydrocarbons from drilling wastes and operations; heavy metals and fuel contamination from drilling wastes (e.g., chromium, barium, diesel based drill muds); and seismic survey related blasting agents
Facilities on public land either Federal or private (under a right-of-way)	Leaky underground storage tanks, asbestos; PCBs; batteries; petroleum hydrocarbons

Source: (BLM 2004b; BLM 2004c)

Illegal Dumping. Illegal dumping of hazardous materials is a management concern on BLM property. BLM's policy is to identify potentially responsible parties (PRPs) who are liable for hazardous materials releases affecting BLM lands or resources. After a PRP is identified, BLM will ensure that the PRP cleans up the hazardous material, or reimburses BLM for costs incurred in cleaning up a hazardous substance release.

Oil Spills. Spills of oil are a management concern on BLM property. BLM's policy is to require all users of BLM lands to fully comply with State and Federal regulations concerning prevention of and response to releases of oil. BLM includes the requirement to comply with Spill Prevention, Control, and Countermeasures prescribed by Federal and State regulations in all Land Use Permits (Appendix A). When a release of oil, usually a diesel or gasoline range fuel, is identified, BLM policy is to identify PRPs who are liable for the release. After a PRP is identified, BLM will ensure that the PRP cleans up the oil release or reimburses BLM for costs incurred in cleaning up the release.

ADEC and EPA Listed Sites. There are no U.S. Environmental Protection Agency (EPA)-permitted hazardous waste treatment/Storage/Disposal facilities on or adjacent to public lands within the planning area. Non-hazardous solid waste disposal facilities (NHSW Landfills) are regulated by EPA and administered by ADEC under 18 AAC 60. BLM generally does not permit landfills on public land; however, properly permitted NHSW landfills are occasionally established/operated at Federal mine claims or other industrial sites. Closed landfills of various sizes exist on or near public lands within the planning area. Some of these landfills are included in the ADEC's records, some are yet undiscovered/unrecorded. Hazardous materials are likely to have been placed in some landfills that operated prior to establishment of modern disposal standards. If present these hazardous materials can

possibly leach into groundwater. Other potentially regulated sources of hazardous materials within the planning area include the use of aboveground storage tanks (ASTs) and underground storage tanks (USTs). With the exception of specifically excluded UST uses (e.g., home heating oil), UST operations are regulated by the USEPA and administered by the ADEC under 18 AAC 78. A listing of permitted USTs in Alaska can be obtained at the following web site: http://www.state.ak.us/dec/spar/csp/db_search.htm Based on that database, no BLM-owned regulated USTs are located in the Bay RMP planning area; however, there may be USTs on BLM lands that are owned by other entities (e.g., DOD, other Federal agencies).

EPA and the ADEC have identified contaminated sites within the Bay RMP planning area. ADEC contaminated sites program is administered under the regulatory authority of 18 AAC 75. This program identified sites that are known to have current contamination or that have been cleaned up during administration of the program. Due to the large area included in the planning area, sites may be included in both the ADEC and EPA databases. Additionally, other regulatory programs may have sites that are not included in the ADEC and EPA databases such as those reported to the US Coast Guard or other Federal agencies.

2. Social and Economic Conditions

This section summarizes demographic and economic trend information, and describes key industries in the planning area that could be affected by BLM management actions. Local industries most likely affected by BLM land management policies and programs are: fisheries, travel, tourism and recreation, and mineral exploration and mining.

a) Regional Overview

The Bay planning area includes the Lake and Peninsula Borough, the Bristol Bay Borough, the Dillingham census Area, and the villages of Goodnews Bay, Platinum, and Quinhagak within the eastern Bethel Census Area. There are 24 villages or towns in the planning area. Dillingham and King Salmon are "gateway communities," as the trade and transportation centers of the region. Naknek and Iliamna are also gateway communities, given their importance to commercial and recreation activities in the region. The total population within the planning area is 7,917 (2000 Census).

Dillingham, Iliamna, and King Salmon have commercial airline service connecting cities outside the region. Air service provides the only year round access to most villages in the planning area. Although there are roads connecting communities on the north side of the Naknek River, in the Iliamna area, and in the Dillingham area, no road leaves the planning area and there are no roads connecting the communities, although waterways are important travel routes and links between communities in this region during months of ice free water. Cross country snowmachine travel is relied upon for nearly six months of the year.

The planning area can be characterized as a mixed subsistence-market economy. Villages such as Twin Hills and Kokhanok fit this description closely, while Dillingham and King Salmon are closer to a Western economic model. Subsistence is of universal significance in the planning area and Bristol Bay communities are natural resource dependent.

Many of the villages and towns are incorporated and collect sales tax ranging from 2% in Togiak to 6% in Dillingham. Several towns and villages collect other taxes, including raw fish taxes, liquor taxes, bed taxes, and gaming taxes. Property tax is assessed in Dillingham. Bristol Bay Native Corporation, and Calista Corporation are regional corporations formed under ANCSA. Native village corporations within the planning area are also corporations formed under ANCSA. There are 25 villages with Tribal status. The village of Ekuk is not included in economic analysis because census data is unavailable.

The Bristol Bay region has long been reliant on commercial salmon fishing as its main industry. The Alaska Department of Labor and Workforce Development reported 1,881 workers in the seafood processing industry of which 1,569 were nonresidents for Bristol Bay in 2003 (Hadland et al. 2005). Both the value and volume of fish harvest in the planning area have declined in the last 20 years. The majority of Alaska's fish harvest now occurs beyond state waters in the Federally-controlled Extended Economic Zone (ADOL 2004).

Recent change agents in the planning area include the passage of ANCSA, and the passage of ANILCA. ANICLA facilitated the creation of five conservation units in the area. These include: Alaska Maritime National Wildlife Refuge, Becharof National Wildlife Refuge, Katmai National Park and Preserve, Lake Clark National Park and Preserve, and Togiak National Wildlife Refuge. These events directly resulted in employment and income in the planning area. With growth of major population centers (Southcentral Alaska and Fairbanks), visitation, and use of area resources has dramatically increased in the last 20-30 years. Population in the area has grown over the last three decades, although migration from the area has also increased. Also, renewed interest in exploration for oil and gas, and minerals is occurring. The Pebble Prospect is within the planning area, although not located on BLM-managed land.

Increasing incomes and desire for basic amenities often not available in Bush villages inspire out-migration. Consider for example, in the Dillingham Census Area almost 20% percent of housing lacked complete plumbing and 14% lacked complete kitchen facilities.

Energy is very expensive in the region. Market basket surveys conducted by the University of Alaska Fairbanks Cooperative Extension Service in December, 2004 reported Dillingham area electricity 76% more expensive than Anchorage, and 156% higher than the U.S. average; heating oil 17% less expensive than Anchorage; unleaded gasoline 82% higher than Anchorage; and propane 91% higher than Anchorage. Census 2000 reported that almost 22% of workers in the Dillingham Census Area walked to work and 17% used "other means," referring to personal modes of transportation other than motor vehicles and public transportation. Diesel generated electricity provides the main source of power throughout the region. Food costs are much higher in the planning area than urban centers in Alaska. The market basket for a family of four in Dillingham cost 1.76 times of the price of the same basket of goods in Anchorage and 1.9 times the price in Fairbanks in March, 2005.

