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C. Resource Uses

1. Forest Products

Siberia, Scandinavia, northern Canada, and Interior Alaska are the primary locations for the green mantle of subarctic forest wrapping the earth. Forested lands within the planning area are part of this band of northern forest, known collectively as the boreal forest or taiga. Only the hardiest of tree species can withstand the combination of short growing season, cold and shallow soils, plus frigid and dry, often abrasive winter winds. Boreal forest in the planning area is characterized by closed, open, and woodland evergreen forests of white and black spruce. Mixed forest types are also common, composed of varying amounts of deciduous trees (birch, balsam poplar, and aspen) scattered in with spruce.

Forest communities in the planning area are primarily open-canopied woodlands dominated by white spruce (*Picea glauca*). White spruce will tolerate a wide range of site conditions, but grows best on well drained soils of gentle, south-facing slopes or deeper soils of protected river valleys. Stands of black spruce (*Picea mariana*) occupy low, poorly drained areas with fine-grained soils, or occasionally dominate stands of regrowth after fire. Paper birch (*Betula papyrifera*) is scattered in small groves in some areas at protected sites with porous, deeper soils. Balsam poplar (*Populus balsamifera*) stands form narrow, linear units along stable river banks. Small, stunted quaking aspen (*Populus tremuloides*) are occasionally found in the most interior portions of the planning area on dry, warmer soils of south-facing slopes or low hilltops.

Within the planning area, forest lands cover only 8% of BLM-managed lands, just under one million acres (USGS 1997). There are five main regions within the planning area characterized by forested landscapes: the southeast corner of the Seward Peninsula, the Nulato Hills, the Kobuk River valley, the Squirrel River valley, and the lower Noatak River corridor (Map 3-24).

BLM has not conducted an inventory of forest resources for the planning area. A study done by the U.S. Bureau of Indian Affairs in the early 1970s at the Norton Bay Native Reserve (now known as Elim Native Corporation lands) indicated net annual growth on more productive forested sites ranged from 4-9.9 cubic feet per year (Zufelt 1973). A 1960s statewide inventory by the USDA Forest Service (Hutchison 1967, Selkregg 1976) concluded that for wooded areas of northwest Alaska 13% of tree growth can be classified as commercial, specifically an annual growth of at least 15 cubic feet per acre. For the planning area this works out to approximately 126,200 acres of potentially commercial timber. At a suggested rotation period of 120 years (Hutchison 1967) the low volume, low productivity, scattered timber stands, and long distances involved in log transport in the planning area make commercial logging ventures impractical, while the potential to incur adverse environmental impacts is large.

Natural impacts to forest communities in the planning area include wildfire, insect pests, wind thrown trees (with shallow permafrost soils a contributing factor), and trees snapped off at 5-10 feet above the base due to high winds. Forest health issues are beginning to emerge in the south and southeastern portions of the Seward Peninsula. A spruce beetle infestation (*Dendroctonus rufipennis*) was documented by the BLM in August 2003 when areas of conspicuous beetle-killed spruce were observed and aerially photographed in the upper Tubutulik River region on the east side of the Darby Mountains (Sparks 2003). In 2004, the annual statewide aerial survey conducted by the USDA Forest Service and the ADNR, Division of Forestry, reported 81,389 acres of beetle-killed spruce on Elim Native Corporation lands

along the coast and inland from Moses Point to Mount Kwiniuk (Map 3-23). This outbreak appeared to have peaked within the last few years, with current activity being very light. USDA Forest Service and ADNR Division of Forestry personnel estimated a near total loss of the forest resource in that area (Wittwer 2005). The 2004 statewide aerial survey also documented an area of light to moderate spruce beetle activity north of the village of White Mountain along the Fish River. Mapping showed 8,681 acres of beetle-affected spruce, with the majority characterized as light intensity (Wittwer 2005). Smoke from tundra wildfires in McCarthy's Marsh prevented additional survey in this region during the summer of 2004.

Earlier aerial surveys flown over the Seward Peninsula and other portions of the planning area in 1991, 1999, 2000, and 2002 by the USDA Forest Service and ADNR Division of Forestry mapped small patches of light spruce beetle activity in the Tubutulik River drainage (1991), South Fork of the Buckland River (1999), and lower Fish River (2002), plus low to moderate spruce beetle damage of limited acreage (52 acres) along the upper Kobuk River in 2000 (Map 3-23) (U.S.D.A. Forest Service 1991, Wittwer 1999, Wittwer 2001, and Wittwer 2003). One system used by State and Federal foresters and entomologists to rate spruce beetle activity describes a light spruce beetle infestation as 1-5 dead trees per acre, moderate as 6-10 dead trees per acre, and severe as more than 10 dead trees per acre (Wittwer 2005, Zogas 2005).

On July 28, 2005, BLM personnel from the Fairbanks District Office and NRCS personnel from the Homer Office conducted an informal aerial and ground survey of BLM-managed lands along the Tubutulik River in the southeastern corner of the Seward Peninsula to estimate the extent of beetle-killed white spruce forest (Meyers et al. 2005). Approximately 45,850 acres were surveyed by helicopter, with two landings made to examine individual trees more closely. A "TracBack" feature on a Garmin III Plus GPS unit was used to create a record of the area covered. The area surveyed followed the Tubutulik River from the mouth to the headwaters, plus adjacent uplands to the east between the Tubutulik River and June Creek. Gray, standing dead trees were an obvious component of the valley bottoms and hillsides. In some places gray and red trees were observed (red indicating more recent death of the tree). Based on both ground and aerial observations the affected trees ranged in size (diameter and height), indicating the beetles were attacking trees of all sizes (from 4.5-12 inches diameter at breast height), not just the largest trees. During informal aerial observations, dead trees ranged from patches of approximately one acre in size with all standing dead, to one dead tree in every five trees, one in every 10 trees, one in every 20-30 trees, or one dead in every 30-40 trees. Lower slopes and flats seemed to have a lower incidence of dead trees, and the higher slopes and heads of valleys a greater percent.This may have been tied at least partly to moisture: drier soils on upper slopes may have increased drought stress, making the trees more susceptible to beetle attack. Examination of trees on the ground in two locations showed that the beetle infestation was ongoing, as trees with dead, reddish-brown needles of current growth (but otherwise green-needled), with beetle bore holes and evidence of increased pitch production stood next to dead, gray-limbed trees with bark flaking off in large patches. Based on the informal survey of the Tubutulik River and adjacent uplands it was estimated this area has sustained a moderate to severe level of spruce beetle activity (Meyers et al. 2005).

With standing dead and fallen timber of beetle kill origin letting in more light, early seral species such as grass (*Calamagrostis canadensis*, and others) may colonize, providing a source of flash fuels that could support larger and more intense fires than normally expected for the southeastern Seward Peninsula.

Demand for Forest Products

The BLM forest resource program in northwest Alaska is basically in custodial management. Little demand exists for forest products from BLM administered lands. Most lands with forest resources are located in remote areas with poor or non-existent access. Many of the timber stands are several hundred miles from the nearest road.

The Kobuk-Seward Peninsula planning area is a sparsely timbered region of Alaska, and contains vastly more tussock tundra, shrublands, and thinly vegetated alpine land cover than it does woodland and forests. Many riparian corridors with accessible timber have been conveyed to village or regional Native corporations, and in some cases the State, leaving little easily accessible timber under BLM jurisdiction. The forestry program managed by BLM in northwest Alaska has focused mainly on processing a low volume of permits for personal use house log and firewood, and a single Christmas tree sale. Forestry management issues may be more related to habitat management rather than demand for forest products.

Since 1980 the BLM has issued nine free use authorization permits for house logs and firewood and one small sales vegetative contract for Christmas tree harvest in the planning area. Two free use permits granted in 1994 for a total of 220 house logs and the small sales contract for 10 Christmas trees in 2004 have been the most recent actions. From 1978-1980 two timber sales were conducted in the planning area, totaling 7,405 linear feet. Also during 1978-80 two free use permits were issued for 80 house logs and 1,000 board feet of sawtimber, plus four free use permits for a total of 500 cords of wood and 460 house logs. However, the lands harvested for timber during 1978-1980 are no longer under BLM management.

Current authorized use of forest products in the planning area during the last 14 years has been less than 10 free use permits, plus one small sales vegetative contract. The amount of unauthorized use is difficult to monitor or estimate, given the size and remoteness of the area and current level of staffing. It is estimated that the amount of authorized and unauthorized use is well below that which the resource can sustain. Incremental increases of individual use products like firewood and house logs can be expected as rural population numbers in the planning area increase over time.

The remote nature of forested lands coupled with changing land ownership patterns has resulted in a situation where little is known about the resource. The first step in management is inventory. In order to adequately determine the condition and quantity of the forest resource, a basic inventory should be conducted. The inventory should provide location of timber stands, their age, size class, and species composition, plus current and predicted health (including insect infestation level and disease potential). Pockets of old growth white spruce, which may have escaped fire for 200-300 years or more, should be noted. These old growth stands often have abundant and unique arboreal lichens (examples of significant range extensions) and are of scientific interest and research potential (Juday 1985, Meyers 1995d, 1997c). Their presence increases the diversity of forested plant communities in the planning area. Without a comprehensive, baseline timber survey professional management of the resource will be limited.

No prescribed burns or fuels treatments have been conducted in the planning area in the past. The forest inventory recommended for the planning area would provide baseline information needed to assess future management direction for forest resources, including a possible need for more intensive management to enhance wildlife habitat or reduce hazardous fuels. Guidance and authorities provided by the Healthy Forests Restoration Act of 2003 would be utilized to structure hazardous fuels reduction and forest health improvement treatments identified as necessary.

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2. Livestock Grazing

Sheldon Jackson initially introduced reindeer (*Rangifer tarandus tarandus*) into Alaska from Siberia in 1891. Reindeer herding was heralded as a way to develop an economic base and a reliable food source for the rural residents of the Seward Peninsula, as caribou populations had declined due to market hunting and natural fluctuations. Scandinavians were brought in later in that decade to teach and work in the herding industry. The first shipment of reindeer meat to the Lower 48 was in 1911. Over 33,000 reindeer were counted during that year. Reindeer research was conducted from 1920 to 1935 by the U.S. Biological Survey and the FWS. The number of reindeer in Alaska peaked in 1932, with an estimate of over 640,000 head. Of these, 127,000 resided on the Seward Peninsula. The Reindeer Act of 1937 restricted ownership of reindeer herds to Alaska Natives. In 1940 the government bought 84,000 head from non-Alaska Native owners. By 1950, the number of reindeer in Alaska was estimated to be 25,000 individuals. Overgrazing, predation, and less active herding were all thought to have contributed to the decline. Brucellosis was introduced to caribou and other ungulates in Alaska via the original reindeer introductions.

The term “range” is used to indicate Federal lands available for the grazing of reindeer and livestock. The entire Seward and adjacent Baldwin peninsulas are broken up into different grazing allotments; there are no other grazing allotments in the planning area. However, there is nothing in the current MFP that disallows grazing in other parts of the planning area. There are currently 15 reindeer grazing allotments covering 12.6 million acres. There are two vacant areas (the northern portion of the Menadelook allotment in the upper Kuzitrin River watershed and McCarthy’s Marsh) covering 1 million acres, and two areas not designated for grazing (Nome and Elim) covering 0.3 million acres. Specific acreages of each allotment is shown in Table 3-16. Map 3-25 portrays the locations of the allotments within the planning area.

Extensive incursions onto the Seward Peninsula by the enormous WACH have been devastating for reindeer herders. The WACH consists of approximately 490,000 caribou (*Rangifer tarandus granti*). Reindeer on all of the eastern allotments have mixed with the WACH and subsequently emigrated with the herd on its annual spring migration. There are currently no active herders on the eastern side of the Seward Peninsula. All but the westernmost herders have been strongly affected by the WACH’s extensive incursions on to the peninsula. Reindeer have run off with members of the WACH for decades at least, but this emigration was constrained mainly to the northern and easternmost herds. There were a total of about 7,500 reindeer corralled by the only five active herders in 2004. The UAF Reindeer Research Program and the Kawerak Reindeer Herders Association estimate that only 80 % of a herd is typically rounded up for a particular corralling. Therefore, there may have been as many as 9,000 reindeer on the Seward Peninsula in 2004.

Table 3-16. Grazing Allotments in the Kobuk-Seward Peninsula Planning Area

Allotment Name	Acres*
Sheldon	1,695,000
Karmun	1,229,000
Goodhope	1,130,000
Hadley (Buckland River)	1,110,000
Grey (Mt. Wick)	1,047,000
Weyiouanna	1,000,000
Davis	956,000
Kakaruk	838,000
Noyakuk (Kougarok)	762,000
Henry (Koyuk)	707,000
Ongtowasruk	599,000
Olanna	524,000
Sagoonik (Shaktoolik)	400,000
Walker (Baldwin Peninsula)	360,000
Menadelook (Mt. Bend)	301,000

* Includes State and National Park Service lands.

Since the allotments contain intermingled Federal, State, and private lands, grazing is managed jointly by the BLM, NPS, and ADNR under a Memorandum of Understanding (MOU). The herder also obtains permits for the use of private lands through the Native corporations.

Besides reindeer emigrating off the Seward Peninsula, reindeer herding also faces the problem of hunters and predators killing reindeer. ADF&G and the UAF Reindeer Research Program have tried to mitigate the problem associated with emigration and hunters by using satellite collars on reindeer and caribou to allow the herders to try to move their herds away from the movements of the WACH. This information could by used by the Reindeer Herders Association to anticipate expansion of reindeer herds if and when the WACH's population decreases and range shrinks correspondingly.

Inquiries have been received about the possibility of grazing other species, such as bison (*Bison bison*), on the Seward Peninsula. Grazing by other forms of livestock is not currently occurring within the planning area, nor was it addressed in the MFP.

Another potential use of the range resource is grazing of pack animals associated with special recreational permits (SRPs). To date, the BLM has not authorized this type of use and there are currently no commercial operators using pack animals in the planning area.

INSERT 8½x11 MAP
3_25_grazing

3. Minerals

a) Leasable Minerals

(1) Oil and Gas

The Kobuk Seward planning area contains parts of three basins: the Colville, Kotzebue/Hope, and Selawik basins. At present there are no active Federal oil and gas leases within the planning area. A total of five hydrocarbon wells have been drilled within the boundaries of the planning area. Areas currently open to mineral leasing are shown on Map 3-26.

Pending Oil and Gas Leases

There are 19 suspended oil and gas lease offers within the Kobuk-Seward Peninsula planning area. Most of these pending noncompetitive offers were filed prior to 1975 and grandfathered in by Congress when it passed Sec. 5106(a) of the 1987 Federal Onshore Oil and Gas Leasing Reform Act (101 Stat. 1330-256, 259) (Reform Act). The Reform Act requires BLM to issue leases for these suspended offers unless such lease issuance would not be lawful under other applicable law.

Sec. 5106(a) states:

> Notwithstanding any other provision of this subtitle and except as provided in subsection (b) of this section, all noncompetitive oil and gas lease applications and offers and competitive oil and gas bids pending on the date of enactment of this subtitle shall be processed, and leases shall be issued under the provisions of the Act of February 25, 1920, as in effect before its amendment by this subtitle, except where the issuance of any such lease would not be lawful under such provisions or other applicable law.

The 19 suspended oil and gas lease offers comprise 34,935 acres of BLM unencumbered and Native selected lands within the Kobuk-Seward Peninsula planning area (BLM unencumbered = 2 leases, 2,945 acres; Selected lands = 17 leases, 31,990 acres). If the Native selected mineral estates underlying these offers are not conveyed as entitlement lands to a Regional Native Corporation under the Alaska Native Claims Settlement Act, the offers will be adjudicated and, if appropriate, leases will be issued at such time as the land withdrawals suspending the offers are removed.

If the mineral estates are conveyed, the offers will be rejected. As is the case with all leases issued under the Mineral Leasing Act of 1920, as amended, site-specific environmental analyses will be performed and appropriate bonding will be required prior to the authorization of any on-the-ground lease activities.

(a) History and Development

1. Colville Basin

The Colville Basin is one of two basins in Alaska (the other being the Cook Inlet Basin) where hydrocarbons are being produced. While oil out of Prudhoe Bay has been produced for many years, exploration has made it only halfway through the Colville Basin and is primarily focused in the north along the Barrow Arch,

Several wells have been drilled within the portion of the Colville Basin that encompasses the planning area. Eagle Creek #1 was drilled by Chevron in February 1978 and completed in December 1978. It reached a total depth of 12,049 feet in the Lower Cretaceous. The purpose of the test hole was to test structures in allochthonous rocks of the Brooks Range foothills (Moore and Potter 2003). Gas was recovered in drill stem tests from sandstones within the Nanushuk or Torok formations. The well was plugged and abandoned.

Tungak Creek #1 was drilled by Unocal in December 1981 and completed in March 1982. The well reached the Torok Formation at its total depth of 8,212 feet. The well encountered pooled gas at depth. Gas quantities are similar to those encountered at Wolf Creek, Gubik, Meade, and Square Lake within NPR-A.

Akulik #1 was drilled by Chevron in April 1981 The well was drilled to a total depth of 17,038 feet. Gas was recovered in drill stem tests from sandstones within the Nanushuk or Torok formations. The well was plugged and abandoned.

2. Kotzebue/Hope Basin

Two hydrocarbon test wells, Cape Espenberg and Nimiuk Point, were drilled in the Kotzebue/Hope Basin. Both were drilled in the mid-1970s by the Standard Oil Company of California (SOCAL). Cape Espenberg #1 was drilled in 1975 to a total depth of 8,373 feet. The drill hole did not encounter anything that would classify as an oil or gas show, but small indications of methane associated with coalbeds were present in the mudlog. Four formation tests were conducted but recovered only salt and no hydrocarbons (Troutman and Stanley 2002).

Nimiuk Point #1 was drilled five miles west of the Selawik NWR boundary. The well was bored in the same locality as the conceptual Early Sequence Play. It reached a total depth of 6,311 feet. The well proved largely unsuccessful. A formation test was run between 3,537 and 3,755 feet in which a short blow was observed, but no gas was observed at the surface, making the test inconclusive. Gas zones identified by geophysical well logs were present from 1,130-1,132 feet, and from 1,158-1,160 feet, but were determined to be too thin to hold economic quantities of gas. The well was abandoned as a dry hole (Troutman and Stanley 2002).

A hole was drilled at Kotzebue in 1950 to test for fresh water. The hole ran into some high pressure gas at 238 feet, which lifted the heavy string of tools several feet into the air, showering the area with mud. The gas continued to flow for more than 24 hours. The gas may have been biogenic, formed from decaying organic matter (Troutman and Stanley 2002).

In 1973 SOCAL discovered gas at a depth of 90 feet in a seismic shot hole on the Kobuk River Delta, 33 miles southeast of Kotzebue. Samples were taken and results indicated the gas to be 66% methane, 26% nitrogen, 65% oxygen, 2% carbon dioxide, and trace amounts of ethane and higher alkanes. A similar gas show was discovered five miles east in the delta at a depth of 65 feet and with similar lab results (Troutman and Stanley 2002).

Oil seeps have been reported within the basin and in the Seward Peninsula area over the years, but these findings were either not investigated by USGS, or, if investigated, have not been confirmed. Four wells were drilled on the Seward Peninsula near Nome on two separate occasions in 1906 and 1918. The wells were located along Hastings Creek and were very shallow (). The two wells drilled in 1906 had shows. One well that reached a total depth of 122 feet had a gas show and the other well had an oil show. The gas is believed to be derived from alluvial deposits. The oil show is difficult to explain as the wells were drilled in basement rocks composed of schist and granite. The wells were drilled in response to oil-like films observed on the nearby lagoons and the films brought onshore attached to beach foams (Miller et al. 1959).

3. Selawik Basin

Oil and gas activity within the Selawik Basin has been minimal. The area has been geologically mapped by the USGS during the late 1950s and early 1960s, with some additional recent mapping within select areas. There have been no oil or gas wells drilled in the basin.

(b) Occurrence Potential

Several geologic elements are necessary for oil and gas to accumulate in sufficient quantities. These elements include an organic-rich source rock to generate oil or gas, the combined effects of heat and time, a porous and permeable reservoir rock in which to store the petroleum, and some sort of trap to prevent the oil and gas from reaching the surface. Traps generally exist in predictable places such as at the tops of anticlines, next to faults, in the updip pinchouts of sandstone beds, or beneath unconformities. Map 3-27 shows oil and gas basins throughout the planning area.

The USGS conducts estimates of oil and gas resources in the United States based on the concept of a “play,” which is defined as a set of oil and/or gas accumulations sharing similar geographic boundaries and geologic attributes, such as source rock, reservoir type, and trap (Beeman et al. 1996). Of the three basins that partially fall within the planning area, only one, the Colville Basin, has been identified as containing plays. By definition, plays defined by the USGS are to be considered high potential for future oil and gas exploration.