Data used in this analysis are largely from the Alaska Department of Labor and Workforce Development, the Alaska Department of Commerce, Community, and Economic Development, the U.S. Census Bureau, and from the Sonoran Institute's Economic Profile System.

b) Community Profiles

Community profiles for all villages, towns, and cities in the state, in both summary and detailed report forms, are available at the Alaska Department of Commerce and Community Development, Community Database or online at http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.htm. Detailed information on planning area communities can be found at this site.

c) Demographics

Diilingham (2,466), has the highest population in the planning area, followed by Togiak (809), Naknek (678), Quinhagak (555), and New Stuyahok (471). The remaining 19 villages within the planning area range in population from 36 (Portage Creek) to 399 (Manokotak). The planning area encompasses two boroughs, the Dillingham Census Area, and three towns in the Bethel Census Area. The population is approximately 70% Alaska Native, primarily indigenous Alutiiq, Athabascan, and Central Yup'ik people. In comparison, Alaska Natives comprised 16% of the state's population, which is a larger percentage of Native Americans than in any other state. The balance of the racial distribution in the area and the state is primarily white, comprising as much as 70% of the state population. Although the Alaska Native population has doubled in the last 30 years, the population growth in these regional communities slowed

in the 1990s. Tables 3.28 and 3.29 are a compilation of historic and modern population figures for communities and boroughs in the planning area.

Alaska Natives are migrating to urban population centers including the Matanuska-Susitna Borough, and Anchorage. The growth rate of the Native population for these two areas is 68.3% and 30% respectively. The growth rate of Native population in Fairbanks North star Borough is relatively low at 7.2% for the decade, which is half the growth rate for the state (See Table 3.27, Growth of Alaska Native Population).

Overall, the population growth in the three boroughs/census areas touching the planning area is very similar to the population growth rate for the State of Alaska, while it is far below the population growth rate of southcentral Alaska. The median age ranges from 29 in the Dillingham Census Area and Lake and Peninsula Borough to 36 years in the Bristol Bay Borough. The State median age was just over 32 years (2000).

Out migration is evident with 3.4 persons per year per 1,000 individuals within the population leaving the Dillingham census Area, and 14.8 persons per year per 1,000 individuals within the population left both Bristol Bay and Lake and Peninsula Boroughs between1990 and 2003. This is similar to Fairbanks North Star Borough (-11.5/1000/year), and similar to most of rural Alaska. Net positive migration was reported in Juneau, Anchorage, the Kenai Peninsula, and the Matanuska-Susitna Borough (highest at 25.5/1,000/year) during the same reporting period (Alaska Department of Commerce, 2005).

d) Employment and Income

Table 3.33 provides information about local employment. Commercial salmon and herring fishing has long been the predominant economic activity in Bristol Bay and in Southwest Alaska. As elsewhere in rural Alaska, public employment is very important to the economy of the planning area. The largest employers in the region are the Bristol Bay Area Health Corporation, Bristol Bay Native Association, Wards Cove Packing Association, and Borough government and school districts.

Table 3.27. Growth of Alaska Native Population

Area/Year	1990	2000	Percent Growth
Alaska	85,698	98,043	14,4%
Anchorage	14,569	18,941	30%
Fairbanks	5,330	5,714	7.2%
Mat-Su	1,939	3,264	68.3%
Dillingham Census Area	2,925	3,452	18%
Bristol Bay Borough	455	550	20.9%
Lake and Peninsula Borough	1,261	1,340	6.2%

Source: U.S. Census Bureau, Census 1990, 2000

Table 3.28. Population per Community, Historic U.S. Census Data

	Year				
Community	1960	1970	1980	1990	2000
Aleknagik	231	128	154	185	221
Clark's Point	138	95	79	60	75
Dilliingham	424	914	1,563	2,017	2,466
Ekwok	106	103	77	77	130
Goodnews Bay	154	0	168	241	230
Igiugig	36	36	33	33	53
Iliamna	47	58	94	94	102

Community	1960	1970	1980	1990	2000
King Salmon	227	202	545	696	442
Kokhanok	57	88	83	152	174
Koliganek	100	142	117	181	182
Levelock	88	74	79	105	122
Manokotak	149	214	294	385	399
Naknek	249	178	318	575	678
New Stuyahok	145	216	331	391	471
Newhalen	63	88	87	160	160
Nondalton	205	184	173	178	221
Pedro Bay	53	65	33	42	50
Platinum	43	55	55	64	41
Port Alsworth	0	0	22	55	104
Portage Creek	0	60	48	5	36
Quinhagak	228	340	412	501	555
South Naknek	142	154	145	136	137
Togiak	220	383	470	613	809
Twin Hills	0	67	70	66	59

Source: U.S. Census Bureau, Census 2000

Table 3.29. Population of Selected Boroughs, Census Areas

Regional Entity	Year				
	1960	1970	1980	1990	2000
Fairbanks North Star Borough	43,412	45,864	53,983	77,720	82,840
Anchorage Municipality/Borough	82,833	126,385	174,431	226,338	260,283
Dillingham Census Area	1,213	2,322	3,203	4,012	4,922
Bristol Bay Borough	618	1,147	1,094	1,410	1,258
Lake and Peninsula Borough			1,384	1,668	1,823

Source: ADOL 2005b

Both seafood harvesting and processing are seasonal industries in Bristol Bay. Salmon and herring fishing comprise most of the harvest activity which occurs between May and September. In 2003, 21% of private sector workers in Alaska were nonresidents of the state. (ADOL 2005b) Seafood processing employs the highest number of nonresident workers (63.4%) in this state. In 2002, there were 2,820 fish harvesting jobs in Southwest Alaska. This was 21% of all private sector employment. Adding seafood processing workers (3,900) makes the fishing industry in Southwest Alaska the largest sector of employment (49% of private jobs). The State reports fish harvesting jobs using a regional approach, estimating employment since the number of workers does not correspond to wage and salary employees who are qualified for workers compensation. Although Southwest Alaska includes areas outside the planning area, it is a reasonable measure of the Bristol Bay region.

Table 3.30. Workers and Wages in the Seafood Processing Industry

Locale	Total Workers	Total Wages (millions)	Nonresident Workers	Nonresident Percent	Nonresident Wage (millions)	Nonresident Percent
Bristol Bay Borough	1,316	$9.2	1,071	81.4%	$7.1	76.8
Dillingham	228	$2.0	180	78.9%	$1.6	81.0
Lake and Peninsula Borough	337	$2.9	318	94.4%	$2.7	91.8
Plan area Total	1881	$14.1	1,569	83.4	$11.4	80.9
Alaska	19,480	$247.4	13,858	71.1%	$156.8	63.4

Source: ADOL 2005b

Table 3.31. Commercial Fishing Permits Held by Residents

Community	Permits
Aleknagik	33
Clark's Point	16
Dillingham	277
Ekwok	6
Goodnews Bay	41
Igiugig	5
Iliamna	17
King Salmon	36
Kokhanok	8
Koliganek	18
Levelock	15
Manokotak	96
Naknek	115
New Stuyahok	43
Newhalen	7
Nondalton	14
Pedro Bay	3
Platinum	9
Port Alsworth	4
Portage Creek	Not reported
Quinhagak	83
South Naknek	43
Togiak	244
Twin Hills	15
Total	**1148**

Source: Alaska Department of Commerce, Community & Economic Development, Alaska Economic Information System 2004

Government employment includes State of Alaska, borough, city, and Federal agency jobs in the planning area. The Alaska Department of labor reported that government employment ranged from 33% of the workforce in Bristol Bay Borough (398 of 1,203), 39% in the Dillingham Census Area (904 of 2,332), to 50% in the Lake and Peninsula Borough (320 of 636) during 2003.

Table 3.32. Employment by Sector (Percentage of Total Employment)

Employment by Sector	Dillingham Census Area	Bristol Bay Borough Area	Lake and Peninsula Borough	Alaska
Agriculture, forestry, fishing, hunting, mining	3.9	0.9	1.4	4.9
Construction	4.2	11.4	4.8	7.3
Manufacturing	1.9	1.5	1.2	3.3
Wholesale trade	0.6	0.3	0.5	2.6
Retail trade	10.0	7.7	5.7	11.6
Transportation, warehousing and utilities	9.9	17.4	10.2	8.9
Information	1.1	6.4	0.9	2.7
Finance, insurance, real estate, rental and leasing	2.7	2.4	1.0	4.6
Professional scientific, management, administrative and waste management	1.8	4.1	2.4	7.6
Education, health and social services	37.9	23.6	33.9	21.7
Arts, entertainment, recreation, accommodation and food services	2.9	7.2	6.2	8.6
Other services	9.4	2.2	7.2	5.6
Public administration	13.7	14.7	24.6	10.7

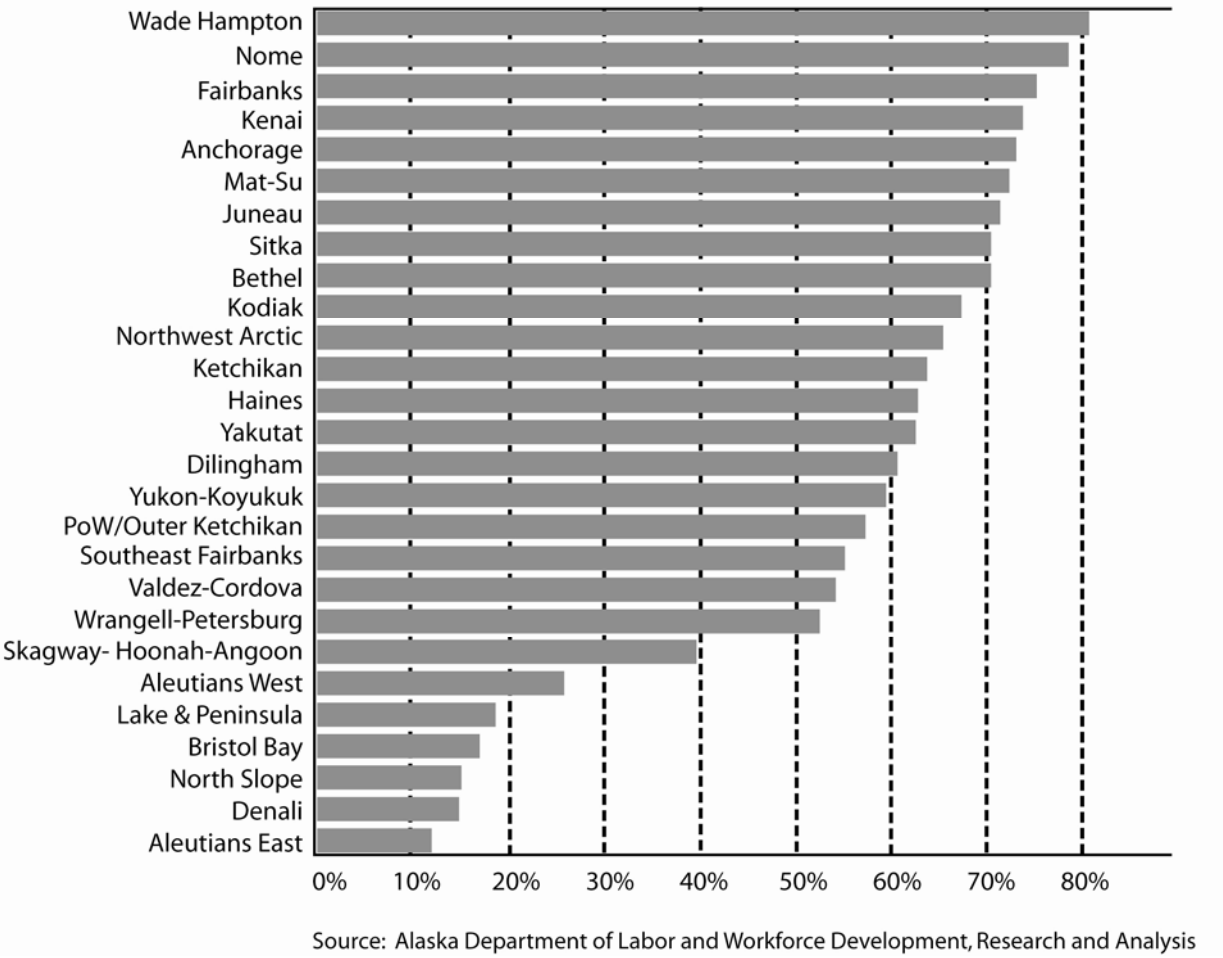
Source: U.S. Census Bureau, Census 2000.

State of Alaska statewide data indicate that mining, oil and gas, and oil and gas service industries employed 24% to 26% non-resident workers in 2003. North Slope Alaska industry employs less than 15% within region labor. These industries, which may be expanding presence in southwest Alaska, are likely to provide jobs to Alaskans; however, they will be primarily out of region residents. Teck Cominco Alaska has worked with NANA Regional Corporation to employ NANA shareholders at Red Dog Mine in northwest Alaska. However, most of the NANA shareholders employed at the mine are out of region residents.

Teck Cominco Alaska provided 412 direct jobs to employees and contractors in 2003. This is slightly over 14% of wage and salary employment, and 22% of non-government employment in the Borough. Over 50% of mine workers are NANA shareholders. Those directly employed by Teck Cominco Alaska receive free transportation to the job site from their residence within the state. As a result only about 140 employed NANA shareholders live in the planning area. The mine operation also resulted in the Borough's largest source of revenue through payments in Lieu of taxes of $5.9 million in 2003 (ADOL 2004).

Even visitor related industry provides a significant number of jobs to non-resident Alaskans. ANCSA Corporations and subsidiaries provide jobs in some locations within the planning area. The regional corporation is headquartered in Anchorage.