(c) Development Potential

Actual development activity within the planning area will be determined by accessibility to resources, including the impact of lease stipulations applied to the petroleum industry; exploration and development costs; the success rate of wells drilled in the future; commodity prices; and production rates required to provide an economically viable return on investment.

1. Topset Play

The Topset Play’s primary reservoir rocks consist of sandstone and conglomerate from the Mid- to Upper-Brookian Sequence (Upper Cretaceous to Cenozoic). Porosity in the western play area ranges between 10 and 20%. Source rocks occur below the play interval (9,000 feet)

within the Hue Shale, the Kingak Shale, and the Shublik Formation. According to Magoon et al. (1996), between 8 and 60 oil accumulations of one million barrels or more could be present in the play. Additionally, 2-90 gas accumulations with a calculated mean of 127.6 billion cubic feet could occur in the play. The overall area of the play covers roughly (Magoon et al. 1996). A total of 138,748 acres of the play are contained within the planning area.

2. Turbidite Play

The Turbidite Play is comprised of rocks from the Lower- to Mid-Brookian Sequence (Cretaceous age). Reservoir rocks are primarily toe-of-slope or basin-plain turbidites from the Torok and Canning formations. Sandstone bodies are thin and laterally discontinuous with reservoir thicknesses that could potentially reach 100 feet or more. Porosity ranges from 5-30%, with the higher value associated with eastern play rocks. Source rocks include the gas-prone Torok and Canning formations and oil-prone Hue Shale, Pebble Unit Shale, Kingak Shale, and the Shublik Formation. According to Magoon et al. (1996) resource potential of undiscovered oil accumulations (one million barrels or more) is estimated to occur between 10 and 110 locations. Between 5 and 80 undiscovered gas accumulations are estimated to occur with a calculated mean of 108.9 billion cubic feet. Total play area covers roughly (Magoon et al. 1996). A total of 298,169 acres of the play are contained within the planning area.

3. Ellesmerian-Beaufortian Clastics Play

The Ellesmerian-Beaufortian Clastics Play consists of stratigraphic and structural traps of Permian to Early Cretaceous age. Reservoir rocks include sandstones of the Echooka, Ivishak, and Kuparuk formations, Sag River Sandstone, Kemik Sandstone, and unnamed sandstone units in the Kingak Shale, all of which were deposited in shallow marine environments. Within the planning area, porosity is estimated to be less than 10%. Source rocks include the Kavik Shale, Shublik Formation, Kingak Shale, the pebble shale unit, and the Hue Shale. The shales are primarily overmature within the planning area. Oil potential is unknown and unestimated. Magoon et al. (1996) estimates between 10 and 140 gas fields with a calculated mean of 108.9 billion cubic feet (1996). Total play area covers approximately (Magoon et al. 1996). A total of 234,050 acres of the play are contained within the planning area.

4. Fold-Belt Play

The Fold-Belt Play primarily contains anticlinal traps in sandstone reservoirs within the Brooks Range fold and thrust belt. Potential reservoirs are sandstones representing deltaic, shallow-marine, and turbidite environments. Porosity ranges from 5 to 30%, with the lower porosity rate more representative of the western portion of the play. Source rocks include several gas prone shales of the Nanushuk Group, as well as the Canning, Sagavanirktok, and Torok formations. They also include the oil-prone shales of the Hue Shale, Pebble Unit Shale, Kingak Shale, and Shublik Formation. The oil-prone rocks range from mature to overmature. Additionally, oil is less perspective in this play due to the Hue Shale thins to the west. Magoon et al. (1996) estimate between 1 and 20 of one million barrels or more. Undiscovered gas occurrences could result in 10-150 accumulations with a calculated mean of 212.7 billion cubic feet. The overall area of the play covers roughly (Magoon et al. 1996). A total of 3,374,677 acres of the play are contained within the planning area.

5. Lisburne Play

The Lisburne Play is a hypothetical play that consists of structural and stratigraphic trapped carbonate or clastic reservoirs in the Lisburne Group. Potential reservoir rocks in the planning area would probably be limestone or sandstone. Limestone porosity is estimated at less than 5%. The sandstone is a marginal reservoir in that it may be cemented partially or completely with calcite. Source rocks beneath the planning area could include a marine shale in the overlying Sadlerochit Group, marine shale and limestone in the Lisburne Group, and marine to lacustrine shale and coal in the underlying Endicott Group. Undiscovered oil potential was not determined; however, between 1 and 100 gas accumulations could be present with a calculated average of 287.6 billion cubic feet. The overall area of the play covers approximately (Magoon et al. 1996). A total of 4,180,072 acres of the play are contained within the planning area.

6. Lisburne Unconformity Play

The Lisburne Unconformity Play is a hypothetical play that consists of stratigraphic traps that developed as a result of differential erosion on the Permian or Lower Cretaceous unconformities that lie at the top of the Lisburne Group. Reservoir rocks are primarily limestone. Source rocks are gas-prone marine and non-marine shale. Oil and gas accumulations for the play was not quantitatively assessed. The overall area of the play covers approximately (Magoon et al. 1996). A total of 4,180,072 acres of the play are contained within the planning area.

7. Endicott Play

The Endicott Play is a hypothetical play comprised of both structural and stratigraphic traps in sandstone reservoirs within the Mississippian-aged Kekiktuk Conglomerate. Reservoir rocks are comprised of fluvial to shallow-marine quartzose sandstone and conglomerate within the Kekiktuk Conglomerate. Porosity is estimated to be less than 10%. Source rocks include coal and lacustrine shale within the Kekiktuk and marine shale in the Kayak Shale. The overall area of the play covers roughly (Magoon et al. 1996). A total of 4,180,072 acres of the play are contained within the planning area.

8. Western Thrust Belt Play

The Western Thrust Belt Play is a hypothetical oil and gas play that consists primarily of structural traps in Mississippian and Pennsylvanian carbonate reservoirs in the Brooks Range fold and thrust belt. Reservoir rocks include greywacke sandstone of the Jurassic and Cretaceous and fractured chert and silicious shale of the Mississippian and Jurassic. A potential source rock is the marine shale of Mississippian to Cretaceous age. Traps in the play are large anticlinal structures composed of multiple thrust sheets of carbonate rocks. According to Magoon et al. (1996), undiscovered oil potential projects between 1 and 45 accumulations of one million barrels or more; undiscovered gas occurrences could result in 10-150 accumulations with a calculated mean of 278.1 billion cubic feet; and total play area covers approximately (Magoon et al. 1996). A total of 2,472,913 acres of the play are contained within the planning area.

(2) Coal

All or parts of five coal fields reside inside the planning area, as shown on Map 3-28. A coal field as defined in this document is an area that has high resource potential

and contains one or more known coal beds of mineable thickness and quality. This does not imply that coal within these fields is economical to mine.

Coal is classified by rank in accordance with the standard specifications of the American Society for Testing and Materials. Coal in the planning area ranges the entire spectrum of rank from lignite to anthracite. The predominant type is subbituminous to bituminous. It is likely that some of these coal resources will be developed within the next 15-20 years.

(a) History and Development

Two Federal coal leases were issued in 1999 within the Beaufort Field. Both leases were issued as a result of a Preference Right Lease Application, which meant that a discovery of coal was made through a prospecting permit issued prior to August 4, 1976. These preferential right leases will terminate in .
Currently, the two leases are not producing coal.

1. Cape Beaufort Field

The Cape Beaufort Field is located on the northern coast of Alaska east of Cape Lisburne to the Kukpowruk River south of Point Lay. Most of the coal within the Cape Beaufort Field is from the Nanushuk Group of Early to Late Cretaceous age and bituminous in rank.

2. Lisburne Field

The Lisburne Field from Niak Creek, five miles south of Cape Lisburne, 45 miles south to Cape Thompson. The Mississipian-age Kapaloak Formation coals are high quality semi-anthracite in rank. The average coalbed thickness does not exceed four feet The structural complexity of the area makes it difficult to determine a resource estimate for the field.

3. Kukpowruk Field

The Kukpowruk Field is located northeast of Deadfall Syncline in the Cape Beaufort Field toward the western boundary of NPR-A. Composition and quality of the coal is similar to that of Beaufort Field coal. Coal seams vary from 1-22 feet in thickness and are oriented horizontal to vertical depending on the location. Strippable reserve estimates are 20 million short tons for the

Kukpowruk Field. Total estimated resources are approximately three billion short tons (Merritt 1988).

4. Chicago Creek Field

The Chicago Creek Field, also known as the Kugruk River Field, is located on the northwestern part of Seward Peninsula , and occupies an area of less than 40 square miles (Merritt 1986). The coal field lies in a north-south trending linear trough that may be as great as two miles wide. Identified resources of the Late Tertiary lignite are 4.7 million short tons within 300 feet of the surface

5. Kobuk Basin (East and West Kobuk Fields)

The Kobuk Basin is comprised of the East and West Kobuk Fields and several other coal occurrences. Most exposures are located along the drainages within the basin including the Singauruk River, Hunt River, lower Ambler River, lower Kogoluktuk River, and the Lockwood Hills. The coals are mid to late Cretaceous and bituminous in rank. Coal seams tend to be less than three feet thick.

(3) Geothermal

Geothermal energy consists of heat stored in rocks, and, to a lesser extent, in water or steam-filled pores and fractures. Water and steam transfer geothermal heat by convection to shallow depths within the earth's crust. This heat may then be tapped by drilling. Geothermal heat may also escape at the surface in geysers, thermal springs, mud volcanoes, and vents (usually volcanic) called fumaroles.

Geothermal leases are issued through competitive bidding for Federal lands within a Known Geothermal Resource Area (KGRA), or are issued noncompetitively for Federal lands outside of a KGRA. KGRAs are areas where the BLM determines that persons knowledgeable in geothermal development would spend money to develop geothermal resources. Pilgrim Hot Springs is a KGRA , one of three in Alaska, and the only KGRA in the planning area.

In addition to the KRGA, the DGGS (Motyka et al. 1983) has identified within the planning area a "region favorable to the discovery at shallow depth (less than 1,000 meters) of thermal water of sufficient temperature for direct heat applications." The area includes 11 hot springs and extends from Pilgrim Hot Springs in the southwest to Serpentine Hot Springs in the northwest, then east across the Seward Peninsula to Hogatza, then southwest to Norton Bay and west to Pilgrim Hot Springs. This area is shown on Figure 9 in the Leasable Mineral Occurrence and Development Report (BLM 2005n).

(a) History and Development

Pilgrim Hot Springs, formerly known as Kruzgamepa Hot Springs, is located on the Seward Peninsula approximately 40 miles northeast of Nome and one-third of a mile south of the Pilgrim River. Access is by air to a small, gravel airstrip or by four-wheel drive vehicle. The Nome-Taylor Highway is seven miles to the east. The hot, saline water rises to the surface in an abandoned river channel within the Pilgrim River valley. The springs area has a sandy surface soil and is permanently thawed by the hot water. Water temperature averages roughly 156° F, with a maximum of 190° F. The water runs clear with only a slight odor of hydrogen-sulfide (USGS 1971).

Two 164-foot test wells were drilled in 1979 with artesian aquifers encountered between 66 and 98 feet. In 1982 Woodward-Clyde Consultants drilled four additional test wells as well as perforated and tested the two previous wells. The four wells were drilled within a temperature contour where soils at a 15-foot depth exceeded 140° F. By conducting analysis based on downhole data, a heat source was located near a depth of 4,875 feet. A fracture has been determined as the conduit that carries the superheated water vertically from 4,875 feet to a depth of 50 feet (Economides 1983). The water then enters an aquifer system and seeps to the surface (Woodward-Clyde Consultants 1983).

(b) Occurrence Potential

Potential geothermal resources in the planning area may be found in a swath that extends along the entire western part of Seward Peninsula narrowing to the east-northeast and the Purcell Mountains. There are six thermal springs within the planning area. Thermal springs are produced by subsurface hydrothermal systems, which transfer heat to the surface through fluids as opposed to transferring heat through solid rock.

(c) Development Potential

Currently, there is no production from Pilgrim Hot Springs. The development potential is low, but could rate higher if there is an increase in demand for alternative energy sources. The geothermal resource at Pilgrim Hot Springs could provide power to Nome or aid in mineral development on the Seward Peninsula. Powerlines could be routed through the Cobblestone River Valley, crossing the Kigluaik Mountains at Mosquito Pass then south to Jensens Camp before following the road back to Nome. Distance is about 55 miles (Economides 1983).

(4) Coalbed Natural Gas

Coalbed natural gas (CBNG) exploration in Alaska has been focused around the Matanuska-Susitna Valley in southcentral Alaska. Coalbed natural gas is gas composed primarily of methane that was produced by the coals during the coal-forming process and is held within the coals by hydrostatic pressure created by the presence of water. In order to produce coalbed natural gas, the pressure within the coal needs to be reduced to release the gas. This is accomplished by pumping water from the coals. Commonly the water is pumped to ground surface, but new technologies allow for the water and gas to be separated downhole. The gas naturally rises to the surface while the water is pumped further downhole to a deeper injection zone. The gas flows through the coals to the well bore where it is captured for use.

(a) History and Development

Methane within coals has long been recognized as a hazard when mining the coals. It wasn't until the 1980s that coalbed natural gas was thought of as a potential reservoir target, even though producers often drilled through coal seams on their way to deeper targets. During the late 1990s coalbed natural gas production increased dramatically nationwide to meet the ever growing energy demands. Today coalbed natural gas accounts for 17% of total gas production within the United States.

The most likely location within the planning area for coalbed natural gas to occur is in the Colville Basin (as discussed under Oil and Gas on page 3-156). As many as 150 coal beds with thicknesses ranging from 5 to 28 feet, with a maximum of 40 feet, have been documented along the North Slope. The uplift of the Barrow Arch eroded many of the shallow coal beds to the north. Coal beds thicken to the south and outcrop more in the western part of the Colville Basin.

Currently, no coalbed natural gas wells have been drilled in the planning area; however, oil and gas wells drilled in the area show gas kicks in the shallow coal zones penetrated.

(b) Occurrence Potential

Two factors indicate the potential presence of coalbed natural gas in a coal: 1) thick, laterally continuous subsurface coal deposits, and 2) thermal maturity (rank) of the coal. The only way to determine if coal contains coalbed natural gas is to drill and sample the coal. The Colville Basin is the most likely location within the planning are for coalbed natural gas because the basin contains thick, laterally continuous coals that are thermally mature (sub-bituminous to bituminous). The Colville Basin is ranked high for coalbed natural gas occurrence.

(c) Development Potential

It is unlikely that interest in the western Colville Basin for commercial coalbed natural gas will increase over the life of this RMP; however, coalbed natural gas as a low-cost, alternative energy source for local village use may increase. This is especially true as oil prices continue to increase, causing the cost of not only purchasing diesel fuel to increase, but also the cost of transporting the fuel to villages.

INSERT 11x17 MAP
3_26_mineral_leasing

INSERT 11x17 MAP
3_27_oilgas_basins

INSERT 11x17 MAP
3_28_coal

b) Locatable Minerals

(1) Mining-related Surface Disturbance and Reclamation Requirements

Surface disturbing activities under the jurisdiction of 43 CFR 3809 regulations are reviewed on a case-by-case basis. Occupancy related to mining is regulated under 43 CFR 3715. The intent of the 3809 regulations is to prevent unnecessary or undue degradation of surface resources and to ensure reasonable reclamation of disturbed sites on Federal lands. The intent of the 3715 regulations is to ensure mining claim occupancy is on a level commensurate with and reasonably incident to the present level of the mining activity and remoteness of location of a particular claim or claims.

According to 43 CFR 3809, casual use employing non-mechanized equipment does not require notification to the BLM. Submission of a notice is required 15 days prior to any surface-disturbing exploration activities using mechanized equipment or explosives when the cumulative disturbance is less than five acres. Notices and casual use are not Federal actions and thus do not require environmental analysis or approval by the Authorized Officer (AO). Notices are reviewed and measures applied (standard stipulations) to prevent unnecessary or undue degradation. Production activities or exploration activities disturbing more than five acres require a Plan of Operations, Reclamation Plan, and environmental analysis. Plans of operations require specific approval by the BLM prior to commencing work. Construction of new access requires consultation with the AO.

Notices and plans of operations are filed using the State of Alaska's Alaska Placer Mining Application (APMA) form submitted to the ADNR, Division of Mining Land and Water (Map 3-30). By Memorandum of Agreement these filings are distributed by the State to all agencies involved in the regulation of mining activities. While the State does not require bonding for mining activity under five acres, new notices and plans on Federal mining claims must be bonded regardless of acreage of disturbance or proposed disturbance. The BLM accepts bonding through the Statewide Bond Pool, a reclamation bonding program administered by the State. Ongoing notice of operations are grandfathered and not required to conform to Federal bonding regulations.

The BLM is required to conduct inspections at least once a season on notices and twice a season on plans of operations to ensure compliance and to check for unauthorized use. Generally there is no road access to mining operations in the planning area. Inspections are carried out by OHV, fixed-wing aircraft, or helicopter support.

Under notices of operations, operators reclaim their surface disturbance at the end of the mining season except for the camp footprint and other improvements such as tailing ponds and bypasses that will be utilized in the following season's operations. Seasonal shutdown is dictated by Alaska's climate. If un-reclaimed acreage is left to accumulate beyond five acres, the mining activity is moved into the plan category, which then requires an environmental assessment, BLM-approval to operate, and reclamation bonding, if not already bonded. The filing of multi-year plans is acceptable to the BLM.

After filing and reclamation requirements were instituted in 1980, the number of filings rose steadily to a high of 34 notices and 10 plans in 1984 within the present-day planning area, and declined almost as quickly. By 1997 the area was carrying 13 notices and four plans. Each year one to two new notices would start up and the same number or greater would be closed out. For the past three years BLM has been left with one active notice and three inactive/abandoned notices/unapproved occupancies along with one inactive plan and one plan level record of non-compliance and unapproved occupancy.

(2) Mining Claim Occupancy

Regulations found at 43 CFR 3715 state “The purpose of this subpart is to manage the use and occupancy of the public land for the development of locatable mineral deposits by limiting such use or occupancy to that which is reason-ably incident. The BLM will prevent abuse of the public lands while recognizing valid rights and uses under the Mining Law of 1872 and related laws . . .”

These regulations were enacted in 1996 to prevent occupancy of public land under the guise of mining when no justifiable reason or significant amount of mining is occurring. The occupancy must be “reasonably incident to mining” (not undue or unnecessary) and the occupancy must be needed to sustain regular work, to protect property, or other justifiable reason. It must also lead to the extraction and beneficiation of minerals, involve observable activity and use appropriate operable equipment. Generally, if adequate housing within a reasonable distance is available the occupancy is not justified (unless property must be protected). These regulations have proved difficult to apply in Alaska where mining claims are remote, inaccessible, and seasonal shutdown is dictated by the severe climate.

BLM has four types of enforcement actions it takes under the regulations found at 43 CFR 3715. These include: 1) immediate suspension, 2) cessation order, 3) notice of non-compliance, or 4) other (if the occupancy is not incidental to mining, an application for use under another regulation may be required, and trespass under a different regulation may be pursued).

(3) Other Factors Affecting the Development of Locatable Mineral Resources

(a) Land Ownership

Major landowners within the planning area include three regional Native corporations, the State, the Federal government, and privately owned lands (primarily patented mining claims). Federal ownership is subdivided into National Park Lands administered by the NPS, Wildlife Refuges managed by the FWS, and public domain lands administered by the BLM. A significant amount of the BLM-managed lands remain in selected status awaiting conveyance to the State or Native corporations. Both the State and the regional Native corporations recognized the value of retaining potentially valuable mineral deposits and made their selections accordingly. Only since 1980 when the BLM instituted requirements to file mining plans and notices of surface disturbing operations related to mining development and instituted reclamation requirements did the effectiveness of this selection strategy employed by the State and Alaska Natives become apparent. Filings received by the BLM were consistently on lands under selection and interim management by the Federal government.

Of the 30.5 million acres within the planning area, approximately 17% (5.0 million acres) are unencumbered and managed by the BLM. Most, but not all, of these lands are open to mining (Map 3-29). An additional 8% (6.3 million acres) have been Tentatively Approved (TA'd) or patented to the State and are open to mining under State Statutes. Selected lands (both State- and Native-selected) account for 22% of the planning area (6.5 million acres). Mining (under Federal jurisdiction may occur on selected lands where Federal mining claims were located prior to withdrawal for selection purposes under ANCSA. Most of these lands will go to the selecting entity, but, because of overselections, some will come back to Federal management. FWS, NPS, and military lands, comprising 21% of the planning area (6.4 million acres), are not open to mining. Private lands (including interim conveyed Native lands) account for 19% of the planning area; some of these lands may be open to mining at the discretion and terms of the Native corporation or private landowner. In summary, approximately 60% of the lands in the planning area (BLM-managed, selected lands, and State lands) are conditionally open to mining. Some mining on private land (19%) could be permitted at the discretion of the landowner. At least 21% of the planning area under management of the NPS, FWS, and the Military are closed to mining.