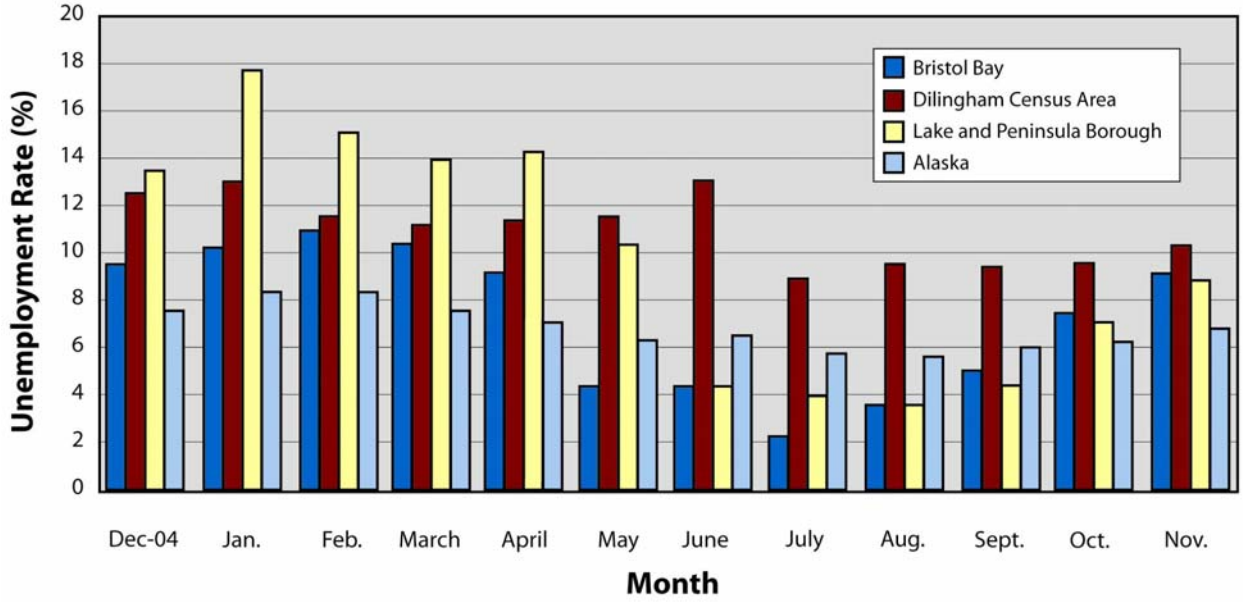
Table 3.33. Percent of Private Sector Workers Who Are Local Residents



Source: Alaska Department of Labor and Workforce Development, Research and Analysis
Jeff Hadland, et.al., Nonresidents Working in Alaska-2003, Alaska Department of Labor and Workforce Development, January 2004.

Unemployment in the planning area fluctuates widely compared with urban centers in Alaska and the state average. According to State of Alaska data, average unemployment during 2004 ranged from 6.6% in Bristol Bay, 10.2% in the Lake and Peninsula Borough, and 11.2% in Dillingham Census Area. At the same time the state average was 7.5% (ADOL 2005a).

Table 3.34. Comparative Unemployment Rates December 2004-November 2005

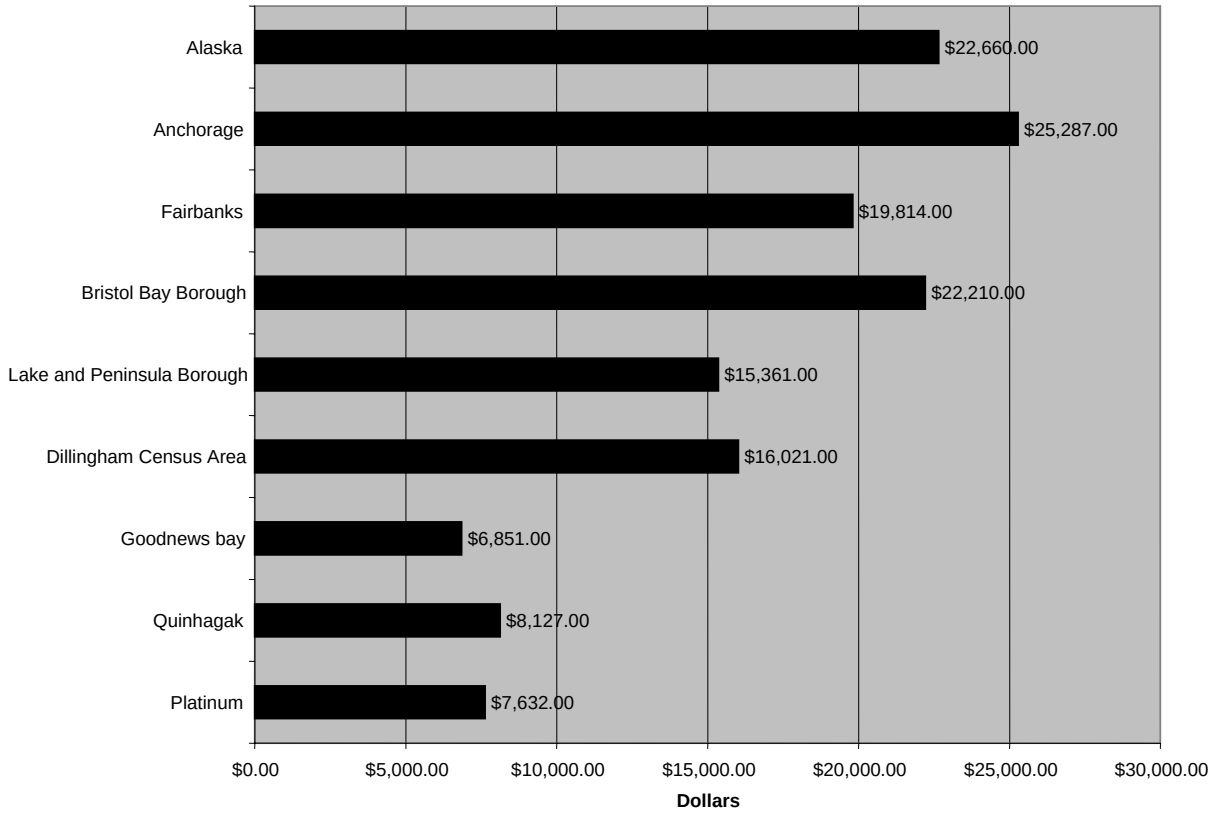


This measure reports the number of individuals in a census area that are not seeking employment. Labor force participation rates are low as is typical in bush Alaska (Table 3.34). Census data shows that Kokhanok has the lowest participation rate in the planning area, where about 64% of the population was not in the labor force in 2000. Eleven villages in the planning area have labor force participation rates in excess of 50%. This underscores the relative scarcity of jobs, and emphasizes the role and importance of subsistence activities or the phenomena could be attributable to the dynamics of acculturation and cross culturalization.

The educational attainment curve lags in bush villages. Over 88% of the residents in the State have completed high school, 60% of the residents in Alaska have some college education; and almost 25% have college degrees. In the planning area, 59% of the residents completed high school, and 11% hold bachelor's degrees or advanced degrees. The difference may be attributable to skewing as a result of out-migration by individuals with higher education; perhaps, a consequence of the dynamics of acculturation and cross culturalization between Western culture and the culture of an indigenous people.