(b) Mining Claim Status

On unpatented Federal mining claims on lands conveyed to Native corporations it was left to the Native corporation and the claimant to determine what rights the claimant would retain under the new land owner. For unpatented claims on lands TA'd or patented to the State, the claimant had the option of converting to State mining claim or protesting the conveyance and remaining a Federal claim under Federal jurisdiction. Initially most claimants retained their Federal status as Federal claims, keeping the right to go to patent. A moratorium was placed on the ability to file for patent in 1995 and has remained in place since. This has led to overstaking of State claims by claimants of their Federal mining claims on TA'd, and even selected lands and filing of requests for priority conveyance of these lands to the State. These actions, combined with a requirement in 1994 of $100/claim annual rental fee paid to the Federal government resulted in a large decrease in the number of active Federal mining claims.

(c) Mineral Assessment Efforts

Following the gold rushes at the turn of the nineteenth century, the pace of mineral development slowed due to the lack of developed infrastructure, changing economic conditions, world wars, and political factors introduced by the passage of ANCSA in 1971 and ANILCA in 1980. These two legislative acts closed hundreds of thousands of acres to further mineral exploration and development other than a few active mineral development operations which immediately preceded the passage of the ANCSA in 1971 and were grandfathered in. The last major attempt to assess the mineral potential of the region (limited to the Seward Peninsula) was done by the Mineral Industry Research Lab of UAF in 1966. Due to the complex land ownership pattern and political restrictions on further development activities on these lands, exploration and development have been limited largely to private lands, mostly mining properties patented in the early 1900s and Native lands conveyed early in the process. In recent years, interest has increased, due to the State's conduct of airborne geophysical surveys of State land and adjoining Federal land. Only since 1995, have mineral development interests been encouraged by the State's conduct of airborne geophysical surveys on these lands.

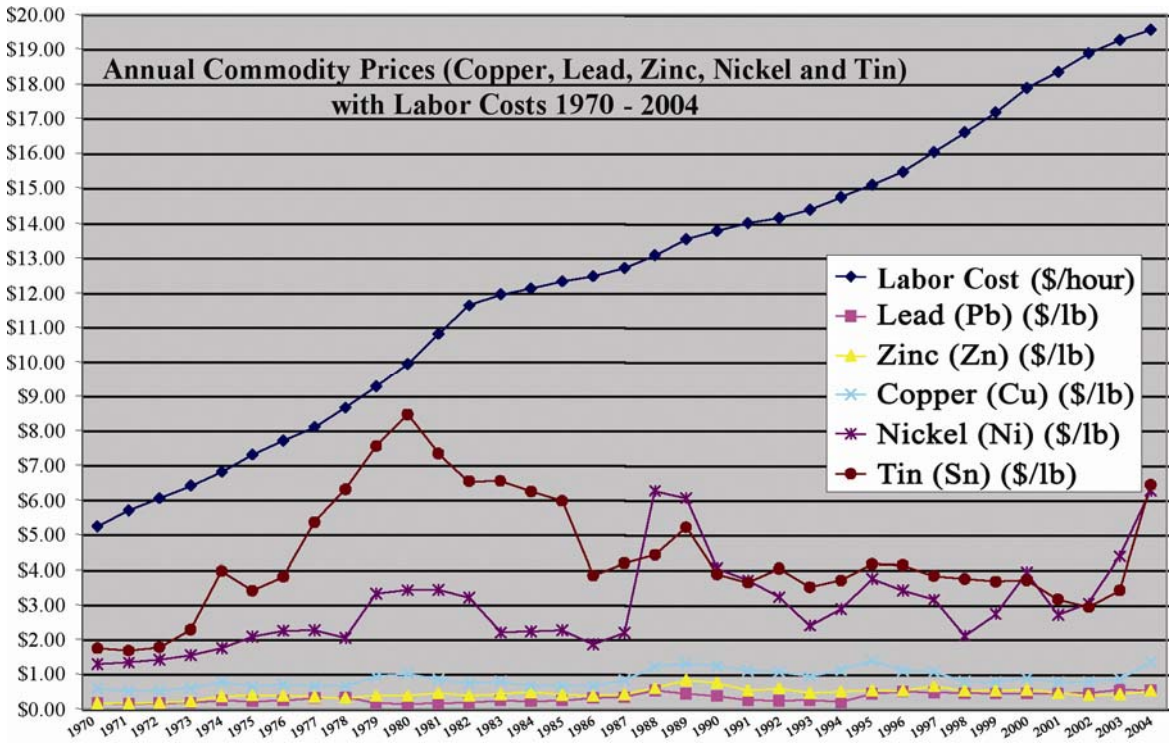
In the fall of 2004 the BLM wrote a Mineral Occurrence and Development Potential Report (BLM 2005f) and let a contract to the Alaska Division of Geological and Geophysical Surveys (ADGGS) to update and review the currently available data on mineral resources in the planning area. Once the mineral potential report was finalized, a Reasonable Foreseeable Development

Scenario (BLM 2005g) was written to address the likelihood that a particular mineral occurrence is likely to be explored or developed within the next 10-15 years.

(d) Commodity Prices and the Business Cycle

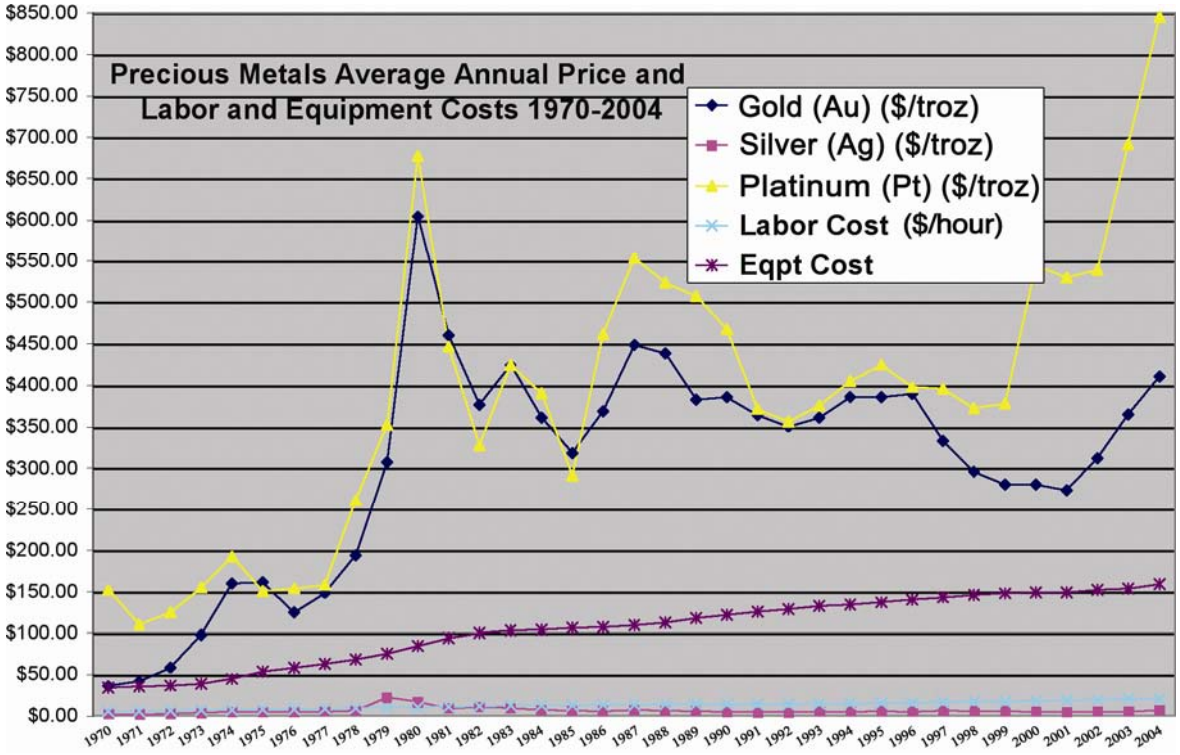
Mining activity at its most elemental level is predicated on metals commodity prices and perceived trends based on historic records. Throw into this mix the speculation factor, uncertain land status, an increasingly strict domestic regulation climate, and the high capital cost of going to production, and mining becomes a high risk industry. From 1989 to present is a relatively short period of time to say much about commodity trends particularly when the price graph is fraught with large, short duration peaks and valleys.

Figure 3-3. Base Metal, Nickel, and Tin Prices and Labor Costs 1970-2004



Commodity prices of particular interest in the region from around 1970 onward generally increase at about the same rate or somewhat less than the inflation rate (cost of doing business). This is particularly true for base metals (copper, lead, and zinc), as well as for nickel, though, as the graph illustrates, there are more upward and downward short duration spikes.

Figure 3-4. Precious Metal, Labor, and Equipment Costs 1970-2004



Precious metals, gold and silver, prices show a sharp upward spike around 1980 and then drop precipitously around 1985 where they have leveled off. In the chart above, labor and equipment costs are plotted in actual dollars per hour and commodities in dollars per troy ounce. While these do not equate, it is the slope and inflections of the curves that are instructive. Likewise the price of tin with its 10-year steady upward climb to peak in 1980 shows a relentless decline with a sharp downward spike in 1985, marking the end of the International Tin Council which had been successful in stabilizing tin prices worldwide since 1921.

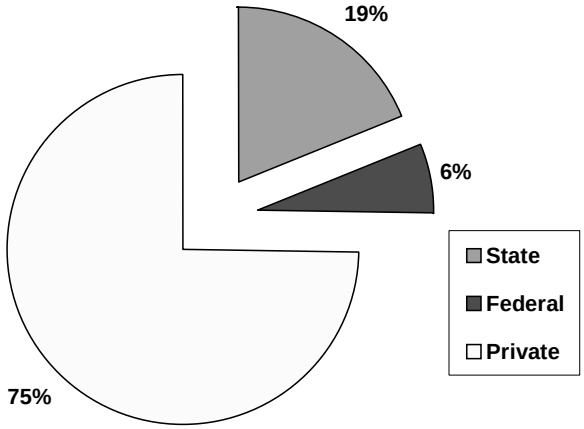
In Alaska, and in this region in particular, remote locations and lack of infrastructure to bring in mining equipment and transport the mineral commodity to market limits development and production to only the unusually large (on a world wide scale) mineral deposits. Even that limited development has been predicated on assistance from State development oriented programs such as Alaska Industrial Development Authority, special congressional legislation that excluded the Red Dog mineral deposit from Federal enclaves that would have precluded mineral development, and in the case of Native lands, the desire of the Alaska Natives of the region to develop mineral resources as a source of jobs and a cash economy. Outside this, the "smaller" mineral deposits go begging and are traded from one mineral exploration company to another on a four to five year cycle. Many of these smaller desposits would be a mineable deposit in the Lower 48 where infrastructure (roads, rails, ports, and power) is already in place. These smaller deposits may be mined in the future with increased commodity prices and development of infrastructure in the area.

(4) Recent Activity

There is no one universally agreed upon way to gauge or characterize the level of mining activity and mineral potential of a region. The ADGGS sends out an annual survey form, the results of which are used to tabulate in both narrative and tabular form such things as expenditures for exploration, development, and mining as well as annual production and new claim location numbers by quadrangle. The data from these survey forms is generalized for publication into broad geographic areas to maintain confidentiality of individual respondents. Since gold and other mineral commodities are bought and sold on the open market, there is no requirement to report production. Publicly traded companies are required to report their activities to the Securities and Exchange Commission but this information is not tabulated, published, or made readily available to the public. Daily commodity spot prices are available in the newspaper and selected trade journals. Commodity prices are tabulated and current as well as historical prices are readily available on the internet. For example the monthly average spot price of a commodity could be charted over a period of years (5 years, 10 years, or 20 years depending on what the researcher considers a complete business cycle) to forecast long-term growth or decline. This, however, is a simplistic approach as it does not take into account numerous other factors unique to a geographic mining region. Such things would include cost of equipment and supplies, availability of access, cost of transportation and labor, and labor supply to name a few. Information on numbers of mining claims staked and mining claims relinquished can be obtained from Federal and State land management agencies, particularly the ADNR Division of Mining, Land and Water for State claims as well as the BLM for Federal mining claims. These figures can be researched from the public records and are tabulated in the annual mineral industry report published by Alaska Division of Geological and Geophysical Services.

Another type of approach, the one adopted here, is through a recent database put together by the State that tracks specific information fields found on the APMA. The location and level of recent activity is gauged by filings of mining notices and plans of operations from 1989 through the 2004 mining season.

Figure 3-5. Summary of Mining Surface Disturbance (excluding Red Dog) by Land Ownership in the Planning Area

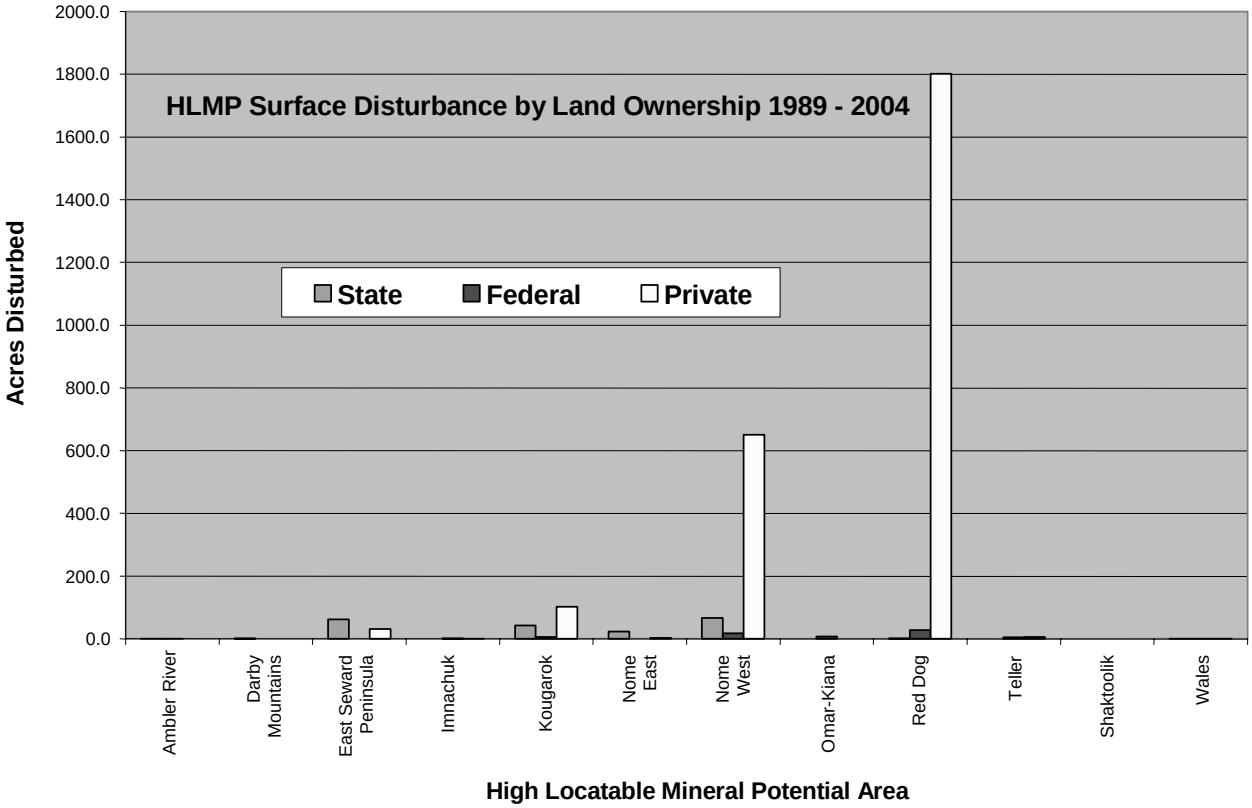


This database was obtained from the ADNR land records and converted to a shape file for use in ArcGIS. What this database does not capture are mineral exploration programs initiated by

regional Native corporations on Native-selected lands. These programs are permitted by the BLM under interim management policies by miscellaneous land use permits as selected lands are not open to mineral entry and location. This is a relatively minor issue as there have been less than a half dozen of these permits issued since 1982 and lands conveyed to the Native corporation may or may not be available to mineral exploration and development depending on the determination of the landowner. It excludes the 1,800 acres currently impacted at the Red Dog Mine. Inclusion of this acreage would dramatically skew the percentages in favor of private development, with State at 7%, Federal at 2%, and private at 91%. .

In the following narratives that describe the management situation of each of the high locatable mineral potential (HLMP) areas, mining activity highlights are taken from the State's annual publication that summarizes, by broad region, the questionnaires sent out to mining interests operating in the state. For surface disturbance acreages by land status and creek drainage the following narrative incorporates information from the geo-referenced APMA database, BLM land status records, and the Mineral Occurrence and Development Potential Report for Locatable and Salable Minerals (BLM 2005f). The HLMP areas are grouped by geographic location. Each area summary consists of a section summarizing land ownership, mineral deposit model characterization, and a summary of recent activity in the area.

Figure 3-6. HLMP Surface Disturbance by Land Ownership 1989-2004



Note: See also Table 3-17 showing HLMP acreage by land ownership.

Table 3-17. HLMP by Land Ownership

HLMP	State Acres	Federal Acres	Private Acres
Ambler River	1.0	0.7	0.3
Darby Mountains	2.0	0.0	0.0
East Seward Peninsula	62.4	0.0	32.0
Imnachuk	0.0	2.0	1.0
Kougarok	43.5	6.5	102.6
Nome East	23.0	0.0	2.7
Nome West	67.2	17.5	650.4
Omar-Kiana	0.0	7.0	0.0
Red Dog	2.5	28.2	1801.3
Teller	0.0	5.0	6.5
Shaktoolik	0.0	0.0	0.0
Wales	1.0	1.0	1.0
	202.6	67.9	2597.8

Note: See also Figure 3-6 showing HLMP surface disturbance by land ownership from 1989 to 2004.

The State's APMA database contains many duplicate records that had to be sorted manually and consolidated. For a single application and permit each applicant and each section of a township applied for is entered as a separate record. In the following tables, the land status column represents land status of the lands underlying the mining activity at the time of filing. The next column is the estimated surface disturbance acreage anticipated by the operator or claimant for that season. In some instances the application is merely a paper filing, meaning that the applicant makes application to disturb a certain acreage but never gets out on the ground. In following years, the same applicant may submit the same acreage and again fail to do the work. It is not possible to tell from the database when or how often this occurs. The next three columns break out actual surface disturbance according to whether the activity occurred on State mining claims, Federal mining claims (on public domain lands or tentatively approved State lands where claimant chose to retain the Federal mining claim) and private lands (mostly patented mining claims or on conveyed Native lands). These numbers are also generated by the applicant for the purposes of reclamation bonding and but are verified by the Federal or State jurisdictional agency. As the APMA data input is generated by the claimant or operator and not closely verified in the field, the accuracy of any individual number may be suspect, but summary data does provide a useful tool to describe

general activity levels and trends of areas under management of Federal and State mining regulators and accurately reflect the ongoing management situation.

Based on surface disturbance acreages tabulated by HLMP the most active areas are, in order, the Red Dog, Nome West, and the Eastern Seward Peninsula areas. The top two areas, mining activity is very nearly exclusively limited to private lands. The acreages in these two areas represent the Red Dog Mine on conveyed Native lands and the Alaska Gold Company's dredging and open pit operations on patented Federal mining claims. The third most active area, Eastern Seward Peninsula, the activity has occurred on State lands. The activity on Federal mining claims represents mining plans and notices that were filed on Federal claims on State-selected lands. In no areas where significant mining activity has occurred in the past 16 years has mining occurred primarily on Federal lands.

Mineral resource development and mining since 1989 in the planning area has occurred primarily on private lands and secondarily on State lands. This can be attributed to the patenting of large numbers of Federal mining claims staked during the gold rush era and to the State and Native corporations targeting of mineral resources for selection under ANCSA.

(5) Potential Areas

In the following sections, the term BLM land refers to public domain land, excluding selected lands. Although State- and Native-selected lands are still BLM land, they are segregated from mineral entry.

(a) Northern Seward Peninsula Region

Some of the oldest rocks (Proterozoic to middle Paleozoic) in the planning area are limestone and shale units thought to represent continental shelf and marine slope sediments originally deposited along the passive margin of North America. These rocks are similar in composition and age and are thought to have been deposited as a single belt including the Arctic Alaska and Seward lithotectonic terranes. The Northern Seward Peninsula Region includes the following high locatable mineral potential areas: Wales, Shishmaref, Kougarok, and Imnachuk.