Per capita income in the planning area ranges from almost equal to the Alaska average in Bristol Bay Borough to under $8,000 per year in smaller villages (Table 3.35 and Table 3.36). Only in the regional centers does per capita income begin to track with the high cost of living.

Table 3.35. Comparison of Per Capita Income (2000)



The number of individuals considered at or below poverty level in the planning area is much higher than the average for the state of Alaska. In the Bristol Bay Borough 9.5% Individuals were below poverty level in 2000. In the Dillingham Census Area 21.4% Individuals were below poverty level in 2000. In the Lake and Peninsula Borough, 18.9% of the population was below poverty level in 2000. In comparison, 9.4% of individuals in Alaska were below the poverty level in 2000.

e) Environmental Justice

The United States Department of the Interior and the Bureau of Land Management are under a legislative mandate to "…cause the least adverse impact possible on rural residents who depend upon subsistence uses of the resources...." of the federal public lands in Alaska, 18 U.S.C. §3112 (1), and an Executive Order to "…identify… the need for ensuring protection of populations with differential patterns of subsistence consumption of fish and wildlife….", E.O. 12898, dated February 11, 1994.

A Presidential Memorandum accompanying Executive Order 12898 requires Federal agencies to "… analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. section 4321 et seq."

Alaska Natives, Yup'ik, Alutiiq, and Dena'lina Athabascan, are the predominant minority population of the planning area. Demographic characteristics for communities within the planning area are presented in Table 3.36. Data shows that all but four villages and towns have very high minority populations, in excess of 50%. These same locales have high percentages of individuals and households with incomes

below poverty level, although there is wide variability between villages. The work force participation percentage for all communities in this area is consistently lower than the participation rate for the state as a whole. Unemployment rates are high in Bristol Bay. Despite the positive income effect of commercial fishing in the region, poverty rates remain high in most Bristol Bay communities. The Western concept of poverty maybe an inappropriate label when one factors in considerations of and an appreciation for the significance of a subsistence lifestyle, a lifestyle engaged in throughout the planning area.

President Clinton's cover memo to Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, emphasizes public participation in the NEPA process. Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments," requires the BLM to consult with tribal governments in the planning area on Federal matters that significantly or uniquely affect their communities. The EPA's Environmental Justice guidance of July 1999 stresses the importance of government-to-government consultation. In fostering tribal participation, the BLM held scoping meetings in seven villages in the planning area.

Scoping meetings and alternative development meetings were held during development of the draft plan and draft EIS. Six scoping meetings were held from January through April 2005 at communities in the planning area, and in Homer and Anchorage. During this scoping process, BLM received feedback on potential Environmental Justice concerns of the local residents**.**

Major concerns expressed at these meetings included:

- The Native community wants continued access and opportunity for subsistence hunting, but is concerned about impacts to subsistence activities, mostly related to mining, and increased recreational or sport hunting and fishing activities.
- A more detailed discussion of public concerns is provided in the Bay Resource Management Plan Scoping Report (June, 2005).
- Subsistence activity is an important source of food and material which offsets high cost of living and high unemployment.

Table 3.36. Environmental Justice Data from the 2000 Census

State or City	Per Capita Income	Percent of Population as a Minority	Percent of Individuals Below Poverty Level Income	Percent of Households Below Poverty Level Income	Percent of Unemployed Population Over 16 Years of Age	Percent Population Over 16 Years of Age Not In The Labor Force
Alaska	$22,660	19.0	9.4	6.7	6.1	28.7
Aleknagik	$10,973	81.9	40.8	21.7	13.3	39
Clark's Point	$10,988	90.7	45.7	20	5.1	53
Dillingham	$21,537	52..6	11.7	9.2	7.1	27
Ekwok	$11,079	91.5		29.2	11.1	44
Goodnews Bay	$6,851	92.6	39.0	37.8	9.9	55
Igiugig	$13,172	71.7	6.9	0	0	55
Iliamna	$19,741	50.0	3.1	0	0	28
King Salmon	$26,755	29.0	12.4	8.8	6.9	22
Kokhanok	$7,732	86.8	42.6	40.0	4.1	64
Koliganek	$13,242	87.4	19.3	14.9	9.2	30
Levelock	$12,199	89.3	24.5	16.7	0	53
Manokotak	$9,294	94.7	35.3	32.5	5.5	54
Naknek	$21,182	45.3	3.7	3.1	6.7	29
New Stuyahok	$7,931	92.8	31.7	32.6	9.2	46
Newhalen	$9,448	85.0	16.3	26.7	17.9	43
Nondalton	$8,411	89.1	45.4	37.3	18.7	50
Pedro Bay	$18,420	40.0	6.0	0	0	21
Platinum	$7,632	90.2	22.0	33.3	20.0	26.7
Port Alsworth	$21,716	4.3	6.0	0	0	29
Portage Creek	$8,010	86.1	0	0	0	50
Quinhagak	$8,127	96.0	26.1	27.2	6.3	59
South Naknek	$13,019	83.9	27.1	16.1	12.5	48
Togiak	$9,676	86.3	29.9	32.5	11.9	55
Twin Hills	$16,856	84.1	27.9	22.2	0	50

Source: Census 2000

There is some income outflow evident in the planning area. In Bristol Bay Borough, the outflow decreased from 45.6% in the 1980's to 28% in 2000 (EPS 2005). The Dillingham Census Area and the Lake and Peninsula Borough experience income outflow to a far lesser degree.

f) Revenue

Local government revenue in the planning area is influenced by exemption of ANCSA village corporations and regional corporations from certain forms of property taxation.

Villages and boroughs are empowered to levy and collect tax revenues if they are incorporated political subdivisions. Several villages or towns in the planning area levy sales taxes and specific use or product taxes. The City of Dillingham and the Bristol Bay Borough collect property tax.

Table 3.37, 2004 Per Capita Tax Revenues in Dollars, lists collections by those villages and boroughs that levy taxes. The columns labeled "Other Tax" aggregate collections for items such as liquor, tobacco, bed use, and fish processing. The North Slope Borough collections and revenue are greatly enhanced by North Slope oil field property taxes. This greatly skews the per capita revenues compared with the rest of

the state. Anchorage, Fairbanks North Star Borough, Matanuska-Susitna Borough, and the city of Fairbanks are included in the table for comparison purposes.

Table 3.37. 2004 Per Capita Tax Revenues in Dollars

Municipality[1]	Property Tax (Inc. Oil & Gas)	Sales Tax	Other Taxes	Total Taxes Reported	Population (2004)	Per Capita Revenue
Lake and Peninsula Borough	0	0	$731,799	$731,799	1627	$450
Bristol bay Borough	$1,747,532	0	$363,737	$2,111,269	1,103	$1,914
Anchorage	$322,352,907	0	$19,681,861	$342,034,768	273,565	$1,250
Fairbanks North Star Borough	$71,382,439	0	$1,375,192	$ 72,757,631	82,131	$886
Matanuska-Susitna Borough	$55,571,134	0	$716,992	$56,288,126	67,526	$834
Fairbanks, City[2]	$8,685,154	0	$3,748,522	$12,433,676	29,002	$429
Aleknagik	0	$93,429	$618	$2,484,947	235	$400
Dillingham	$1,339,892	$2,014,814	$328,551	$3,683,257	2,390	$1,754
Quinhagak	0	$77,506	0	$77,506	578	$134
Togiak	0	$76,097	$32,680	$108,777	820	$133
Manokotak	0	$1,185	0	$1,185	405	$3
All other towns	0	0	0	0	0	0
Average statewide per capita revenue (excluding the North Slope Borough)						1,224
Average statewide per capita revenue (including North Slope Borough)						1,518

Source: ADCCED 2005c

[1] Only those municipalities that levy sales, severance, property, or other type of local tax are included in this table.