1. The Wales HLMP Area

From 1989 through the 1991 mining season three locations in the area were filed for under the APMA process. On Cape Creek one acre was recorded in 1989 for surface disturbance on unpatented Federal mining claims overlying Native-selected lands. This placer tin mining operation was quite successful in the late 1970s and 1980s and received patent in 1983 to most of their Federal claims on which they were working. This operation used a dragline to strip the overlying creek gravels, a dozer to push up tin bearing gravels, and a loader to tram these gravels to a slusher pile which fed an elevated combination sluice and jig wash plant. Tin concentrates (up to 70% tin) were packed in 55 gallon drums weighing approximately 1,500 pounds each and the drums lightered by a landing craft to offshore barges for transport to Seattle, Washington, and then overland to a smelter in Texarkana, Texas. The second location was filed on by Kennecott Exploration in the area around Potato Mountain to evaluate the hard rock tin and gold potential on selected Native lands. The third location filed on by Placer Dome, Inc. was filed for the Lost River area in support of an ongoing mineral patent examination of lode mining claims. A core drill was set up in one location to target a geophysical anomaly on one of the claims under patent application. Surface disturbance for each of these two location was estimated at one acre each and listed as Federal lands (Federal mining claims at the Lost River

location) though the underlying lands were actually Native-selected lands and conveyed Native lands, respectively. There are no BLM-managed or State-selected lands in this HLMP.

Table 3-18. Wales HLMP Surface Disturbance Summary

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
Cape Ck	Teller	C-6	Mining	1989		Federal Land	1.0	0.0	0.0	0.0	0.0
Potato Mountain	Teller	C-6	Exploration Hardrock	1990		Private Land	1.0	0.0	0.0	0.0	0.0
Lost River	Teller	B-5	Exploration Hardrock	1991		Private Land	1.0	0.0	0.0	0.0	0.0

Abbreviations: St = State; Fed = Federal; Pri = private; dst = disturbance; Cr = creek; no entry in the Last Year column means operations only lasted for 1 year.

Mining of placer tin from Cape Creek continued in 1989 and ceased operations thereafter, presumably due to declining resources available and soft price of tin. This small Alaskan corporation has mined on this drainage nearly continuously since 1969. The core of this claim block is patented Federal mining claims. Prior to that the area of Cape Mountain and Cape Creek was mined sporadically since 1935 for both hard rock and placer tin resources. In 1990 Kennecott Copper Corporation undertook to conduct hard rock mineral exploration on Native lands around Potato Mountain to evaluate the hard rock tin potential of the tin granite there. The third operation, by Placer Dome US was the drilling of an unpatented mining claim at Lost River in support of a mineral patenting application. In addition, though APMA records are not available prior to 1989, hard rock exploration is also known to have occurred on State and Native lands west of Baltuk Creek.

Unique to Alaska and North America, mineral interests in this area are tied to the price of tin. Cape Mountain, Tin Creek, and Lost River are the only locations in North America where significant quantities of tin have been produced as the primary product. Also USGS commodity summaries report that unique to tin has been its long history of commodity "agreements" dating back to 1921. These agreements were usually structured between producer countries and consumer countries on a complex global basis. Through these agreements the International Tin Council (ITC) supported the price of tin during periods of low prices by buying tin for its buffer stockpile and was able to some degree to restrain and partly take advantage of the historically high tin prices. The sharp recession of 1981-82 proved to be quite harsh on the tin industry. The ITC was able to avoid truly steep declines through accelerated buying for its buffer stockpile but eventually reached its credit limit in late 1985. This long standing "agreement" process then collapsed. Beginning In 1973 the price of tin (USGS Minerals Yearbook summary) climbed from the $2.00 per pound price toward a peak of $8.46 per pound in 1980. Mining activity in the area flourished. From 1981 to 1985 tin prices slowly declined and dropped sharply below $4.00 per pound in 1985. There was a brief rebound taking the price above $5.00 per pound and since then the price has flattened to around $4.00 per pound. From 1989 to 2004 tin prices drifted from just under $4.00 per pound to a low of $1.95 per pound, rebounding to $4.12 per pound in 2004. In 2007, the price of tin rose to $6.42 per pound. In this area developed resources were mined out during the late 1970s to late 1980s and current commodity prices and trend have apparently not been sufficient to encourage further significant exploration or development.

Mining Activity Highlights

- In 1989 tin production dropped, Lost River Mining Co., Cape Creek Mine dropped off 35% (180,000 pounds). One of the largest producers of tin in the United States for the past 15 years exhausted their reserves and dismantled operations.
- In 1989, BSNC Lode tin exploration Cape Mountain, Potato Mountain, Brooks Mountain, Lost River, and Black Mountain. Gold veins around Rock Creek and Mount Distin.
- For the 1990 mining season Kennecott Exploration drilled two holes on the Potato Mountain tin deposit.
- In 1993 Lost River Mining trenched for more tin on Cape Creek.

2. Shishmaref HLMP Area

There is no recent activity or APMA filings for the Shismaref HLMP area. This area contains tin granite intrusives whose lode potential was explored in the early 1900s but never developed like the Cape Mountain Deposit, presumably due to the distance to tidewater and lack of transportation access. Placer tin possibilities also exist and mining occurred on creeks draining Ear Mountain in the early 1950s but did not continue, probably due to increasingly unfavorable economics after World War II. There are no BLM or State-selected lands in this HLMP.

3. Kougarok HLMP Area

There are no BLM lands in this HLMP area. There is an isolated tract of State-selected land, approximately one township in size, containing no known, significant mineral deposits in the middle of the area and at the eastern protrusion of this HLMP area. The eastern protrusion of State-selected lands are located in the Boulder area, upland tributaries west of the Noxapaga River. In addition there are some square mile sized parcels of Native-selected lands at the south end of the area. They do not contain any known, significant mineral deposits.

As documented by the APMA data over the16-year period from 1989 through 2004, mining and mineral exploration has occurred over a total acreage of at least 145.9 acres (171.0 acres applied for but only 145.9 can be strictly accounted for) of this high mineral potential area. By land ownership this acreage breaks down into 36.8 acres State land, 6.5 acres Federal land within unpatented Federal mining claims, and 102.6 acres of private land (patented mining claims). Most of this mined acreage is on Washington Creek and the Kougarok River and mined by a family-operated 2.5 cubic foot bucket-line dredge. Prior to these Federal mining claim being patented these claims were located on State-selected lands. The remaining operations in this area are bulldozer-loader-wash plant operations in open cuts along river and creek flood plains operated by individuals and small, independent Alaskan mining companies.

Table 3-19. Kougarok HLMP Surface Disturbance Summary

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
Washington Ck	Ben	C-6	Suction Dredge	1989	1997	Federal & Private Land	19.0	0.0	0.0	0.0	0.0
Macklin Ck	Ben	D-6	Mng/Expl/Let Intent	2000	2003	State Land	0.0	6.0	0.0	0.0	6.0
Skookum Ck	Ben	B-5	Mng/Expl/Let Intent	1992		Federal Land	1.0	0.0	0.0	0.0	0.0
Black Ck	Ben	C-5	Mng/Expl/Let Intent	1992	1993	Federal Land	1.0	0.0	0.0	0.0	0.0
Coarse Gold	Ben	C-6	Mining/Exploration	1989	1990	State Land	4.0	0.0	0.0	0.0	0.0
Dick Ck	Ben	D-6	Mng/Expl/Let Intent	1989	2004	State Land	23.0	21.0	0.0	0.0	21.0
Boulder Ck	Ben	B-5	Mng/Expl/Let Intent	1989	1993	Federal Land	4.0	0.0	0.0	0.0	0.0
Noxapaga R	Ben	C-5	Expl/Let Intent	1995	2004	Federal Land	4.0	0.0	5.0	0.0	5.0
Humbolt Ck	Ben	D-5	Mng/Expl/Let Intent	1994	1993	Federal Land	2.0	0.0	0.0	0.0	0.0
Auburn Ravine	Sol	D-5	Exploration	2001		State Land	0.0	0.1	0.0	0.0	0.1
Boulder Ck	Ben	C-5	Expl/Let Intent	1993	2004	Federal Land	0.0	0.0	1.5	0.0	1.5
Garfield Ck	Ben	B-5	Exploration	2001	2004	State Land	1.0	4.5	0.0	0.0	4.5
Kougarok R	Ben	C-6	Expl/Let Intent	1990	1994	State & Federal Land	0.0	0.0	0.0	0.0	0.0
Kougarok R	Ben	B-6	Mng/Expl/Let Intent	1990	1994	State & Federal Land	0.0	0.0	0.0	0.0	0.0
Kougarok R	Ben	C-6	Exploration	1990		State Land	0.0	0.0	0.0	0.0	0.0
Kougarok R	Ben	B-6	Expl/Let Intent	1997		Private Land	0.0	0.0	0.0	0.0	0.0
Kougarok R	Ben	C-6	Expl/Let Intent	2000		State Land	0.0	0.1	0.0	0.0	0.1
Kougarok R	Ben	C-6	Mining/Let Intent	1989	2004	State/Fed/Priv Land	89.0	0.0	0.0	93.3	93.3
Arctic Ck	Ben	C-6	Exploration	1990		State Land	0.0	0.0	0.0	0.0	0.0
Atlas Ck	Ben	B-6	Mng/Expl/Let Intent	1995		State Land	4.0	0.0	0.0	0.0	0.0
Harris Ck	Ben	C-6	Expl/Let Intent	1995		State Land	0.0	0.0	0.0	0.0	0.0
Coffee Ck	Ben	B-6	Expl/Let Intent	1995	2001	Private Land	1.0	0.0	0.0	0.7	0.7
Coffee Ck	Beaver	B-6	Mng/Expl/Let Intent	1993	1999	Private Land	16.0	0.0	0.0	8.6	8.6
Quartz Ck	Ben	B-6	Expl/Let Intent	1996	2006	State & Private Land	4.0	6.8	0.0	0.0	6.8
Windy Ck	Teller	C-1	Expl/Let Intent	1998		State Land	0.0	0.2	0.0	0.0	0.2
Windy Ck	Ben	B-6	Exploration	2000	2004	State Land	2.0	4.5	0.0	0.0	4.5
Star Ck	Teller	C-1	Exploration	2001	2005	State Land	0.0	0.3	0.0	0.0	0.3

Abbreviations: St = State; Fed = Federal; Pri = private; dst = disturbance; Ck = creek; R = river; Ben = Bendeleben; Sol = Solomon; Expl = exploration; mng = mining; Let Intent = letter of intent; no entry in the Last Year column means operations only lasted for 1 year.

In Table 3-19, there are multiple entries for the same drainage. This is due to the fact that each row of the table represents a separate APMA filing and there are multiple operations on the same drainage. Between 1989 and the present, 27 separate mining operations, mostly for placer gold resources were in operation on 18 creeks and rivers in this area. Five of these owner/operators can be categorized as small Alaskan corporations. These include N.B. Tweet and Sons, Goldstream Exploration, LLC Lohman Mining and Commercial Company, Thurman Oil and Mining Inc., and Navigator Exploration Company. The remaining operations were conducted by individuals as small family businesses. Except for the small bucket-line dredge operating on the Kougarok River below Taylor, mechanical mining consisted of small to medium size open cut mining using elevated wash plants fed by dozers and loaders. The largest mining operation, the bucket-line dredge, is reported to have mined 93 acres between 1989 and the end of the 2004 season, just less than six acres per year. The remaining operations disturbed 1-10 acres over their permitted lifetime or about 1.5 acres per year. Except for Black, Skookum, and Boulder creeks, mining operations were conducted on State and private lands. Once Federal mining claims on the upper Kougarok River were patented in the early 1990s their status changed to private lands. Humbolt Creek is located within the Bering Land Bridge National Monument and exploration activity there was for verification of discovery purposes as surface disturbing activities on NPS lands can only be permitted if discovery can be demonstrated. The level of activity documented between 1989 and present occurred during a declining commodity market. Unfortunately, placer mining application data are not available for the 1980s when the commodity market was booming, with the price of gold strongly spiking in 1982. The lode resources that contributed the placer values have not been explored in this region.

The upper Kougarok River and major tributaries were mined by bucket-line dredge since gold rush days and one dredge continues to this day on private lands. The Coffee Dome and Boulder town sites were busy through the 1980s and into the early 1990s. These operations consisted of small and medium size stationary wash plants processing materials from alluvial open pits.

Mining Activity Highlights

- In 1989 Kougarok Mining Limited conducted drilling in the middle reach of the Kougarok River.
- In 1990 and 1991, N.B. Tweet and Son and others continued to mine the upper reaches of the Kougarok River, Washington Creek, and Macklin Creek above the confluence of Henry Creek. This mining continued seasonally through 2004.
- In 2000 mining season Quaterra mining company staked State mining claims, Volcanogenic Massive Sulfide (VMS), in the area reported to be 110 miles northeast of Nome.
- In 2001, there was substantial tin-tantalum exploration on the Seward Peninsula.
- In 2002, follow up core drilling of the tin-tantalum prospect in the Kougarok area 67 miles north of Nome was accomplished.

4. Imnachuk HLMP Area

This HLMP area contains no unencumbered BLM, State-selected, or Native-selected lands.

Between 1990 and 1992 mineral exploration, presumably for placer gold was conducted by a private individual on the Imnachuk River. Proposed surface disturbance was estimated to not exceed two acres. This exploration occurred on Federal mining claims on Native-selected

lands. These Federal placer mining claims were under mineral patent application filed by GEM Exploration, Inc. Interest in pursuing the application waned and in the mid 1990s the application lapsed. These lands have since been conveyed, and the mining claims have come under the jurisdiction of the NANA Regional Native Corporation.

Table 3-20. Imnachuk HLMP Surface Disturbance Summary

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
Inmachuk River	Ben	D-2	Exploration Let Intent	1990	1992	Federal Land	2.0	0.0	0.0	0.0	0.0

Abbreviations: St = State; Fed = Federal; Pri = private; dst = disturbance; Ben = Bendeleben; Let Intent = letter of intent.

Exploration for placer gold and test mining was conducted between 1990 and 1992 on unpatented Federal mining claims that were subsequently conveyed to the Native corporation at which point, mining interest ceased. The area is one of significant historical mining activity largely for placer gold values. In addition, exploration was done on hard rock base and precious mineral shows in the rocks of the valley hillsides. One old time miner worked into the 1980s using shaft sinking and drifting to mine placer resources until his death.

Mining Activity Highlights

- In 1991, Jack Hoogendorn continued his 17th year of underground mining of gold beneath Pliocene basalt flows in the Inmnachuk District.
- In 1991, NANA Regional Corporation through its partner Kennecott Exploration was active in lead/zinc/silver/gold exploration on its lands in the Imnachuk River District as well as the Candle and Ambler Mineral Belt. This work continued through the 1992 season. Exploration targeted the polymetallic mineral occurrences in the Imnachuk River area as well as in the Candle District.
- During 1992 NANA/Kennecott Exploration followed up on previous work which targeted polymetallic mineral occurrences in the Candle and Imnachuk areas.

5. Imnachuk Medium Locatable Mineral Potential (MLMP) Area

In 1996, Kennecott Copper Corporation conducted hard rock mineral exploration in the upland area between Chicago Creek on the Kugruk River and the Utica Landing area of the Imnachuk River (Virginia Creek as listed above) on NANA Corporation lands. Operations were conducted in partnership with the Native Corporation to assist in evaluation of mineral resources on these lands. Presumably the mineral occurrences here are related to the hard rock shows investigated by the placer miners of the Imnachuk MLMP area.

Table 3-21. Imnachuk MLMP Surface Disturbance Summary

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
Virginia Ck	Ben	D-1	Exploration Let Intent	1993	1996	Private Land	1.0	0.0	0.0	0.0	0.0

Abbreviations: Ck = creek; St = State; Fed = Federal; Pri = private; dst = disturbance; Ben = Bendeleben; Let Intent = letter of intent.

Mining by bucket-line dredge and stationary wash plants on the alluvial flood plain was big in the 1930s and included some development of lode potential in the uplands of the drainage basin. Except for a single operator doing shaft mining this industry did not come back after World War II. The operator died in the early 1980s and these lands were conveyed to a Native Corporation, ending the active mining activities in this area.

Mining Activity Highlights

- In 1995, Kennecott Exploration/NANA conducted polymetallic and base metal exploration activities in the Deering area on Native lands.

(b) Southern Seward Peninsula Region

Some of the oldest rocks (Proterozoic to middle Paleozoic) in the planning area are limestone and shale units thought to represent continental shelf and marine slope sediments originally deposited along the passive margin of North America. These rocks are similar in composition and age and are thought to have been deposited as a single belt including the Arctic Alaska and York lithotectonic terranes. The Southern Seward Pensinsula Region includes the following HLMP areas: Teller, Nome and Nome West.

1. Teller HLMP Area

There are no unencumbered BLM or State-selected lands in this HLMP. There are three isolated tracts of BLM land immediately adjacent to the HLMP. However, these BLM parcels do not contain any known, significant mineral occurrences.

The APMA database lists three locations that have been active for the 1991-2004 mining seasons: Alder Creek, Gold Run Creek, and Tuksuk Channel. No surface disturbance is listed for either Alder Creek (Federal land) or Tiksuk Channel (State land). A total of 10.5 acres is listed for suction dredging activities on Gold Run Creek, five acres on Federal mining claims and 5.5 acres on Native Corporation lands. This is however a misclassification of the actual land status. Federal mining claims were extinguished in 1996 and these lands were turned over to the land owner, Bering Straits Native Corporation. The claimant did not understand the change in ownership and continued to file as though he was still operating on Federal mining claims on Gold Run Creek. It is likely that much less than 10.5 acres on Gold Run Creek were actually suction dredged by the claimant or his lessees.

Table 3-22. Teller HLMP Surface Disturbance Summary

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
Alder Ck	Teller	A-3	Mining/Let Intent	1992		Federal Land	0.0	0.0	0.0	0.0	0.0
Gold Run	Teller	A-3	Mining/Rec Plan	2000		Federal Land	2.0	0.0	2.0	0.0	2.0
Gold Run Ck	Teller	A-3	Suction Dredge	2000		Federal Land	0.0	0.0	1.0	0.0	1.0
Gold Run	Teller	A-3	Suction	2001		Federal	0.0	0.0	0.0	1.0	1.0

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
Ck			Dredge			Land					
Gold Run Ck	Teller	A-3	Suction Dredge	2002		Federal Land	0.0	0.0	1.0	0.0	1.0
Gold Run Ck	Teller	A-3	Suction Dredge	2004		Private Land	0.0	0.0	0.0	1.0	1.0
Gold Run Ck	Teller	A-3	Suction Dredge	1991	1999	Federal Land	0.0	0.0	1.0	0.0	1.0
Gold Run Ck	Teller	A-3	Mining/Let Intent	1998		Private Land	4.0	0.0	0.0	4.5	4.5
Tuksuk Channel	Teller	A-2	Exploration	1990		State Land	0.0	0.0	0.0	0.0	0.0

Abbreviations: Ck = creek; St = State; Fed = Federal; Pri = private; Let Intent = letter of intent; dst = disturbance; Rec Plan = reclamation plan; no entry in the Last Year column means operations only lasted for 1 year.

In reality the above listings represent only two separate locations. The multiple listings for Gold Run/Alder Creek are preserved to show different operators in different years. The limited mining that actually occurred, was by small scale suction dredging of the creek bottom. The second location, Tuksuk Channel is a tidally influenced channel between Imuruk Basin and Grantly Harbor, two inland lakes. The claimant was the same as on Gold Run Creek and presumably was using his suction dredge to assess placer gold potential of areas of this channel. According to the available records from 1998 through the 2002 mining season, a total of 6.5 acres of State lands were disturbed using small scale suction dredging methods. In the 1980s there was a medium scale placer mine operating on Eagle Creek, southwest of Teller. These records are not included in the APMA database but at least three shallow mining cuts were taken out along the creek, each in excess of 600 feet in length and up to 300 feet wide. Mining was by small dozer and scraper operations feeding a sluice box set on bedrock grade. These operations ceased in the late 1980s. Small scale wash plant mining operations followed up on historic dredge and scraper mining operations of the gold rush era around the northeast end of Grantley Harbor until the early 1980s.