[2] Both the city of Fairbanks and the borough in which it is located levy taxes.

[3] Per capita revenue encompasses both city and borough taxes.

F. Subsistence

1. Definition of Subsistence

The Federal Subsistence Board assures a subsistence priority among consumptive uses on Federal public lands under ANILCA Title VIII. This means that rural residents have priority for the use of fish and wildlife resources on Federal lands for wildlife and on Federal reserved waters for fisheries. There are no Federal reserved waters on BLM lands in the planning area that fall under the BLM subsistence management responsibility. State- and Native-selected lands are not within the jurisdiction of the Federal subsistence management program, except within Federal CSUs, such as national parks, preserves, and wildlife refuges. Title VIII of ANILCA defines subsistence uses as:

> The customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of inedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter or sharing for personal or family consumption; and for customary trade (16 U.S.C. § 3113).

Under state law, subsistence use means:

> The noncommercial, customary and traditional uses of wild, renewable resources by a resident domiciled in a rural area of the state for direct personal or family consumption, such as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible by-products of the fish and wildlife resources taken for personal or family consumption; and for customary trade, barter, or sharing for personal or family consumption (AS 16,05.940[32]).

The state does recognize preferential allocation of resource harvest opportunities for rural or non-rural user groups where uses are allowed.

2. The Federal Subsistence Program

The Federal Subsistence Program, unique to Alaska, and without precedent in Federal law, implements ANILCA Title VIII through the Federal Subsistence Board (FSB), Secretary of Interior-appointed Subsistence Regional Advisory Councils (SRACs), and interagency staff specialists. The FSB consists of the Regional or State Directors of the U.S. Fish and Wildlife Service, BLM, U.S. Forest Service, National Park Service and Bureau of Indian Affairs. The FSB is chaired by a subsistence user representative appointed by the Secretary of the Interior. The FSB is tasked with management of subsistence resources relative to customary and traditional use determinations, animal population health and maintenance, bag limit determinations, seasons of harvest, methods and means of taking determinations, and regulatory and public processes.

The planning area lies within Regions 4 and 5 of the ten Federal Subsistence Program's regions in Alaska. Each region is represented by a Federal Subsistence Regional Advisory Council. These councils provide an opportunity for rural Alaskans to contribute in a meaningful way to management and use of subsistence wildlife, fish and shellfish resources.

The planning area encompasses, wholly or in part, Game Management Units 9(B), 9(C), 17(A), 17(B), 17(C) and 18 of the State's 25 Game Management Units, Management Areas 6 and 7 of the State's 14 Fishery Management Areas and the Bering Sea Management Area of the eight Alaska Shellfish Management Areas.

The program provides for customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools or transportation; for making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken. A person must be a qualified rural Alaska resident to harvest fish and wildlife under Federal Subsistence Regulations on Federal public land in and Federal reserved waters in Alaska. All communities within the planning area are rural, as it is defined in the current rural determination. While the majority of planning area inhabitants are Alaska Native and have established the patterns for subsistence use in Alaska, the Federal subsistence regulations apply to all rural residents who have a customary and traditional use of fish and wildlife in the area, irrespective of their race or ethnicity.

Subsistence resources are highly valued and are central to the economies, customs and traditions of many families and communities in Alaska. Customs and traditions include sharing and distribution networks, cooperative hunting, fishing, gathering, and ceremonial activities. Subsistence fishing, hunting, and gathering are important sources of nutrition and livelihood in all of the rural communities in the planning area. ADF&G (2000) estimated that approximately 43.7 million pounds of useable weight of wild foods are harvested annually by residents of rural areas of the state. That would be about 375 pounds per person per year for rural residents. ADF&G (2000) suggests that in Southwest Alaska 65% of rural households harvest game, 86% harvest fish, and 90–94% use fish and game. Because there may be little cash available for store-bought groceries, this region's residents participate in a mixed subsistence – cash economy. A 2005 survey comparing living expenses across Alaska indicates that groceries for a family of four for one week in Dillingham cost $227, compared with $122 for the same groceries in Anchorage (University of Alaska Fairbanks 2005).

A person must have his or her primary, permanent residence in a rural area to qualify to hunt and fish under Federal subsistence regulations. Seasonal residence in a rural area does not qualify a person as a rural resident. The FSB determines which communities have customarily and traditionally taken specific fish and wildlife populations in which areas. These customary and traditional use determinations are listed along with seasons and harvest limits for each management unit in the Federal regulations. The Federal program publishes separate hunting/trapping and fishing regulation booklets annually. If there is a positive customary and traditional use determination for specific communities or areas, only those communities and areas have a Federal subsistence priority for that specific species in that management unit. If no customary or traditional use determination for a wildlife/fish population in a management unit has been determined by the FSB, then all rural residents of Alaska may harvest fish or wildlife from that population. The FSB may determine that there is no customary and traditional use of a specific fish or wildlife population.

The planning area has within its borders over 6,400 people in 25 Federally-qualified subsistence communities ranging in population from less than 50 to over 2400 people and the additional rural residents not associated with a community. The following rural communities lie within the planning area.

Table 3.38. Bay Planning Area Communities and their Locations With Relation to the Subsistence Game Management Units

Game Management Unit(s)	9(B)	9(C)	17(A)	17(B)	17(C)	18	Other
Aleknagik					√		
Clarks Point					√		
Dillingham					√		
Ekuk					√		
Ekwok					√		
Goodnews Bay						√	
Igiugig	√						
Iliamna	√						
King Salmon		√					
Kokhanok	√						
Koliganek				√			
Levelock	√						
Manokotak					√		
Naknek		√					
Newhalen	√						
New Stuyahok					√		
Nondalton							
Pedro Bay							
Platinum						√	
Portage Creek					√		
Port Alsworth							√
Quinhagak						√	
South Naknek		√					
Togiak			√				
Twin Hills			√				

Depending upon subsistence determinations, other rural residents of Alaska residing outside the planning area are also qualified subsistence users on Federal Public land in the planning area

3. Historic Subsistence Use Patterns, Social Organization and Sharing Patterns

The following brief overviews of social organization and sharing patterns describe those encountered at the time of European contact. While these traditions may continue into the present day, a number of influences brought changes to traditional ways of life. Several epidemics (smallpox, influenza, tuberculosis and measles) decimated local populations and interrupted the transmission of culture. The introduction of European and Euroamerican economic, religious and political practices also brought changes.