2. Nome HLMP Area

As this HLMP is so heavily impacted by mining activity, it is split into two parts: the Nome East HLMP and the Nome West HLMP.

a. Nome East HLMP

The Nome HLMP covers a vast area of the southern Seward Peninsula and has received much attention by prospectors and miners beginning with the Nome Gold Rush at the turn of the 19th Century. An expansive system of roads and trails, supplemented in the early days by railroads, assisted the development of the largest number of mineral deposits in the planning area. There are only a couple of small, isolated tracts of unecumbered BLM lands scattered though the eastern edge (east of Council) of the Nome HLMP area. There is a large block of State-selected lands in the northwest corner of the area (the Kigluaik Mountains), but these selected lands contain only two significant known mineral occurrences. There are also large tracts of Native-selected lands: one particularly large block northeast of Nome and another block east of Solomon. The block east of Solomon contains three significant, known mineral deposits.

Table 3-23. Nome East HLMP Surface Disturbance Summary

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
L Willow Ck	Solomon	D-6	Mng/Expl/Let Intent	1991	1995	State Land	5.0	0.0	0.0	0.0	0.0
Eagle Ck	Solomon	D-6	Mining	1988		State Land	1.0	0.0	0.0	0.0	0.0
Eagle Ck	Solomon	D-6	Mining/Exploration	1989	1990	State Land	2.0	0.0	0.0	0.0	0.0
El Dorado Ck	Solomon	B-3	Mining/Exploration	1991		Private	5.0	0.0	0.0	0.0	0.0
Telegram Ck	Solomon	D-6	Mining/Let Intent	1992		State Land	1.0	0.0	0.0	0.0	0.0
Crooked Ck	Ben	B-4	Expl/Mining/Let Intent	1992	1999	State Land	10.0	1.0	0.0	0.0	1.0
Gold Bottom	Solomon	D-4	Mining/Exploration	1989		State Land	1.0	0.0	0.0	0.0	0.0
Iron Ck	Solomon	D-6	Mining/Exploration	1991		State Land	7.0	0.0	0.0	0.0	0.0
Iron Ck	Solomon	D-6	Mining/Exploration	1989	1990	State Land	4.0	0.0	0.0	0.0	0.0
Goose Ck	Solomon	D-5	Mining/Exploration	1989		State Land	3.0	0.0	0.0	0.0	0.0
Sunshine Ck	Solomon	D-5	Mining/Exploration	1989		State Land	3.0	0.0	0.0	0.0	0.0
Dome Ck	Solomon	D-6	Expl/Let Intent	1989	1993	Federal	10.0	0.0	0.0	0.0	0.0
Dome Ck	Solomon	B-6	Expl/Let Intent	1996		State Land	0.0	0.0	0.0	0.0	0.0
Dome Ck	Solomon	D-6	Expl/Let Intent	1993	1994	Federal	1.0	0.0	0.0	0.0	0.0
Dome Ck	Solomon	D-6	Mining/Exploration	1989	1991	State Land	11.0	0.0	0.0	0.0	0.0
Dome Ck	Solomon	D-6	Mining/Let Intent	1995	2001	State Land	10.0	4.8	0.0	0.0	4.8
Iron Ck	Solomon	D-6	Mng/Expl/Let Intent	1993	1996	State Land	10.0	0.0	0.0	0.0	0.0
N/A (Beach)	Solomon	C-4	Mng/Expl/Let Intent	1993		Private	4.0	0.0	0.0	0.0	0.0
Auburn Ck	Solomon	D-5	Mng/Expl/Let Intent	1993	2000	State Land	3.0	0.1	0.0	0.0	0.1
Daniels Ck	Solomon	C-4	Mining/Exploration	1991		Private	4.0	0.0	0.0	0.0	0.0
Albion Ck	Ben	A-4	Hrdrock Expl/Let Intent	1995	1998	State Land	4.0	1.0	0.0	0.0	1.0
None	Ben	A-5	Expl/Let Intent	1995	1997	State Land	1.0	0.0	0.0	0.0	0.0
Pilgrim River	Solomon	D-6	Hardrock Exploration	1996	2002	State Land	0.0	1.0	0.0	0.0	1.0
Crooked Ck	Ben	B-4	Hrdrock Expl/Let Intent	1996	1997	State Land	2.0	0.0	0.0	0.0	0.0
Boulder Ck	Solomon	D-5	Mining/Exploration	1997	2003	State Land	5.0	7.5	0.0	0.0	7.5
Goose Ck	Solomon	D-5	Mng/Expl/Let Intent	1997	2000	State Land	0.0	1.0	0.0	0.0	1.0
Slate Ck	Solomon	D-6	Expl/Let Intent	1997	1998	State Land	2.0	0.9	0.0	0.0	0.9
Little Willow Ck	Solomon	D-5	Expl/Let Intent	2000	2001	State Land	0.0	0.6	0.0	0.0	0.61
Solomon River	Solomon	C-5	Expl/Let Intent	1998		State Land	1.0	0.1	0.0	0.0	0.1

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
Lower Willow	Solomon	D-5	Expl/Let Intent	1998	1999	State Land	0.0	1.0	0.0	0.0	1.0
Canyon Ck	Solomon	D-5	Suction Dredge	2000	2002	State Land	0.0	1.0	0.0	0.0	1.0
Solomon River	Solomon	C-5	Expl/Reclamation	2000		Private Land	0.0	0.0	0.0	0.1	0.1
Solomon River	Solomon	C-5	Exploration	2001		Private	0.0	0.0	0.0	0.1	0.1
Sherrette Ck	Solomon	D-6	Exploration	2001	2004	State & Private	0.0	1.5	0.0	2.5	4.0
American Ck	Solomon	D-5	Expl/Let Intent	1989	1993	Federal Land	16.0	0.0	0.0	0.0	0.0
Norton Sound	Solomon	C-4	Suction Dredge	1998	2002	State Land	0.0	1.5	0.0	0.0	1.5
Norton Sound	Nome	C-2	Suction Dredge	1997		State Land	0.0	0.0	0.0	0.0	0.0

Abbreviations: Ck = creek; St = State; Fed = Federal; Pri = private; dst = disturbance; Ben = Bendeleben; Expl = exploration; Mng = mining; Let Intent = letter of intent; no entry in the Last Year column means operations only lasted for 1 year.

In the eastern part of the Nome HLMP area, 39 mining operations are listed from 1989 to present. Three of these operations represent suction dredging of offshore mining lease holdings. The overwhelming majority of the upland operations are located on State lands with only a couple on private (patented) lands. The six mining operations listed identified as being on Federal lands occurred in the early 1990s and represent mining activities on selected lands that were subsequently conveyed out of Federal ownership. In total 126 acres in the Eastern Nome HLMP were under permit for mining from 1989 through the 2004 mining season. Alaskan mining companies operating in the East Nome area include Quaterra Alaska Inc. on Pilgrim River, Alaska Eldorado Gold Company on Dome Creek, Goldstream Exploration, LLC on Little Willow Creek and the Solomon River, and Thurman Oil and Mining on the Solomon River. Teck Cominco American, Inc., an international mining corporation, conducted hard rock exploration activities on State land in Albion Creek, Crooked Creek, and Pilgrim River.

The most active mining area during the 1990s to present is the Iron Creek/Dome Creek drainage. Eight mining operations are listed with a total of 53 acres under permit. The largest operations (10 acres or more) were located on Crooked, Dome, Iron, and American creeks. These operations averaged less than two acres of disturbance per year of operation. Owner/operators were private individuals operating as a family business except for the activity on American Creek which was done under the auspices of the Gold Prospectors Association of America (GPAA). The GPAA also operated their business on private lands on Sherette Creek. The GPAA is a quasi mining business that offers vacation packages to persons interested in gold panning and prospecting.

Mining Activity Highlights

- In 1992 Cook Inlet Regional Native Corporation (NPMC) conducted mineral exploration of the Big Bar prospect in Bendeleben Mountains.
- In 1995, Bering Straits Native Corporation (BSNC) and Kennecott Exploration conducted mineral exploration activities on Native lands north of Nome. These locations had been previously explored by others from 1987 through 1992.
- Cominco American staked what they interpret as a high grade mesothermal quartz-carbonate-gold occurrence on State land in the Stewart River drainage.
- In 1996 Kennecott Exploration and BSNC conducted trenching on Native land around Mt. Distin.
- Thurman Oil and Mining drilled 52 holes for placer gold on patented mining claims at Dahl Creek.
- In 1997 Intercontinental Mining conducted 6,000 feet of core drilling at the Big Hurrah Mine. Exploration continued through 1997 along Mt. Aurora and Mt. Distin trends (State and Native lands).
- Kennecott Exploration interest in BSNC's lease properties at Mt. Distin, Fred, and Steep creeks and Energizer initiated in 1996 continued through 1998. Additional hard rock property targets included Bulk Gold (23 miles north of Nome), Wild Bunch (Candle), and Think Zinc (54 miles northeast of Nome) properties.
- In 2000 exploration activity continued at Mt. Distin and vicinity.
- The year 2002 brought a drop in exploration interests in the area. Quaterra dropped their interest in the Think Zinc, Sinuk River, and Rocky Mountain Creek properties, retaining Big Bar in the Bendeleben Mountains (State or Native lands).
- In 2003 the ADGGS released maps of their geophysical surveys in Council Area. Altar Resources explored areas north of Nome and in the Council area and through a joint venture with BSNC explored mineral potential along Ophir Creek.

b. Nome West HLMP

Over a 16-year period (1989-2004) mining and mineral exploration for placer and hard rock minerals has occurred on 31 creek drainages involving a total of approximately 1,621 acres of surface disturbance within the Nome West HLMP. Hard rock exploration has occurred in at least six locations in this area involving 22.5 acres of surface disturbance primarily on private and State lands. Major mining companies involved in this work include Teck Cominco American, Consolidated Aston Resources, Ltd., Tenneco Corp, Aspen Exploration, Resource Technologies Group, Nova Natural Resources Corp, Alaska Gold Company, and Rio Fortuna Exploration Corp. By land ownership the surface disturbance acreage breaks down into 58.4 acres on State lands, 29 acres on Federal land (unpatented Federal mining claims) and 1,533.6 acres on private lands (patented mining claims and conveyed Native lands). Hard rock exploration here has expanded beyond the surface geochemical sampling and geophysical surveys. Systematic trenching, reverse circulation, and core drilling are being used to outline mineralized zones, drill geophysical targets, and collect large samples for metallurgical testing. Three of these operations have filed multiyear APMAs, one of which extends out through the 2008 mining season.

The individual miner and family owned business mining operation is present here, as in other areas but provides a background to the large operations of the Alaska Gold Company. Two medium size bucket-line dredges have been in operation annually from 1989 to 1997. Dredging near the Nome airport on Submarine Beach resulted in the disturbance of 156 acres between 1989 and 1994. A second medium size bucket-line dredge, also operated by Alaska Gold Company on Third Beach just east of Beltz, has disturbed 130 acres between 1989 and 1997. Beginning in 1992 the Alaska Gold Company began phasing out its dredging operations and switched over to more conventional open pit, drilling, and blasting operations on Center Creek along the northwest edge of Nome. By 1999, the last year of operation, approximately 303 acres of private land (patented mining claims) were disturbed and reclaimed. The other major placer gold mining operation that operated on lands under lease from the Alaska Gold Company just north of Beltz at the foot of Anvil Mountain, disturbed and reclaimed 255 acres during 1989 through 1991. This operation stripped overburden mechanically and used excavators to load 255 ton haul pack trucks to load pay into a stationary wash plant. Another operation preceded Tanner's operation, using scrapers to mechanically strip and haul pay gravels to their stationary wash plant. It had a similarly sized footprint and was located adjacent to Tanner's excavations. Since these operations occurred before 1989, they are not incluced in the APMA database.

Table 3-24. Nome West HLMP Surface Disturbance Summary

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
Mt Distin	Nome	D-1	Expl/Let Intent	1999	2000	State/Private	0.0	4.8	0.0	0.0	4.8
Anvil Ck	Nome	C-1	Mng/Expl/Rec Plan	2000		Private Land	4.0	0.0	0.0	16.5	16.5
Anvil Ck	Nome	C-1	Mining/Rec Plan	2000		Private Land	14.0	0.0	0.0	14.6	14.6
Tripple Ck	Nome	C-1	Mining/Rec Plan	2000		Private Land	9.0	0.0	0.0	28.0	28.0
Cripple River	Nome	C-2	Suction Dredge	2000		Private Land	3.0	0.0	0.0	5.1	5.1
Divide Ck	Nome	D-1	Expl/Let Intent	1999	2001	State Land	1.0	4.0	0.0	0.0	4.0
Osborne Ck	Nome	C-1	Expl/Let Intent	1999	2000	Federal	0.0	0.0	3.1	0.0	3.1
Anvil Ck	Nome	C-1	Mining/Exploration	2001		Private Land	10.00	11.0	0.0	12.0	23.0
Anvil Ck	Nome	C-1	Mng/Expl/Rec Plan	2001		Private Land	4.0	0.0	0.0	17.5	17.5
Tripple Ck	Nome	C-1	Mining/Rec Plan	2001		Private Land	6.0	0.0	0.0	19.0	19.0
Divide Ck	Nome	D-1	Expl/Let Intent	1999	2001	State Land	1.0	4.0	0.0	0.0	4.0
Cripple River	Nome	C-2	Suction Dredge	2001		Private Land	5.0	0.0	0.0	18.0	6.0
None	Nome	C-1	Mining/Rec Plan	2001	2001	Private Land	9.0	0.0	0.0	9.0	9.0
Anvil Ck	Nome	C-1	Mng/Expl/Rec Plan	1999	2002	Private Land	10.0	1.5	0.0	20.4	21.9
Rocky Mtn Ck	Nome	D-1	Hardrock Exploration	2002		State Land	5.00	5.0	0.0	0.0	5.0
Divide Ck	Nome	D-1	Hardrock Exploration	2002		State Land	0.0	2.0	0.0	0.0	2.0
Dry Ck	Nome	C-1	Mng/Expl/Rec Plan	2002		Private Land	9.0	11.0	0.0	16.0	27.0
Glacier Ck	Nome	C-1	Mining/Let Intent	2002	2006	Private Land	11.0	3.0	0.0	15.8	18.8
Anvil Ck	Nome	C-1	Mng/Expl/Rec Plan	2003		Private Land	3.0	0.0	0.0	10.4	10.4
Cripple River	Nome	C-2	Mining/Rec Plan	2003		Private Land	1.0	0.0	0.0	4.5	4.5
Divide Ck	Nome	D-1	Hardrock Exploration	2003		State Land	0.0	0.5	0.0	0.0	0.5
Snake River	Nome	C-1	Hardrock Exploration	1999	2005	State/Private	0.0	3.8	4.0	0.0	7.8
Clara Ck	Nome	D-1	Expl/Let Intent	2002	2007	State/Private	17.0	8.0	0.0	14.3	22.3
Cripple River	Nome	C-2	Mining/Rec Plan	2004		Private Land	1.0	0.0	0.0	4.5	4.5
Snake River	Nome	C-1	Expl/Let Intent	1999	*	Private Land	1.0	0.0	0.0	1.0	1.0
Anvil Ck	Nome	C-1	Mining/Exploration	1989	1991	Private Land	20.0	0.0	0.0	0.0	0.0
Submarine Beach	Nome	C-1	Mining/Rec Plan	1989	1994	Private Land	55.0	0.0	0.0	0.0	0.0
Third Beach	Nome	C-1	Mining/Rec Plan	1989	1997	Private Land	130.0	0.0	0.0	0.0	0.0
Little Rocker	Nome	C-1	Mining/Let Intent	1989	1992	Federal & Private Land	2.0	0.0	0.0	0.0	0.0

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
Dry Ck	Nome	C-1	Exploration	1991		Private Land	1.0	0.0	0.0	0.0	0.0
Snake River	Nome	D-1	Expl/Let Intent	1991	2000	State/Private	8.0	3.6	0.0	6.0	9.6
Anvil Ck	Nome	C-2	Mining/Rec Plan	1992	1994	Private Land	18.0	0.0	0.0	0.0	0.0
Rock Ck	Nome	C-2	Mining/Rec Plan	1992	1993	Private Land	7.00	0.0	0.0	0.0	0.0
Oregon Ck	Nome	C-2	Mng/Expl/Let Intent	1992	1996	Private Land	12.0	0.0	0.0	0.0	0.0
Center Ck	Nome	C-1	Mining/Rec Plan	1992	1997	Private Land	210.0	0.0	0.0	0.0	0.0
Dexter Ck	Nome	B-1	Mining/Let Intent	1992	1999	Private Land	27.0	0.0	0.0	8.1	8.1
Anvil Ck	Nome	C-1	Mng/Expl/Rec Plan	1992	1999	Private Land	36.0	0.0	0.0	32.5	32.5
Speciman Glch	Nome	C-1	Mining	1989	1990	Private Land	40.0	0.0	0.0	0.0	0.0
Specimen Glch	Circle	C-1	Mining/Rec Plan	1989	1999	Private Land	85.0	0.0	0.0	23.0	23.0
Clara Ck	Nome	D-1	Exploration	1989	1990	State Land	2.0	0.0	0.0	0.0	0.0
Basin Ck	Nome	C-1	Mining/Let Intent	1989	1997	Private Land	10.0	0.0	0.0	0.0	0.0
Buster Ck	Nome	C-1	Mining	1989	1991	Private Land	3.0	0.0	0.0	0.0	0.0
Daniels Ck	Solomon	C-4	Mining/Exploration	1991		Private Land	2.0	0.0	0.0	0.0	0.0
Tripple Ck	Nome	C-1	Mng/Expl/Rec Plan	1993	1998	Private Land	65.0	0.0	0.0	108.0	108.0
Hastings Ck	Nome	B-1	Mng/Expl/Let Intent	1990	1994	Private Land	4.0	0.0	0.0	0.0	0.0
Rock Ck	Nome	C-1	Expl/Let Intent	1990	1994	Private Land	2.0	0.0	0.0	0.0	0.0
Cripple River	Nome	C-2	Suction Dredge	1990	1999	Private Land	23.0	0.0	0.0	6.5	6.5
Divide Ck	Nome	D-1	Expl/Let Intent	1995	2001	State Land	5.0	5.0	0.0	0.0	5.0
Ashland Ck	Nome	C-2	Expl/Let Intent	1995	1998	Private Land	0.0	0.0	0.0	0.2	0.2
Dry Ck	Nome	C-1	Mng/Expl/Rec Plan	1996	1999	Private Land	66.0	0.0	0.0	147.0	147.0
Sinrock River	Nome	D-2	Expl/Let Intent	1996	1997	State Land	2.0	0.0	0.0	0.0	0.0
Submarine Beach	Nome	C-1	Reclamation Plan	1996	1998	Private Land	105.0	0.0	0.0	0.0	0.0
Washington Ck	Nome	C-1	Expl/Let Intent	1998	1999	Federal	1.0	0.0	3.3	0.0	3.3
Osborne Ck	Nome	C-1	Expl/Let Intent	1997	1999	Federal	3.0	0.0	7.1	0.0	7.1
American Ck	Nome	D-2	Mining/Let Intent	1997		State Land	1.0	0.0	0.0	0.0	0.0
Center Ck	Nome	C-1	Mining/Rec Plan	1999	2001	Private Land	93.0	0.0	0.0	92.5	92.5

Abbreviations: Ck = creek; St = State; Fed = Federal; Pri = private; dst = disturbance; Ck = creek; Glch = gulch; Mng = mining; Expl = exploration; Rec Plan = reclamation plan; Let Intent = letter of intent; no entry in the Last Year column means operations only lasted for 1 year.

Between 1989 and present 57 operations were permitted within the Nome West HLMP area, accounting for approximately 1,189 acres. By far the largest operation, an open pit placer mine operated by Alaska Gold Company on their private lands on Center Creek mined 210 acres from 1992 through 1997 using drill and blast techniques. The second largest mining operation, also Alaska Gold Company, mined 130 acres of ground along Third Beach, on patented mining claims. This was accomplished by bucket-line dredge operating seasonally from 1989 through 1997. The third largest mining operation, again Alaska Gold Company mined 105 acres between 1996 and 1998 on Submarine Beach using drill and blast open pit mining methods. In addition there were nine other placer mining operations that mined between 14 and 85 acres each. These were located on Anvil Creek, Specimen Gulch, Tripple River, Dry Creek, and Cripple River. All of these large operations were on the coastal plain or river drainages flowing across the plain, and were located on private, patented mining claims.

The second largest center of activity was on Rock Creek, a tributary to the Snake River in the foothills behind the Nome Coastal Plain. Exploration and development of hard rock resources was carried out by a combination of BSNC, Addwest Minerals Inc., Tenneco Mining Corporation, and Aspen Exploration Corporation. This development is taking place largely on private (patented mining claims and Native lands) lands and some Federal claims on selected lands. At the time of this writing, the operator on this property, NovaGold Resources Inc., the successor in interest to the Alaska Gold Company, plans to bring this hard rock property into production in 2007.

Continuing up the Snake River from Rock Creek on Mt. Brynltsen are the active hard rock exploration operations of Hawley Resource Group, Inc., Consolidated Aston Resources, Ltd., and Kennecott Exploration Company on Mount Distin. These lands are owned by the State and BSNC as are the lands just to the north of this location on Divide Creek which are being explored for their hard rock potential by Teck Cominco American, Inc. and Rio Fortuna Exploration Company. Quaterra Alaska, Inc. continued hard rock exploration on State lands of Rocky Mountain Creek between 1994 and 2000.

The remainder of the mining permits in this area went to individual miners mining placer gold resources on largely private lands from historic mining locations that have continued to produce for over a century of mining activity. Perhaps the most visible and typical of these operations was Steve Pomeranke's State mining operations on Tripple Creek where mining cuts were opened to aggregate 20 acres of now reclaimed surface disturbance between 1993 and 2001. The only Federal mining operations in the area are on Washington and Osborne creeks. These involved exploration and prospecting from 1997 through 2000 with a dozer and backhoe feeding a mobile test plant for purposed of mineral patenting.

Of passing interest and significant local economic importance are the numerous off shore suction dredge mining operations. Particularly since the State has set aside an area of offshore mineralized lands for recreational dredging opportunities, the few hardscrabble tents pitched on the Nome Beach east of the seawall has developed into a significant, seasonal enterprise. Some 29 operators on both offshore mining lease holdings and within the designated recreational dredging area off the East End of Nome have received permits for offshore dredging from 1997 through 2004. Now instead of the two to three camps with individuals shoveling sand into rocker boxes or sluices connected to small water pumps, its common to see three to four bright yellow suction dredges with underwater divers floating off shore on calmer days.

Exploration, development, and medium to large scale placer mining occurred throughout this geographic area mainly due to access development by the gold rush era miners. Proximity to tidewater and developed port facilities made it easy to import large scale mining equipment, trucks, and Euclid scrapers. The availability of unmined, patented mining holdings of the USSR&M Mining Company (also known as the Alaska Gold Company and now NovaGold Resources Inc.) and their willingness to negotiate reasonable lease mining agreements encouraged additional mining. The Alaska Gold Company operated two large scale bucket-line dredges into the early 1990s before going to year around open pit, drill, and blast operations. These mining operations ceased in the late 1990s as interest in lode gold prospects on patented holdings of the Alaska Gold Company grew. It is now expected that NovaGold Resources Inc. will put its Rock Creek Property in production in 2007-2008.

Two future developments that look promising are the Rock Creek deposit being developed by NovaGold Reources Inc. and Mt. Distin being explored by Kennecott Exploration/BSNC. These mineral properties are located on State lands and State/Native lands respectively.

Mining Activity Highlights

- In 1989, West Gold, in preparation for commencing offshore bucket-line dredging operations (the Bima), conducted offshore design and environmental studies. The Alaska Gold Company continued its thaw field drilling to develop reserves ahead of Dredges 5 and 6. BSNC and Kennecott Exploration conducted lode tin exploration activities at Cape Mountain, Potato Mountain, Brooks Mountain, Lost River, and Black Mountain. Exploration of the gold veins at Rock Creek and Mt. Distin was carried out.
- In 1989, exploration drilling and trenching continued in the Rock Creek and Sophie Gulch locations. Placer Dome/Golden Creek's Joint Venture conducted intensive exploration of the mesothermal gold occurrence in this area by doing additional core drilling to bring the total to 60,000 feet of core drill since 1987. In addition bulk sampling of the gold-quartz veins of Rock Creek was taken for metallurgical testing. Published results of this testing indicated a 92% recovery free milling with grinding/floatation. Lost River Mining conducted exploration rotary drilling for placer gold and tungsten on Anvil and Tripple creeks.
- Tenneco Inc. conducted geochemical exploration activities in 1990 putting in a soil grid at Rock Creek on State and patented mining claims. At the end of the season Tenneco withdrew from the property. The Alaska Gold Company continued its development thaw field drilling in front of its dredges on patented mining claims and continued dredging with its bucket line dredges. BHP-Utah International continued its Mt. Distin core drilling and geochemical sampling programs. BSNC began actively advertising opportunities for joint venture partners with local corporations interested in exploring for rare earth minerals and gold. The Bima offshore bucket-line dredge permanently suspended its operations at the end of the 1990 season.
- During the 1991 season Aspen Exploration ran test mining trials at the Rock Creek-Sophie Gulch property. Anvil and Windfall Mining placer mining operations on private land near Beltz (leased from Alaska Gold Co.) ceased.
- In 1992, BSNC announced that at its Mt. Distin property the gold values are thrust fault controlled gold and reduced its State holdings. It was announced that Alaska Gold Co. plans to make this the last season of bucket-line dredging and would begin year round open cut mining the next season.
- In 1993, Kennecott Exploration with BSNC and Hawley Resource Group discover a gold-polymetallic prospect they call Twin Mountain located just west of Snake River on State

land. Alaska Gold Co. dredge operation with a single dredge continues, and open cut preparation begins at the expense of no thaw field expansion.

- The geophysical maps produced in 1994 by the ADGGS airborne geophysical surveys done in 1993 spark interest in the Snake River drainage. Teck Cominco American conducts active mineral exploration on what is considered a massive sulfide deposit on Rocky Mountain Creek. On-Line Exploration conducted mapping and sampling activities of the industrial mineral, graphite, as it occurs on the Federal mining claims of N.B. Tweet and Sons Dredging occurrences. Lost River Mining and Steve Pomeranke continue trenching and sampling Tripple Creek. Alaska Gold Co. continues stripping for open cut mining. Alaska Gold Company's Dredge 6 was mothballed in 1994 and 1995 will be Dredge 5's last year of operations. Dan Walsh opened a mining cut on the bench placers of Dexter Creek and Bert Pettigrew continued mining on Anvil Creek.
- In 1995, Alaska Gold Co. used open pit mining as their sole mining method. Drilling and blasting and stripping overburden and stockpiling pay gravels that occurred over winter changes over to sluicing stockpiled pay in the summer. AGC's bucket-line dredges are mothballed. At Rock Creek drilling, trenching, and ground geophysical surveys continued. The mineral exploration activities of Kennecott Exploration and BSNC at their Aurora Creek property continued. This property is identified as a lead, zinc, barite, gold massive sulfide occurrence.
- In 1996, Alaska Gold Co. conducted a reverse circulation drilling program to develop resources for its open pit mine just outside the Nome town site. Nova Natural Resources Corp. conducts sub sea dredging operations offshore of Nome. Lost River Mining Corp. continues mining placer gold on Tripple Creek.
- In 1999, NovaGold Reources Inc. and Kennecott Exploration conducted a drilling program on Anvil Creek and later in the season announced that it has developed a two million ounce placer gold deposit on patented claims.
- In 2000, NovaGold Resources Inc. at their Rock Creek property conducted bench and pilot scale metallurgical testing. Mineral exploration activities for lode gold mineralization continued on BSNC lands in the Nome area.
- In 2002, NovaGold Resources Inc. announced their decision to bring Rock Creek to production within the next three years. Pre-production work by NovaGold Resources Inc. in 2003 consisted of 36,000 feet of infill drilling and they are proceeding with the feasibility study to bring Rock Creek into production.

(c) Eastern Seward Peninsula Region

Older basement rocks in the area are largely covered by Cenozoic sedimentary and sub-aerially erupted volcanic rocks. Older basement rocks consist of upper Paleozoic and Mesozoic marine sediments and mafic volcanics intruded by Cretaceous intermediate to felsic intrusives. High Locatable Mineral Potential Areas within this region include: Darby Mountains and Western Alaska.

1. Darby Mountains HLMP Area

This HLMP area contains only small isolated tracts of unencumbered BLM land in the northwest and northeast corners of the area and a thin edge along the east central edge. No known, significant mineral deposits occur on these BLM lands. The bulk of the area, the northern Darby Mountains and eastern Bendeleben Mountains, is State-selected.

Over a 13-year period (1989 through 2001) mining and mineral exploration, principally for placer gold, occurred over a total of 22.8 acres. By land ownership this acreage breaks down into 16

acres on unpatented Federal placer mining claims on State-selected lands plus two acres of State land, and 4.8 acres of State land. The 18 acres on the Tubutulik River were mined by an individual for placer gold on mixed Federal and State claims between 1989 and 1993. The 4.8 acres of State land was prospected for hard rock minerals by Greatland Exploration. No applications have been filed in recent years.

Table 3-25. Darby Mountains HLMP Surface Disturbance Summary

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
S.Fork Omilak	Ben	A2	Hardrock Expl	1997	2001	State Land	0.0	2.0	0.0	0.0	2.0
Tubutulik River	Sol	D1	Mining/Expl/ Rec Plan	1989	1993	Federal & State Land	13.0	0.0	0.0	0.0	0.0

Abbreviations: Ck = creek; St = State; Fed = Federal; Pri = private; Dst = disturbance; Ben = Bendeleben; Sol = Solomon; Expl = exploration; Rec Plan = reclamation plan.

Mining interest here is primarily exploration. The GPAA accounts for much of the interest with recreational mining on patented holdings around Omalik Mine (a lead-silver lode) and associated gold placer values of associated mineralization. Greatland Exploration Ltd. staked a large claim block north of the Omalik Mine for molybdenum and rare earth interests in the Darby Mountains south of Omalik which encouraged prospectors for a time.

Mining Activity Highlights

- In 2002 Greatland Exploration Ltd. conducts mineral exploration of the Omalik Mine property.

2. Western Alaska HLMP Area

The bulk of this HLMP area is patented and tentatively approved State lands with the northern and southern points conveyed Native lands. The BLM retains only a couple townships north of Koyuk and east of Haycock. No known, significant mineral deposits are located on these BLM lands.

Over a 16-year period (1989-2004) mining and mineral exploration, principally for placer gold has occurred over a total acreage of 559.5 acres. By land ownership this acreage breaks down into 119.5 acres on Federal land (unpatented Federal placer mining claims), 291.0 acres on State land and 149.0 acres on private (patented mining claims) land. Most of the mining has been done by private individuals and small family businesses. Acreage numbers represent placer gold mining and exploration as hard rock exploration applications listed no surface disturbance. Hard rock exploration for nickel, platinum and other platinum group elements (PGE) was recently conducted on the Peace River by an out-of-state consortium, Pt-PD Corporation. Hard rock exploration also was conducted by NANA Regional Corporation in conjunction with Kennecott Exploration on Virginia Creek presumably to evaluate mineral potential of Native-selected lands.

Table 3-26. Eastern Seward Peninsula/Western Alaska HLMP Surface Disturbance Summary

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
Bear Ck	Candle	C-5	Mining/Rec Plan	1989	1992	State & Federal	47.0	0.0	0.0	0.0	0.0
Bear Ck	Candle	C-5	Reclamation Plan	1989	1998	State & Federal	107.0	7.5	0.0	0.0	7.5
Candle Ck	Ben	D-1	Mining/Let Intent	1989	1993	State Land	3.0	0.0	0.0	0.0	0.0
Candle Ck	Ben	D-1	Mining/Rec Plan	1989	2003	Federal & Private	47.0	5.0	0.0	13.5	18.5
Candle Ck	Ben	D-1	Expl/Let Intent	1993	1994	State & Private	1.0	0.0	0.0	0.0	0.0
Candle Ck	Candle	D-6	Mng/Expl/Let Intent	1989	2000	Private	38.0	0.0	0.0	10.2	10.2
Candle Ck	Candle	D-6	Expl/Let Intent	1996		State Land	1.0	0.0	0.0	0.0	0.0
Candle Ck	Ben	D-1	Mining/Rec Plan	1997	1999	Private	10.0	0.0	0.0	4.0	4.0
Candle Ck	Candle	D-6	Mining/Let Intent	1989	2003	Private	16.0	0.0	0.0	4.3	4.3
Cub Ck	Candle	C-5	Mining/Rec Plan	1995	1998	State Land	63.0	0.0	0.0	0.0	0.0
Glacier Ck	Ben	C-1	Mng/Expl/Let Intent	2000	2001	State Land	4.0	8.0	0.0	0.0	8.0
Glacier Ck	Ben	C-1	Mng/Expl/Rec Plan	1994	2001	State Land	12.0	4.0	0.0	0.0	4.0
Gold Run Ck	Ben	C-1	Mining/Rec Plan	1993	2004	State Land	31.0	13.4	0.0	0.0	13.4
Jump Ck	Ben	D-1	Exploration	1990		Federal	4.0	0.0	0.0	0.0	0.0
Jump Ck	Ben	D-1	Expl/Let Intent	1993	1995	State Land	4.0	0.0	0.0	0.0	0.0
Kiwalik River	Candle	D-6	Min/Recl Plan	1989	1993	State & Federal	54.0	0.0	0.0	0.0	0.0
Kugruk River	Ben	C-1	Expl/Let Intent	1992	1994	State & Federal	2.0	0.0	0.0	0.0	0.0
Kugruk River	Ben	C-1	Expl/Let Intent	1994		State Land	1.0	0.0	0.0	0.0	0.0
Lime Ck	Ben	C-1	Expl/Let Intent	1995		State & Federal	1.0	0.0	0.0	0.0	0.0
Limestone Ck	Ben	D-1	Mng/Expl/Let Intent	1992		State Land	1.0	0.0	0.0	0.0	0.0
Mud Ck	Candle	D-6	Mining/Let Intent	1989	2004	State Land	20.0	23.5	0.0	0.0	23.5
Peace River	Candle	A-5	Expl/Reclamation	2001	2005	State & Federal	0.0	1.0	0.0	0.0	1.0
Quartz Ck	Candle	B-5	Mng/Expl/Rec Plan	1992	1993	State Land	8.0	0.0	0.0	0.0	0.0
Sweepstakes Ck	Candle	B-5	Mining	1989	1990	State Land	14.0	0.0	0.0	0.0	0.0
Sweepstakes Ck	Candle	B-5	Mining	1989		State Land	20.0	0.0	0.0	0.0	0.0

Abbreviations: Ck = creek; St = State; Fed = Federal; Pri = private; Dst = disturbance; Ben = Bendeleben; Mng = mining; Expl = exploration; Rec Plan = reclamation plan; Let Intent = letter of intent; no entry in the Last Year column means operations only lasted for 1 year.

Mining resumed on placer gold properties opened during gold rush times and were facilitated by the availability of patented mining ground. The Kugruk River south of Chicago Creek was very busy in the mid 1980s fueled by the enormous jump in the price of gold in 1980. On these State lands the regulatory environment was quite favorable and access trails and airstrips developed in the early days facilitated access to these properties from both Candle and Deering. The more-than-5,000 foot Granite Mountain airstrip constructed by the military for its White Alice Site and surplus of the earth moving construction equipment encouraged development and mining of historic mines in the area. Very recently the Haycock area, long known for its placer platinum shows along with the placer gold has attracted the interest of mining companies looking for platinum and PGE minerals.

Mining Activity Highlights

- In 1989, BHP-Utah International conducts geochemical exploration (soil grids) of its Kelly Creek Property. In advance of planned placer mining operations, access trails and equipment pads are put in from Candle to Mud Creek and the Kiwalik Flats.
- In 1990, the Berg/Wetelsen partnership, owners of the Independence Mine, conduct core drilling, geochemical, and geophysical surveys on the property.
- The 1991 season is the third and final year of operations of the Kiwalik Flats placer gold mining operation near Candle.
- Mining operations on the Candle Bench patented mining claims continues as does mining on Mud Creek initiated in 1989.
- In 1992, NANA Regional Corporation in partnership with Kennecott Exploration targets exploration of polymetallic mineral occurrences on its lands in the Candle area and the Imnachuk River area to the west.
- Overburden stripping and development churn drilling is conducted in the vicinity of the Independence Mine on the upper Kugruk River, on Lime Creek tributary to Candle Creek, and on patented claims on Candle Creek itself.
- The year 1992 was noted for its abnormally short mining season and disappointing production levels for mining operations on Candle and Mud creeks.
- In 1993 the Berg/Wetelsen partnership conducts rotary drilling for placer gold development at Candle.
- In 1994, Kennecott Exploration continues its hard rock exploration activities out of Candle on BSNC land.
- Hard rock mineral exploration in 1998 targets the Bulk Gold (23 miles north of Nome), Wild Bunch (Candle) and Think Zinc (54 miles northeast of Nome) properties.
- At the southern end of the HLMP Pt-Pd Exploration Co. conducted geochemical exploration with a track mounted soil auger in the Dime Creek area, continued from 2000.

(d) Eastern Norton Sound Region

This lithotectonic terrane consists of upper Jurassic to upper Cretaceous andesitic volcanic and volcaniclastic rocks which are interpreted as representing an island arc type assemblage formed on an overriding plate of a subduction zone operating outboard of the stable North American continental margin. The Eastern Norton Sound Region includes the Shaktoolik HLMP area.

1. Shaktoolik HLMP Area

BLM-managed lands here surround the upper Ungalik River corridor (State- and Native-selected). Two significant, known mineral occurrences lie along the lower Ungalik River.

From 1989 through 1993 a small, two cubic foot steel hulled stacker bucket-line dredge operated on the lower Ungalik River. These Federal mining claims are located on conveyed Native lands and were segregated from conveyance by the filing of a mineral patent application. Total surface disturbance for these 56 claims segregated by the application for the five years of APMA filings amounts to 13 acres. The dredge most likely did not even operate during these years and the same acreage was filed for each year. The dredge was not observed to have moved from its location until approximately five years ago when the Ungalik River eroded the berm of the dredge pond, flooded the pond and sank the dredge. The mining camp is located on patented placer mining claims and access is by air to a short strip leveled in the dredge tailings of the Ungalik River adjacent to the 1950s or earlier era mining camp. Of the 56 original claims in the patent application nearly half of them were lost when the applicant tried to amend the locations after the lands were withdrawn by selection of these lands by Alaska Natives. The applicant reconsidered that these staked as placer claims were actually on lode gold mineralization (a residual deposit at least). Interest in pursuing the application waned and the applicant was not able to follow through with the application.

Table 3-27. Shaktoolik HLMP Surface Disturbance Summary

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
Ungalik River	Norton Bay	C-4	Mining/Let Intent	1989	1993	Federal Land	13.0	0.0	0.0	0.0	0.0

Abbreviations: St = State; Fed = Federal; Pri = private; dst = disturbance; Let Intent = letter of intent.

Small scale bucket-line dredge mining on the lower Ungalik River ceased in the late 1970s due to aging of the dredgemaster and declining interest of individuals of the family business though patented upland properties contain encouraging residual lode gold values.

Mining Activity Highlights

- In 1991, the Bliss bucket-line dredge was reported as not operational, its last operations being in 1987 or 1988.

(e) Upper Kobuk River Region

As subduction continued outboard of the stable North American continental margin basalt, gabbro, and oceanic sediments (Angayucham) were thrust on the Koyukuk-Yukon Terrane. This mid-Cretaceous collisional event eventually closed the intervening sea between the Arctic Alaska and Koyukuk Yukon Terranes metamorphosing these basalts, gabbros, and oceanic sediments to greenstone facies and elevating them to the highest structural unit of the Brooks Range.

Mississippian age ophiolites are comprised of mafic to ultra-mafic assemblages of pillow basalt, chert, diabase, and gabbro locally interbedded with clastic marine sediments.

Relatively unmetamorphosed Paleozoic marine sediments are exposed in the near surface along a thrust fault which delineates the northern front of the Brooks Range and extends to the Chuckchi Sea just north of Kivilina. The Upper Kobuk River Region includes the Ambler high locatable mineral potential areas.

1. Ambler HLMP Area

Over a 16 year period (1989 through 2004) mining and mineral exploration, principally for placer nephrite jade, occurred over a total of 12 acres. This acreage breaks down into 10.3 acres on Federal land (Federal mining claims on Native-selected lands), one acre on State lands and 0.3 acres on private lands. The 10 acres of mining/exploration which occurred in 1989 under an application filed for NANA Regional Corporation on Dahl and Promise creeks was for the purpose of evaluating the nephrite jade potential of Federal mining claims under mineral patent application of Stewarts Jade Company. The Federal claims under this patent application were subsequently sold to NANA Regional Corporation and reverted to private Native land. The remaining 2 acres of disturbance: 1.0 Federal, 0.7 State, and 0.3 private (Native) resulted from exploration for hard rock mineral potential in the Ambler River drainage uplands by Kennecott Exploration.

Table 3-28. Ambler HLMP Surface Disturbance Summary

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	TOT Acre	ST DST	FED DST	PRI DST	TOT DST
Ambler R	Ambler R	A1	Expl/Let Intent	1998	2003	State Land	0.0	1.0	0.0	0.0	1.0
Dahl Ck	Shungnak	D2	Mining	1989	1990	Federal Land	10.0	0.0	0.0	0.0	0.0
Promise Ck	Ambler R	A3	Mining/Expl	1990		Federal Land	0.0	0.0	0.0	0.0	0.0
Sub Arctic Ck	Ambler R	A1	Exploration	2004		State/Fed/ Private Land	1.0	0.0	0.7	0.3	1.0

Abbreviations: St = State; Fed = Federal; Pri = private; Dst = disturbance; R = River; Ck = creek; Expl = exploration; Let Intent = letter of intent; no entry in the Last Year column means operations only lasted for 1 year.