Historically, these groups practiced a central based settlement pattern. This typically included an established winter village from which families or small groups would venture to seasonally based camps for fishing, hunting, trapping, and gathering activities such as gathering eggs, berries, basketry materials or pottery supplies.

a) Central Yup'ik

Historically a winter village would contain at least one men's house (*quasig*) and individual houses inhabited primarily by women and younger children. This was an egalitarian society where leaders are chosen by ability, knowledge and articulate speaking. A winter ceremonial season enhanced visiting and hospitality between villages (Fienup-Riordan 1994; Oswalt 1990).

Sharing was highly valued in the society in the past, and continues to be important today. Men might distribute meat after a kill to hunting partners but when the meat was brought home, the women became responsible for sharing it with family and friends. The first kills by young hunters were often completely given away especially to Elders (Fienup-Riordan 1990).

b) Alutiiq

Historically the Alutiit were a ranked society. Wealth and leadership were concentrated among high-ranking lineages and each village was run by a chief who inherited power from his family. The chiefs directed hunting and trading expeditions. Ordinary families made up a class of free, common people and a lower class of slaves was composed of orphans and people captured in raids or taken in trade from other groups. Within the group were also specialists such as whalers, shamans, weather forecasters, healers and midwives (Crowell and Leer 2001).

The cultural emphasis upon sharing was reflected in large ceremonials noted for their lavish hospitality and gift-giving. Like other groups of the region, a boy's first kill was given away.

c) Dena'ina Athabascan

Historically the Dena'ina were a ranked society with a redistributive economic system. High ranking individuals or "rich men" took the role as leaders and functioned as a center for redistribution of goods. They were responsible for caring for their kin group and were responsible for widows, orphans, and the infirm. Their trading partnerships linked their group with other groups in the region (Ellanna and Balluta 1992).

In the Dena'ina area leaders selected for their generosity, willingness to help others, hunting ability, bravery and ability in warfare. An aspiring leader rose through the system by trading to acquire prestige symbols and gathering supporters (Ellanna and Balluta 1992; Townsend 1981).

Sharing of meat was typical between hunting partners. Potlatches were given for several reasons. Large potlatches were given to honor the deceased and smaller ones were given to honor marriages, and to help the poor. A small potlatch would be given by a father when his son killed his first big game (Osgood 1976; Townsend 1981).

4. Sociocultural, Socioeconomic and Cosmological Aspects of Subsistence Lifeways

For Alaska Natives today, subsistence is more than the harvesting, processing, sharing, and trading of land and sea mammals, fish, and plants. Subsistence subsumes holistically the cultural, social, and spiritual values that are the essence of Alaska Native cultures. The Alaska Federation of Natives (2002) described subsistence as

> The hunting, fishing, and gathering activities which traditionally constituted the economic base of life for Alaska's Native peoples and which continue to flourish in many areas of the state today…Subsistence is a way of life in rural Alaska that is vital to the preservation of communities,

> tribal cultures, and economies. Subsistence resources have great nutritional, economical, cultural, and spiritual importance in the lives of rural Alaskans…Subsistence, being integral to our worldview and among the strongest remaining ties to our ancient cultures, is as much spiritual and cultural as it is physical.

There are several significant differences between traditional approaches to subsistence and the western notion of hunting. Traditional groups often adhere to recognition of an individual's or a family's customary ownership through long-term use of a hunting locality that may be passed on generation after generation. For example, Dena'ina hunting grounds are passed on from father to son. If anyone else kills game there the owner usually is paid a quarter of the meat from the hunt (Ellanna and Balluta 1992).

A common belief is that animal souls return after death to be born into new animals. The hunter's respectful treatment of animals is reflected in his future success and often the success of the entire group. If respect is not shown, an animal will not continue to give itself to people. Animals may abandon an area if not respectfully treated or they may hide themselves from hunters. Since hunting was a survival situation for groups, behavior was regulated and social sanctions were often enforced (Crowell and Leer 2001; Fienup-Riordan 1994).

Some behavior seen as ethical in western hunting and fishing practices, such as catch-and-release fishing, is seen as disrespectful in traditional Native society (Fienup-Riordan 1990). In the traditional view this type of behavior may threaten future fish runs.

5. Historic and Contemporary Subsistence Use Patterns

Archaeological evidence indicates that the Bristol Bay region has been continuously inhabited by humans for at least the past 8,000 years or more (Dumond 1981). Among the three linguistic groups present at European contact, all of them had subsistence economies and all participated in widespread formal trade which was well-established in the region and beyond prior to the arrival of the Europeans (Fitzhugh and Crowell 1988). However, the Russian trappers and traders who explored the region in the 18th and early 19th Centuries were the first to develop an export market economy of large scale (Wright et al. 1985; Fitzhugh and Crowell 1988). The Russians established trading posts and churches in parts of the region in the early 1800s. In 1867 the Russians sold Alaska to the United States and subsequently the fur trade declined (Wright et al. 1985). Commercial salmon fishing began in the late 1800s, and became the dominant industry (Wright et al. 1985).

Many of the communities in the Bay planning area remain predominantly Alaska Native (Table 3.39) and in many of these communities traditional patterns of subsistence hunting, fishing and gathering activities have been retained flexibly, accommodating a part-time cash economy that includes the commercial fishery, trapping for a commercial market as well as for personal use, hunting and fishing guiding activities, and other cash-generating activities (Wright et al. 1985; McClenahan 2004). Having a cash income has proven beneficial in that it provides for the purchase of modern equipment and gasoline that make subsistence activities more efficient and productive. However, it has also required some changes in the duration and timing of some subsistence activities to accommodate wage employment.

A detailed discussion of the subsistence use of salmon and freshwater fish, caribou, and moose was presented in the wildlife portion of Chapter III. In addition to these three leading subsistence resources, upland game, grizzly and black bears, furbearers and waterfowl are all important local subsistence resources but are of lesser importance in terms of biomass harvested for food and fiber than fish, caribou and moose (ADF&G 2005c).

Table 3.39. Bay Planning Area Communities and their Alaska Native Population Composition (U.S. Census Bureau 2004)

Community	Population	Percent Alaska Native
Aleknagik	221	85
Clarks Point	75	92
Dillingham	2466	56
Ekuk	2	0
Ekwok	130	94
Goodnews Bay	230	94
Igiugig	53	83
Iliamna	102	58
King Salmon	442	30
Kokhanok	174	91
Koliganek	187	87
Levelock	57	95
Manokotak	437	95
Naknek	601	47
Newhalen	183	91
New Stuyahok	477	96
Nondalton	205	90
Pedro Bay	47	64
Platinum	39	93
Portage Creek	49	86
Port Alsworth	113	22
Quinhagak	612	97
South Naknek	88	84
Togiak	805	93
Twin Hills	67	94

6. Resources Harvested

Residents of regional centers like Dillingham participate in a mixed subsistence and cash economy. Residents earn cash through commercial fishing and employment in government, service, and trades, but they also harvest substantial quantities of wild foods and share those foods with other households and other communities. Dillingham residents share in non-commercial distribution of fish and game with other communities. This balance of commercial and subsistence activities makes Dillingham, Naknek, and King Salmon distinctive among communities in Southwest Alaska. At the same time, Dillingham residents participate in the overall pattern of resource harvesting activities that are part of the economic system of the Bristol Bay region (Fall et al. 1986).

The cash economy of Dillingham, like the rest of the Bristol Bay region, is inextricably linked to the commercial salmon fishing industry, which is a seasonal industry. About 44% of the sampled households in 1984 were involved in commercial fishing, with a smaller percent employed in fish processing or in businesses that provide services to commercial fishermen (Fall et al. 1986).

a) Harvest Estimates

Table 3.40 provides the rates of participation and harvest levels for those Bay area communities for which data are available, for one study year. These data are not current. The discussion by BLM block in the wildlife section of this chapter provides more recent harvest information including locations by Game Management Unit of harvest for caribou, moose, and brown bear in the planning area.

Table 3.40. Bay Planning Area Communities' Subsistence Take for One Study Year (Alaska Department of Fish and Game Community Profile Database 2005)

Community	Study Year	Study Year Population	All Resources	Salmon	Non-Salmon Fish	Large Land Mammals	Small Land Mammals	Marine Mammals	Birds and Eggs	Marine Invertebrates	Vegetation
Aleknagik	1989	143	54,079.00	13,556.00	8,749.00	21,619.00	1,669.00	2,171.00	2,007.00	450.00	3,859.00
Dillingham	1984	2041	494,486.00	288,651.00	35,649.00	117,878.00	16,612.00	6,067.00	10,807.00	2,488.00	16,328.00
Ekwok	1987	107	85,260.00	48,827.00	7,340.00	20,524.00	6,155.00	0.00	390.00	0.00	2,025.00
Goodnews Bay	*										
Igiugig	1983	47	43,028.00	30,961.00	5,439.00	3,447.00	884.00	183.00	485.00	0.00	1,628.00
Iliamna	1991	98	82,915.00	42,204.00	7,492.00	24,702.00	980.00	4,063.00	1,516.00	321.00	1,637.00
King Salmon	1983	369	81,261.00	37,854.00	5,873.00	36,429.00	1,104.00	0.00	0.00	0.00	
Kokhanok	1992	173	175,639.00	97,626.00	18,325.00	45,658.00	4,931.00	728.00	3,942.00	573.00	3,855.00
Koliganek	1987	186	154,705.00	67,520.00	17,743.00	54,699.00	8,550.00	0.00	2,148.00	240.00	3,878.00
Levelock	1992	111	97,677.00	51,710.00	7,279.00	27,742.00	2,466.00	5,548.00	1,311.00	71.00	1,551.00
Manokotak	1985	308	118,337.00	41,847.00	26,229.00	18,610.00	10,661.00	10,052.00	5,197.00	1,391.00	4,349.00
Naknek	1983	383	72,110.00	39,259.00	7,134.00	24,766.00	554.00	397.00	0.00	0.00	
New Stuyahok	1987	353	247,494.00	144,394.00	12,718.00	67,096.00	16,717.00	207.00	1,382.00	139.00	4,840.00
Newhalen	1991	158	117,716.00	66,192.00	5,925.00	32,229.00	3,863.00	1,310.00	3,276.00	513.00	4,409.00
Nondalton	1983	280	329,274.00	215,447.00	48,946.00	50,323.00	5,498.00	0.00	2,442.00	0.00	6,619.00
Pedro Bay	1996	63	24,931.00	18,269.00	1,626.00	4,560.00	0.00	0.00	135.00	132.00	210.00
Platinum	*										
Port Alsworth	1983	76	27,416.00	18,209.00	881.00	7,205.00	142.00	0.00	332.00	84.00	564.00
Quinhagak	1982	474	363,740.00	162,125.00	70,815.00	49,000.00	6,850.00	58,964.00	13,863.00		2,124.00
South Naknek	1992	134	39,893.00	19,451.00	2,703.00	14,832.00	48.00	269.00	277.00	272.00	2,042.00
Togiak	*		Supplemental data for these communities can be accessed at: http://www.subsistence.adfg.state.ak.us/CSIS/index.cfm/FA/commInfo.summary/CommID/345/Year/1992-								
Twin Hills	*										

*Data currently are not available.

b) Annual Round of Seasonal Subsistence Activities

Because salmon and freshwater fish are the primary resource for subsistence users in the planning area, and because a substantial number of planning area residents also commercial fish, the spring – summer – fall portion of the annual round of seasonal subsistence activities is focused largely on their timing and availability, particularly those of salmon. To a much lesser extent this is also true for migratory waterfowl. Most other resources sought by subsistence harvesters are available year round. In addition to seasonal availability of the resource and periodic fluctuations in resource abundance, the seasonal round is affected by the subsistence user's available time, availability of competing subsistence resources, ability to afford fuel for transportation, and regulatory restrictions.

c) Federal Subsistence Use Areas

Residents of the planning area use all of the blocks of unencumbered BLM land as well as most of the planning area for subsistence purposes. The discussion by block in the wildlife section provides the details of use.

Maps 3.51 – 3.70 are historic subsistence use area maps, recorded by ADF&G in the 1980s and early 1990s (Wolfe et al. 1984; Wright et al. 1985; Morris 1983, 1985, 1986; Endter-Wada and Levine 1992; Fall et al. 1986; Schichnes and Chythlook 1985, 1989, and 1991).

Regulations implementing amendments to the Migratory Bird Act written in 2000 relate to subsistence taking of migratory birds, primarily ducks and geese, but also all water birds and other migratory fowl. These regulations are currently being finalized and implemented.

d) Condition of the Resource

The topic of subsistence has not been addressed previously in any BLM land use planning effort for the planning area. All lands in the planning area that meet the ANILCA section 102(3) definition of Federal public land in Alaska have been managed since 1991 under the Federal Subsistence Program.

Fish and wildlife populations and the habitats upon which they rely in the planning area are in good condition overall, with the exception of the Northern Alaska Peninsula Caribou Herd. Some areas of caribou habitat in the Iliamna blocks of BLM land may be degraded due to overgrazing by caribou (ADF&G 2002c; Valkenburg and Keech 2002). However, no habitat condition surveys have been carried out.

Regional environmental change may alter the quantity and distribution of subsistence resources in the planning area. The potential for extensive and/or intensive mineral resource exploration, extraction, and development as well as development of infrastructure in the region could significantly alter availability, access to, abundance of, distribution of and movement patterns of subsistence resources. Using data from a sample of 98 communities in Alaska, Wolfe and Walker (1987) identified that certain types of economic development can create conditions which diminish subsistence productivity. Construction of roads and settlement entry into roaded areas produce changes associated with lower subsistence harvests, including increased competition for wild resources, increased habitat alteration, and changing community economic orientations away from mixed, subsistence-market adaptations.

As demonstrated by their meaningful participation in the initial scoping process for the Bay RMP/EIS and as reflected in the many substantive subsistence-related comments received, local communities will be in the forefront in addressing potential conflicts, land use actions and issues that may affect the quality, quantity, distribution, access to, and uses of renewable natural resources.