Placer gold was mined from the streams of the Cosmos Hills though the main interest of the small mineral was in the nephrite jade boulders to be found in the alluvial deposits of these same streams. Kennecott Exploration's development of the Bornite property which was subsequently patented was stunted by catastrophic shaft flooding by artesian waters. Once this technical problem was solved, the economics and interests of Kennecott Exploration had changed. The surrounding lands changed to Native ownership. The new landowner has bought out surface and underground interests in the property and is presumably holding them for future development into an economic base for its Alaska Native population. Lack of access either to tidewater (which is difficult geography to negotiate) or to the haul road (stymied by land ownership patterns and political interests) is a major disincentive.

Mining Activity Highlights

- During the 1989 season Stewarts Jade Company carried out an exploration program to evaluate the placer gold potential in the Dahl/Promise creeks area. NANA Regional Corporation, which owns the Empire Jade Mine at Jade Mountain, acquired Stewart Jade holdings at Dahl and Promise creeks.
- In 1990, Teck Cominco American conducted core drilling at the Smucker and Sun properties located in the Baird Mountains north of Bornite.
- In 1991, mineral exploration companies concentrated their efforts in the Ambler Mineral Belt and in historic placer mining areas there as well as the Noatak lead-zinc province southwest of the Red Dog Mine. NANA Regional Corporation is active in lead/zinc/silver/gold exploration in the Ambler District as well as the Candle-Imnachuk River district to the southwest. Mineral exploration in the Ambler Mineral Belt caused renewed interest in the Bornite deposit and the volcanogenic massive sulfides occurrences Arctic, Sun, and Smucker north of the Cosmos Hills as well as the Omar-Frost VMS occurrence north of Kiana.
- Geophysical surveys are conducted in 1995 by Kennecott Exploration across the Ambler Copper belt and at Bornite in particular.
- In 1996, Kennecott Exploration continued its geophysical survey work of the Ambler copper belt and also the Candle area with airborne geophysical surveys.
- In 1997, Kennecott Exploration with NANA Regional Corporation completed 5,000 feet of core drilling at Bornite. Kennecott Exploration continued its exploration work for NANA Regional Corporation in the Ambler copper belt. This work is continued for the 1998 mining season focusing on Bornite and the Arctic deposit as well as in the Red Dog Mine area to the northwest.

(f) Kallarchuk Hills Region

The Kallarchuk Hills, part of the Baird Mountains physiographic terrane, are composed of Paleozoic schist, quartzite, and limestone in an anticlinorial structure. The Kallarchuk Hills Region includes one high locatable mineral potential area, Omar-Kiana.

1. Omar-Kiana HLMP Area

Much of the lands within the area are State-selected and BLM retains lands along the Omar River, a tributary of the Squirrel River. There are no known, significant mineral deposits on BLM land. Significant mineral deposits are mapped along Klery Creek, the next tributary to the Squirrel River east of the Omar.

Though not listed in the APMA database, placer mining on Kleary Creek did occur in the late 1980s at the confluence of Jack Creek and at a location between Jack and Rocky creeks. Surface disturbance related to these mining activities totaled nearly 17 acres. A third area of placer mining occurred on Weise Creek, a tributary to Timber Creek and just over the drainage divide from the headwaters of Klery Creek.

Table 3-29. Omar-Kiana HLMP Surface Disturbance Summary

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
Wiese Creek	Baird Mtns	B-3	Mining Exploration/Let Intent	1989	1997	Federal Land	7.0	0.0	0.0	0.0	0.0

Abbreviations: St = State; Fed = Federal; Pri = private; Let Intent = letter of intent.

Placer gold occurrences in this area, characterized by the developed mining activities on Klery Creek are characterized as elemental gold and PGE alloys in grains and rarely nuggets found in Cenozoic alluvial deposits. The gold is thought to have been formed during hydrothermal activity in the quartz veins in the country rock and subsequently liberated by weathering and erosion, concentrated during transport, and trapped in fractured bedrock, which formed natural riffles. These placer gold occurrences are generally restricted to the schist bedrock which underlies the eastern edge of the area. West of Klery Creek which flows along the boundary of the schist the bedrock changes to limestone. The Omar-Frost prospect and copper occurrences of the medium potential LMP area which are scattered around the Squirrel River drainage divide occur. Massive base metal sulfides and arsenic sulfosalts occur in the limestone/dolomite host rocks as massive replacements, breccia fillings, or stockworks. Diagenetic pyrite or another source of sulfur precipitates the base metals in areas of high porosity and fluid flow. This method of ore emplacement is similar to the method of formation of the Bornite deposit at Ruby Creek in the Cosmos Hills.

This HLMP area, as well as a portion of the MLMP area to the northwest, are within BLM public domain lands that are currently closed to mineral entry and location.

Small scale placer wash plant operations occurred here in the mid to late 1980s. In the early 1900s a small bucket-line dredge mined areas of Klery Creek of which these recent miners took advantage. Lessee/owner relations caused the demise of these operations and the increasingly complex regulatory environment as well as conflicting local and national land use interests have discouraged continued mining efforts of late.

Mining Activity Highlights

- Beginning in the 1992 mining season stripping and mining on Weiss Creek by Timber Creek Mining Company was accomplished.
- In 1993 and 1994, Ambler Mineral Belt hard rock exploration activities spilled over onto the Omar and Frost volcanogenic massive sulfide occurrences.
- During the 1995 mining season Amigaq Copper Mine Inc. conducted mineral exploration activities in the Squirrel River drainage.

(g) De Long Mountains Western Brooks Range Region

Some of the oldest rocks (Proterozoic to middle Paleozoic) in the planning area include a limestone and shale unit thought to represent continental shelf and marine slope sediments originally deposited along the passive margin of North America. These rocks are similar in composition and age and are thought to have been deposited as a single belt including the Seward and York lithotectonic terranes.

Crystalline basement rocks along the southern flank of the Brooks Range and Baird Mountains comprise a structurally complex thrust and fold package of blueschist facies metamorphosed marine shelf sediments. The De Long Mountains-Western Brooks Range Region includes both the Red Dog high locatable mineral potential area and the Red Dog medium locatable mineral potential area.

1. Red Dog HLMP Area

BLM-managed lands in this area are scattered, square-mile parcels in the northeastern part. The significant and producing Red Dog Mine is located on State patented and private (Native corporation) lands.

For the 10-year period between 1995 and 2004 two hard rock exploration operations have been active. Teck Cominco American has been conducting deep core drilling on its properties in the Ikalukrok Creek drainage just north of Red Dog and its helicopter transported drill rigs have disturbed a total of 4.3 acres: 2.5 on State lands, 0.5 on Federal lands (unpatented Federal mining claims on State-selected lands) and 1.3 acres of private land (conveyed Native lands). Mining claims in this area consisted of a core of less than a dozen Federal claims surrounded by State claims. The claimants converted these Federal holdings to State claims in 2001 once core drilling indicated that significant Red Dog style mineralization underlay the area. Some 24 miles west of Red Dog a second significant mineralized area underlies Federal mining claims of GCO Minerals, Teck Cominco, and Kennecott Mining companies.

Surface disturbance and footprint acreages for mines such as Red Dog are not available in the APMA database as these large mines are permitted individually by the ADNR, Division of Mines. As of 2004 the Red Dog Mine reports approximately 1,800 impacted acres. Within that total the pit is currently at 220 acres, tailings impoundment at 540 acres, waste dump at 300 acres, mill and other facilities at 45 acres, and subore stockpile at 11 acres. Over the life of the mine, the pit alone is expected to expand three times its present size. This does not include the haul road or the port facility, both of which are State owned. In the late 1980s GCO Minerals developed a 5,000 foot gravel runway on State-selected lands in the uplands adjacent to the Wulik River and established a 28 acre permanent drill camp and drill core repository, the footprint of which includes the mineralized deposit outcrop. Operations ceased at this camp before 1989 but it has been maintained as a base of operations for mineral exploration on these claims and on surrounding lands by the mining companies mentioned above.

Table 3-30. Red Dog HLMP Surface Disturbance Summary

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
Ikalukrok Ck	De Long Mtns	D-2	Expl/Let Intent	2000	2003	State/Fed/ Private Land	0.0	1.0	0.0	0.0	1.0
Ikalukrok Ck	De Long Mtns	D-2	Expl/Let Intent	2001	2005	State/Fed/ Private Land	0.0	0.5	0.5	0.0	1.0
Ikalukrok Ck	De Long Mtns	D-2	Expl/Let Intent	2003	2005	State/Fed/ Private Land	0.0	0.0	0.0	0.8	0.8
Ikalukrok Ck	De Long Mtns	D-2	Expl/Let Intent	2004	2005	State/Fed/ Private Land	0.0	0.0	0.0	0.0	0.0
Ikalukrok Ck	De Long Mtns	A-2	Expl/Let Intent	1995	2003	State/Fed/ Private Land	1.0	1.0	0.5	0.5	2.0
Wulik River	De Long Mtns	A-2	Exploration	2001		Federal Land	0.0	0.0	0.2	0.0	0.2
Wulik River	De Long Mtns	A-2	Hardrock Exploration	2002		Federal Land	4.0	0.0	1.0	0.0	1.0
Wulik River	De Long Mtns	A-2	Hardrock Exploration	2003		Federal Land	1.0	0.0	13.0	0.0	13.0
Wulik River	De Long Mtns	A-2	Hardrock Exploration	2004		Federal Land	3.0	0.0	13.0	0.0	13.0

Abbreviations: St = State; Fed = Federal; Pri = private; Dst = disturbance; Ck = creek; Expl = exploration; Let Intent = letter of intent; no entry in the Last Year column means operations only lasted for 1 year.

Development of this area was the direct result of the conveyance of lands (and mineral deposits) to the NANA Native Corporation that wanted the development to provide a solid economic base for the regions' Alaska Native population. The producing mine with developed access to tidewater and port construction facilitated by the State has encouraged exploration and development of satellite mineral deposits on surrounding State lands.

Mining Activity Highlights

- In 1989, Teck Cominco conducted limited drilling at Red Dog.
- NANA conducted reconnaissance geological mapping and sampling of ANCSA lands in the western Brooks Range.
- In November of 1989 Red Dog transitions to production.
- In 1990, Cominco American, the operator of the Red Dog Mine conducts core drilling at Red Dog and in discussion with GCO Minerals, Cominco positions itself as a partner in the LIK property 25 miles west of Red Dog Mine.
- During 1994 NANA-Teck Cominco mineral exploration crews conduct hard rock exploration in the Brooks Range.
- During 1995 Teck Cominco discovered a second ore body on private lands at Red Dog, the Aqqaluk deposit. They also completed a major mill upgrade adding production capacity.
- Development drilling by Teck Cominco in 1996 focused on the Aqqaluk deposit at Red Dog.
- In 1998, mineral exploration continued at Red Dog and the immediately surrounding area.
- In 1999, Teck Cominco announced a new zinc-lead-silver deposit (Anarraaq) located six miles north of the Red Dog Mine on State lands.
- In 2000, Teck Cominco conducted gravity surveys around the Red Dog Mine.
- In 2001, Teck Cominco announced drilling results for the Anarraaq deposit.
- In this same year Kennecott Exploration conducted regional mineral exploration in the Wulik River drainage on Arctic Slope Regional Native Corporation-selected land.
- In 2002, Kennecott Exploration conducted core drilling at the LIK deposit.

2. Red Dog MLMP Area

While this location falls outside the high locatable minerals potential area it does represent significant exploration activity in the medium potential area surrounding the Red Dog HLMP. The APMA database lists hard rock exploration activities on Tutuk Creek by Teck Cominco American from 1996 through 1998 and no surface disturbance. Helicopter exploration has identified significant mineral potential here but lack of access and isolated, remote location discourage an increase in the level of work.

Table 3-31. Red Dog MLMP Surface Disturbance Summary

Drainage	Quad	Map	Activity	First Year	Last Year	Land Status	Total Acre	ST DST	FED DST	PRI DST	TOT DST
N/A	Noatak	D-3	Expl/Let Intent	1996	1998	State Land	0.0	0.0	0.0	0.0	0.0

Abbreviations: St = State; Fed = Federal; Pri = private; Dst = disturbance; Expl = exploration; Let Intent = letter of intent

Mining Activity Highlights

- During the 2000 season Quaterra Resources Inc./NANA conducted mineral exploration of the mafic/ultramafic rocks around Asik Mountain looking at the PGM occurrence there.

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c) Mineral Materials

(1) Mineral Materials Program

Congress set aside minerals that cannot be reserved by a mining claim, but can be purchased from the government on a per ton or per cubic yard basis. These are known as mineral materials or common variety minerals, and include such things as sand, building stone, gravel, rip-rap, shot rock, pumice, cinders, and clay.

The BLM's policy is to make mineral materials available to the public and local governmental agencies whenever possible and environmentally acceptable. Mineral material is sold to the public at fair market value, but is given free to States, counties, or other government entities for public projects. Mineral materials on Federal mining claims located prior to 1955 are not available for sale by the Federal Government (Public Law 167). On lands selected by the State or a regional Native corporation, mineral material sales contracts or free use permits cannot be issued without concurrence of the State or Native entity (Instruction Memorandum AK-76-237, dated Nov. 9, 1976). Similarly for sales on un-certificated Native allotments regardless of underlying land ownership the process required concurrence. This represents a recent departure from regulation 43 CFR 3601.12(b) based on an interpretation that the trust land exception to the general FLPMA definition of public lands does not apply to lands subject to an unapproved allotment application (solicitors opinion, Hopewell, 5/16/2001). Monies collected from these sales are placed into escrow for the benefit of the future land owner. Certificated allotments are the jurisdiction of the Bureau of Indian Affairs and until recently involved the BLM in a technical advisor role by MOU dated March 17, 1985. Materials obtained free of charge cannot be bartered or sold. Before they are opened, all sites must have an approved Plan of Operation, a Reclamation Plan, and environmental analysis. Small sales of mineral materials (less than 50,000 cubic yards and under five acres of surface disturbance) are categorically excluded from the NEPA process. Except for State or municipal entities a performance/reclamation bond is required.

(2) Mineral Material Sales 1980 to Present

Between 1980 and 2004 the BLM serialized a total of 32 mineral materials actions within the planning area. This includes one competitive material sale, one material site right of way grant, 19 negotiated material sales, four free use permits, and seven unauthorized use actions. Material sales generally were handled as cash sales and the length of the contract were two to three years. These sales particularly were located close to villages in the planning area. The purpose of the sales were usually to construct/improve village airstrips. In the mid 1980s ADOT was actively upgrading village airstrips to 4,000 feet and crosswind runways, where needed, and installing gravel aprons and shelter facility for waiting passengers and itinerant pilots. A second round of these types of improvements also occurred in the mid-1990s, but by then mineral materials were obtained from conveyed Native lands surrounding the village. Secondarily these materials were and are used for house pad construction, village roads (to airstrip or landfill) or dikes, and groynes for flood control.

Table 3-32. Serialized Mineral Material Actions in the Planning Area 1980-2004

Case File No.		Production (cyd)	Value ($)		Royalty ($)		Type	Permit Issued	Location
FF0	85617	1,000	$500.00		$0.50		MS	1980	KIC, Kotzebue
FF0	71302	100,000	$50,000.00	*	$0.50	*	MS/RW	1981	Crete Ck, Teller Hwy
FF0	72991	390	$195.00		$0.50	*	MS	1981	Ambler
FF0	72992	57,180	$28,590.10		$0.50	*	MS	1981	Shaktoolik
FF0	72995	70,000	$18,630.90		$0.27		MS	1981	Dahl Ck
FF0	73173	60,283	$40,300.00		$0.67		MS	1981	Deering
FF0	72994	45,038	$22,519.10		$0.50	*	MS	1982	Shungnak
FF0	78718	11,500	$5,750.00		$0.50	*	MS	1982	Noatak
FF0	80102	20,000	$10,000.00	*	$0.50	*	FUP	1982	Shungnak
FF0	81049	20,000	$10,000.00	*	$0.50	*	FUP	1982	Kiana
FF0	81224	16,250	$8,125.00		$0.50	*	MS	1982	Red Dog Mine
FF0	81245	0	$0.00		$0.50	*	UU	1982	Kotzebue NANA
FF0	79122	640	$320.00		$0.50	*	UU	1983	Kotzebue KIC
FF0	79140	13,724	$6,862.50		$0.50	*	UU	1983	Hastings Ck Green Const
FF0	81315	59,576	$29,787.86		$0.50	*	MS	1983	Crete Ck, Teller Hwy
FF0	81316	101,151	$50,575.33		$0.50	*	MS	1983	Tisuk R, Teller Hwy
FF0	81317	13,800	$6,900.00		$0.50	*	UU	1983	Nome
FF0	81442	700	$350.00		$0.50	*	MS	1983	Shungnak
FF0	81473	31,500	$15,750.00		$0.50	*	MS	1983	Kobuk
FF0	81494	60,000	$30,000.00	*	$0.50	*	FUP	1983	Fox Ck, Pilgrim Springs
FF0	81682	182	$910.00		$0.50	*	MS	1983	Kotzebue
FF0	83354	900	$450.00		$0.50	*	UU	1984	Koyuk
FF0	83938	15,776	$7,887.75		$0.50	*	MS	1984	Dahl Ck
FF0	86869	375,119	$243,827.30		$0.65		MS	1990	Red Dog Mine
FF0	88233	45,000	$0.00		$0.50	*	FUP	1992	Rocky Mtn Ck, Kougarok Hwy
FF0	88522	126,154	$82,000.00		$0.50	*	MS	1993	Red Dog Mine
FF0	91373	1,439	$1,069.25		$0.50		MS	1995	53.8 Kougarok Rd
FF0	91480	72,231	$46,950.00		$0.50	*	MS	1996	Red Dog Mine
FF0	91826	145	$72.50		$0.50	*	UU	1996	Grand Central Bridge
FF0	91983	0	$0.00		$0.50	*	UU	1996	Feather R, Teller Hwy
FF0	93270	11,155	$15,059.25		$1.30		MS	2001	Shaktoolik
FF0	94203	2,220	$5,550.00		$2.50		MS	2004	Wesley Ck, Teller Hwy

* Estimate (case file destroyed)
Abbreviations: FUP = Free Use Permit; MS = Material Sale; MS/RW = Material Site/Right-of-Way; UU = Unauthorized Use; Ck = Creek; Hwy = Highway; Rd = Road; R = River

During this same time period the Bureau of Indian Affairs (BIA) was also actively working with certificated Native allotment owners to sell mineral materials from their allotments, particularly in the Kotzebue area. The BLM was only peripherally involved in these sales since by agreement the BLM is only responsible to review mining plans, estimate royalty payments and bond amounts, and provide contract conditions and stipulations for sales proposed on certificated Native allotments. The BIA through its contractors issued the sales contract and tracked production. This Memorandum of Agreement lost its applicability in the late 1990s and the BIA took over its own administration of these contracts. Since the early 1990s materials sales dropped off principally due to the conveyance of Native lands surrounding the villages. From there only occasional sales occur on un-certificated Native allotments, the proceeds from which go into escrow for the Native allottee, or occur as unauthorized use actions initiated by ADOT for Nome road maintenance in areas where current land status is complex. Since BLM policy does not permit the trespassing of governmental entities, these unauthorized use activities are converted to material sales after the fact.

Small scale construction projects that consume mineral materials are typically located in or immediately adjacent to a village, which is generally the location of the need. Under ANCSA these lands are dedicated to the Native corporations. By the mid-1980s the conveyance process of these village lands was largely completed. Sales generated in the early 1980s were handled under interim management policies of the BLM. Once the lands were conveyed or tentatively approved, the disposition of mineral materials became the jurisdiction of the Native corporation or State.

On State-selected lands, particularly in the Nome area which has a rather extensive road network for a community of its size with a continuing need for highway maintenance needs, mineral material needs were largely satisfied by issuing material site rights-of-way which were administered by the State and title granted to the State upon conveyance.

(3) Major Construction Projects Developing Infrastructure

Nome is the primary commercial hub for the region due to its developed marine terminal and extensive airport facilities. Kotzebue is secondary to Nome only due to limitations imposed by its shallow marine environment which limits shipping. Like Nome in the early 1980s Kotzebue and other tidewater villages has to lighter container shipments from oceangoing barges which stand offshore to shallow draft barges for delivery to dry land. Nome's construction of a jetty out into Norton Sound and active dredging of its port facilities starting in the early 1980s allows docking of ocean going ships and barges and direct off loading of containers to truck tractors for delivery to warehouse and shipping customers. Construction of this jetty required large quantities of rip-rap and gravel which were conveniently at hand.

The first major construction project in the region, the Nome seawall was completed in 1951. That was followed by upgrade of the unimproved gravel roads from Nome to Teller, to Council and to the Kougarok Mining District completed in the mid-1970s. The 1980s ushered in an era of large scale infrastructure development throughout the region which continues today. What follows is a brief listing of projects undertaken since 1980 which require large amounts of mineral materials (rip-rap, sand and gravel, sand, shot rock, and their screened by-products):

- Nome Seawall - construction completed 1951 requires annual maintenance dredging
- Nome jetty - construction, periodic maintenance, and upgrades
- Bima dredge dock
- Nome water and sewer upgrade - required maintenance

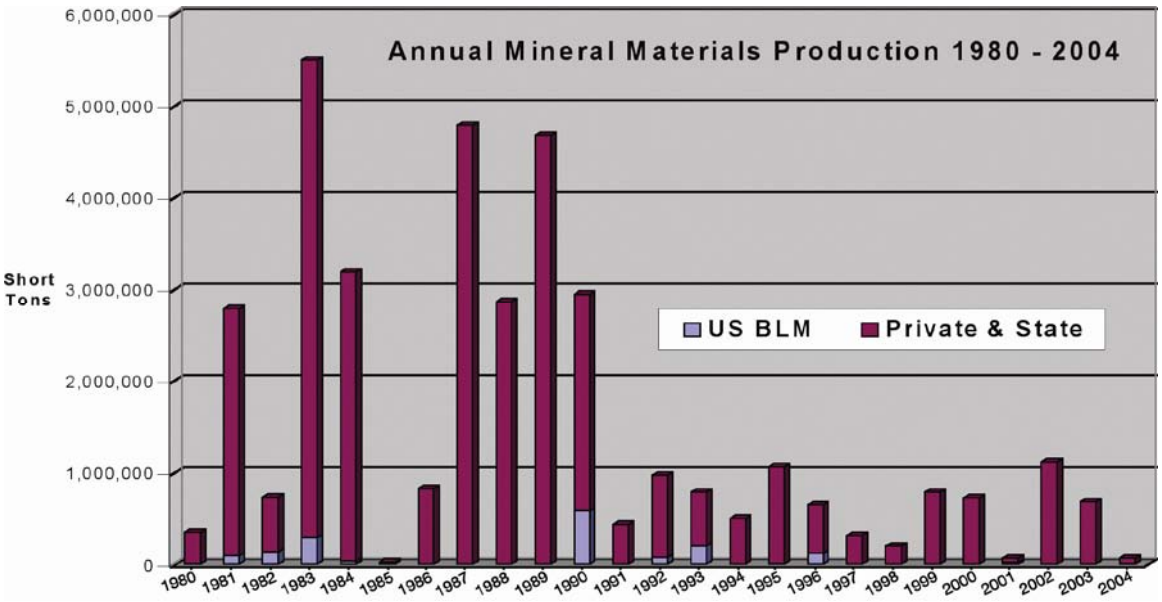
- Nome small boat harbor and port - bid award 1999 construction nearly complete
- Airport improvement and expansion projects in the villages
- Nome airport runway extension and repaving work
- Nome mail handling facility
- Nome power plant relocation
- Kotzebue airport apron expansion
- Kotzebue Regional Health Center (Maniilaq Health Center)
- Housing complexes for hospital personnel and teachers in Kotzebue.
- Red Dog Port facility and haul road
- Red Dog Mine facilities
- Nome-Council road upgrade
- Nome-Kougarok road upgrade
- Four mile road connects between reservoir and military site, Kotzebue.
- DOT road construction Teller Highway to Rock Creek Mine
- Erosion and flood control - Shishmaref, Kivilina and others

(4) Continuing Need for Mineral Materials for Construction Activities

While the BLM's role in providing mineral materials for construction projects in the planning area has dwindled due to loss of ownership of resources proximate to developing areas, the need for these materials has continued to grow. In the Nome area alone nearly 300 miles of unpaved highway has been constructed mostly to interstate standards and needs to be maintained. In the late 1980s lengthening of the Nome seawall to protect against flooding, the construction of the causeway for dockside off loading of groceries, supplies and equipment destined for regional customers, airport construction and improvement in Nome and villages throughout the area, Nome small boat harbor construction, wetland filling and gravel pad construction for Kotzebue regional hospital facilities, tailings dam construction at the Red Dog Mine, the Red Dog Port facility construction, and 52 mile haul road construction and maintenance are a few major projects to date. For the years 1987 through 1990 regional sand and gravel needs ranged between 4.8 and 2.8 million tons annually ($19 million and $9.4 million, respectively). In 1995 and again in 2002 mineral materials private sales again exceeded 1 million tons.

Annual production data for the region is taken from tabulated data collected by the ADGGS and published in their Annual Alaska's Mineral Industry Special Reports. Data is solicited by voluntary questionnaire and summarized by regions as determined by the ADGGS. Of these regions of Alaska the planning area encompasses the western part of the Northern Region and the western part of the Western Region. In ADGGS's Northern Region the bulk of the mineral material reported comes from developments in the North Slope oil fields and along the Dalton Highway. The Western Region encompasses activities in the interior such as large scale mining activities at McGrath and Illinois Creek. Consequently in some instances it is difficult to separate production from these areas outside the planning area based on the narrative in the Alaska’s Mineral Industry Special Report. The following graph is the result of this effort to compare BLM's contribution of mineral material resources against State and private sources.

Figure 3-7. Annual Mineral Materials Production 1980-2004



Principal sources satisfying these needs are found on Native, State, and private lands. The Bering Straits Native Corporation in partnership with private enterprise operates a world class rip-rap quarry at Cape Nome and export to other tidewater villages along Alaska's western coast as well as other Pacific Rim countries. NovaGold Resources Inc. in Nome sells tailings locally off mined patented mining claims on the Nome coastal plain and are currently studying the feasibility of shipping mineral material resources by barge to Seattle and San Francisco areas. Construction and maintenance projects associated with the Red Dog Mine are supplied by State and Native mineral material sources. Point Hope and Kotzebue are the only locations without a large, developed mineral material resource. Kotzebue, situated on the gravel spit of the tip of the Baldwin Peninsula continues to scrape gravels from their backyard to place in their front yard despite the untapped potential resources along the shoreline and bluffs of Selawik Lake.

Native and commercial construction companies have developed to fill the need for construction materials proximate to project locations. Mineral material sources are developed on Native and State lands as the conveniently accessible lands are under their ownership. The BLM retains only a dwindling role as an interim manager. Principal mineral material suppliers in the planning area include:

- NANA Regional Corporation and KIC in the Kotzebue Region
- State of Alaska, numerous locations onshore and offshore suction dredging
- NovaGold Resources Inc. (Alaska Gold Company) Nome area
- Martinson Gravel and Crane, Nome
- Bering Straits Regional Corporation and Sitnasauk Village Corporation Nome and vicinity
- Cape Nome Products (Knik Construction and Sound Quarry, Inc.) at Cape Nome Quarry
- Drake Construction, Nimiuk point source, Kotzebue area projects
- UIC Construction, Barrow - projects in Kotzebue

(5) Commodity Value and Market Share

By tonnage produced between 1980 and 1994 approximately 4% of the mineral materials came from BLM administered sales. Private and State sales over that same time period accounted for 96% of the market. While sales contracts issued by BLM are generally for two to three years if all production (and value) are entered in the year for which the permit was issued or trespass resolved our biggest year was 1993 where BLM sold $274,215 worth of mineral materials followed by 1990 when $243,827 was collected. Over the 25 year period revenues average just over $34,000 per year on the average. It should be also noted that the revenues received from these BLM actions were all placed into escrow accounts to the Native entity or State as these action occurred on selected lands under interim BLM management.

In contrast mineral material sales from private and State lands in the planning area average just over $5 million per year. The big year for these sales was in 1987 where mineral materials value exceeded $19.7 million. In 1983 and 1984 sales exceeded $11.7 million and in 1988 and 1990 sales exceeded $9.4 million.

4. Recreation Management

a) General Recreation

The recreational program within the Kobuk-Seward Peninsula planning area provides for remote outdoor experiences in a largely primitive environment. Only one public campground (Salmon Lake) exists within the planning area. The recreational program is responsible for management of the public's recreational use and enjoyment of BLM administered lands. Due to the remoteness, and harsh Arctic/subarctic conditions within the planning area, public use has been limited. Infrastructure within communities, particularly access, has also been a limiting factor in realizing recreational opportunities. Several areas within the planning area may benefit from an increased level of BLM management. These areas have either conflicts between recreational users or offer unique recreational opportunities.

The major recreation activities in the planning area includes hunting, fishing, trapping, gathering of edible plants and berries, hiking and backpacking, photography, camping and picnicking, wildlife viewing (predominantly bird watching), river rafting, boating, and driving OHVs (primarily snowmobiles). Although the majority of visitors to the planning area are Alaskan residents who live adjacent to BLM managed lands, an increasing number are from out of state and abroad. These visitors are drawn to the area for its recreational opportunities in an Alaskan wilderness setting. The majority of visitor use, particularly from out of state and abroad visitors, occurs during the early summer and fall months from May through the end of September. Two major sporting events, the Iditarod Dog Sled and the Tesoro Iron Dog Snowmobile races, draw the majority of visitors to the planning area during the spring.

The western Seward Peninsula offers high quality bird watching opportunities including rare western Alaska species, Asian accidentals, and representative northern Alaska bird species. A tourism report by ADOT (ADOT&PF 2004) for the Nome Area indicates that 25% of visitors coming to Alaska are interested in birding. Nome has become increasingly well known as a birding destination in the last 15 years and many of these visitors take advantage of the Nome area road system through independent tours. Total numbers of birders visiting the Nome area is uncertain. The Nome Convention and Visitors Bureau documented 228 birders on package tours in 2002. It has been estimated that 500-1,000 birders may visit Nome annually (ADOT&PF 2003).

The planning area has the only recognized National Historic Trail in Alaska, the Iditarod, which crosses the southern portion of the planning area between Unalakleet and Nome (Map 3-32). The Iditarod is used for casual recreational use, inter-village travel, and a variety of commercial events and group activities. One Wild and Scenic River, the Unalakleet River, abuts the planning area to the south. Some visitors are drawn to this river from within the planning area, particularly from Nome to take advantage of its tremendous fishing opportunities. There are commercial fishing guides working the river that offer world class recreational experiences. An environmental impact statement and suitability study was conducted by the BLM on the Squirrel River for inclusion into the National Wild and Scenic River System. The final report was submitted to Congress in December of 2004. The BLM recommended against a wild and scenic designation.

Public services provided by the BLM for recreation have been limited. Services have consisted of: maintenance of the Salmon Lake Campground (trash and waste disposal); the marking and

maintenance of the Iditarod Trail largely by the efforts of the Iditarod Trail Blazers; the marking of some of the designated public easements reserved through private Native owned lands via section 17(b) of ANCSA; and the creation of three recreational brochures (Squirrel River, Kigluaik Mountains, and Iditarod National Historic Trail). Brochures and public informational resources (land status and permit assistance) are available at two remote, single staffed field stations, one located in Nome and one in Kotzebue.

A number of shelter cabins exist through 2920 land use authorizations. Some unauthorized structures also exist on BLM-managed lands. Two structures, one at Wagon Wheel and one at the Squirrel River, are used as public shelter cabins. Unauthorized structures on BLM-managed lands are dealt with on a case-by-case basis.

Annual dispersed visitor use for the planning area is estimated at 2,000 visitor user days for fiscal years 2003 and 2004 (BLM 2005k). Dispersed recreational opportunities exist throughout the planning area. Budget constraints and uncertainty of land status (State and Native selections) have thwarted a comprehensive effort to enhance recreational opportunities by BLM. There is an opportunity to increase recreational use near Nome by taking advantage of the infrastructure that currently exists (BLM campground, road, and public/private services available). Two areas of promise are the Kigluaik Mountains/ Salmon Lake area as well as the Bendeleben Mountains. In other areas such as the Squirrel and Koyuk river areas, current use (primarily commercial guiding) has created conflicts with various user groups and the local resources which may require the BLM to actively manage the recreation program to limit such conflicts. Some areas have unique habitat features which may also benefit from increased recreational management in an effort to continue existing natural conditions on the landscape. This habitat includes essential fish rearing, big game browse areas (primarily moose and caribou), and healthy numbers of prized non ungulate wildlife species (grizzly bear, wolves, and wolverine). These areas would include the Fish River/McCarthy's Marsh area, Buckland and Tagagawik River areas and the Agiapuk, Ungalik, Inglutalik, and Shaktoolik rivers. This listing is certainly not inclusive as nearly every major river within the planning area exhibits many of these habitat features. However, commercial recreational use levels and changing hunting and fishing regulations under State law as well as Federal subsistence management and fish crashes in Norton Sound have elevated the awareness of these identified areas.

b) Special Recreation Permits, Commercial Uses, and Fee Use Areas

Section 4(c) of the Land and Water Conservation Fund Act allows for the issuance of special recreation permits for "uses such as group activities, recreation events, motorized recreation vehicles, and other specialized recreation uses." The issuance of such special recreation permits is not mandatory; the Act states that such special permits "may be issued in accordance with procedures and at fees established by the agency involved."

Commercial recreational use is authorized through 43 CFR 2930, Permits for Recreation on Public Lands. A final rule and a proposed rule (dealing with term lengths of permits) were published in the Federal Register Vol. 67, No. 190, pages 61732-61745 on October 1, 2002. A final rule for the term length was published February 6, 2004 and became effective on April 1, 2004. This final rule allows BLM, in its discretion, to issue a 10-year Special Recreation Permit (SRP).

Commercial recreational use varies from year to year but generally 12-14 SRPs are issued or reauthorized for hunting/guiding activities. Roughly half of the hunting/guiding permits are authorized in the Squirrel River area and the other half in the Nulato Hills and upper Koyuk River area. Two world class competitive events (the Iditarod and Iron Dog races) occur within the planning area and are also permitted. Other smaller snow machine and dog sled events occur within the planning area on existing trails.

The planning area has seen an increase in commercial recreational use, due largely to BLM lands being available to big game guides and through closures to moose hunting by non-residents in adjacent areas. BLM lands in the Squirrel River are surrounded by lands managed by the NPS and FWS that limit guide and outfitter use. BLM lands also carry somewhat healthy moose populations and the largest caribou herd in Alaska, making them ideal for both guided and unguided hunts. There are currently no limits on the number of recreational permits that can be issued within the planning area. Current management does not require companies offering transporter services to access BLM lands for recreational use to obtain a permit.

The level of commercial hunting operations permitted by the BLM, in conjunction with transported resident and non resident hunters and local subsistence and sport use has caused significant adverse public reaction within some BLM-managed lands within the planning area. In the Squirrel River, the increased level of recreational use and the associated harvest of wildlife (moose and caribou primarily) caused BLM to attempt to create an integrated activity plan (IAP) to address recreational use levels. Although a draft IAP was completed in the mid 1990s the plan was never adopted.

The level of use by non-local and non-resident hunters in Game Management Unit 23 has increased substantially since 1989. For example, the average number of non-resident moose hunters in Unit 23 from 1979 to 1988 was 60, compared to 136 for 1991-2000 (Dau 2002a). During the same timeframe, non-local resident moose hunters in Unit 23 increased from an average of 93 to 158 (Dau 2002a). Hunting of WACH caribou by non-local hunters is concentrated in Unit 23. According to Dau (2003b) since the 1998-99 regulatory year, 73% of all non-local hunters pursuing caribou (from the WACH) hunted in Unit 23. An average of 91% of this non-local hunting effort occurred in late August through September, the same time frame as the non-resident moose season. From 1998 to 2001 the average number of non-local and non-residents caribou hunters in Unit 23 was 440.

The Unit 23 User Issues Group, with a broad base of stakeholders, and funded by ADF&G, was initiated in January 1999 in Kotzebue. This group met seven times in Kotzebue, Kiana, and Shungnak through August 2000. During this process two areas were identified as of highest concern, the upper Kobuk River and the Squirrel River. The group felt that during the 10 years prior to 1999 there had been increasing numbers of sport hunters coming to northwest Alaska. Local people saw this as a threat to subsistence opportunity and culture. Commercial operators were concerned with maintaining their economic livelihood. Recreational visitors/hunters/fishers wanted to maintain a high quality recreation opportunity. All involved agreed that the pattern of more people and fewer animals is likely to continue in northwest Alaska, and that this region is feeling the overflow of use from more developed parts of Alaska, the Lower 48, and Europe. Unfortunately in late 2000 ADF&G funding ran out, and they were unable to hire a planner to continue with this process, as they had hoped to do.

The issue of rising use levels continues to be a concern. Rising levels of hunting pressure has caused the ADF&G to limit non resident moose harvest tickets for the first time in 2005 to 12 harvest tickets for the Squirrel River. Resident hunters are now required to obtain a permit tag

within the game management unit. These proactive approaches taken by the State are an attempt to reduce hunting pressure. Residents of the area have expressed concern over use levels changing animal behavior and migration patterns, waste of game meat, OHV use, overcrowding, and increased pressure on subsistence resources. There have been several documented cases of conflicts between subsistence and non-local hunters.

In 2004, the tribal governments of Koyuk and Shaktoolik protested a BLM decision to grant a commercial use permit to a hunting guide within the Koyuk and Shaktoolik rivers. Conflicts over commercial recreational sport hunting were the root of the protest. While the BLM recognizes and acknowledges the State's role in game management, it must also recognize the direct correlation between permitting guides and transporters who make a profit off of BLM-managed lands and the conflict over increased recreational use that the guides and transporters cause. These conflicts are causing a loss of quality recreational opportunities.

Though section 4(b) of the Land and Water Conservation Fund Act authorizes Federal agencies that provide specialized outdoor recreation sites, facilities, equipment, and/or services at Federal expense to charge for the use, there are no fee use areas within the entire 30 million acre planning area.

There is one public campground at Salmon Lake, which is accessible by a State maintained gravel road 40 miles north of Nome. Facilities at the campground include a one mile spur road to a common camping area containing six camping sites with fire pits and picnic tables, a natural boat launch at the shore of Salmon Lake, and an outhouse. The BLM provides trash and sewage disposal within a limited budget. Generally the campground is opened shortly after the Nome-Kougarok Road is plowed free of snow (early June) and remains open until mid October, depending upon snow and road conditions. The Salmon Lake area offers outstanding recreational opportunities. It is the spawning grounds for the most northern run of sockeye salmon in the United States. Opportunities exist to enhance the campground facilities within the framework of a larger recreational area of nearby BLM-managed lands with remarkable scenic value, the Kigluaik Mountains.

Features of interest within the Kigluaik Mountains include carbonate rock habitats that support rare plants, well developed periglacial features, classic glacially sculpted erosional and depositional landforms, small glaciers and moraines, exposed, highly metamorphosed rocks from deep in the earth's crust, and limited gyrfalcon and snow bunting populations and habitat. One of the plant species of interest, *Artemisia senjavinensis*, is a BLM sensitive species. Garnet peridotite found on the surface of Mount Osborn probably formed at more than 28 miles deep in the earth's crust. This may be the deepest crustal rocks now in surface exposure in North America. Glaciated valleys offer excellent winter and summer hiking opportunities. Some lakes supports a unique population of Arctic char and Crater Lake is the source of a water pipeline built to develop the gold placers of the Nome mining districts. This 30 inch pipeline made of redwood slats held together with iron hoops gives a glimpse of the rich mining history of the Seward Peninsula. Much of this pipeline remains after nearly 100 years. Abrupt mountain peaks over 3,000 feet are readily accessible and some canyons near Mosquito Pass have cirque lakes which offer outstanding photo opportunities. A variety of unique wildlife and vegetation also exists. The Kigluaik Mountains have been seeing increased visitor use in recent years. Helicopter charters are now available out of Nome to view some of the spectacular vistas. The area is readily accessible from the Nome Road system. Various economic development groups in Nome have discussed increasing tourism potential as a way to stimulate the economy and the Kigluaik Mountains in conjunction with the facility at Salmon Lake Campground offers an opportunity to assist in reaching this goal.

As discussed previously on page 3-214 under the General Recreation section, recent annual dispersed visitor use for the planning area is estimated at 2,000 visitor user days (BLM 2005k). SRPs add substantially to disperse visitor use from events such as the Iditarod Trail sled dog and Iron Dog snowmobile races, as well as commercial guiding. Exact numbers of visitors is unknown and difficult to collect. Individuals and organizations that obtain an SRP are required to provide the BLM with "user day" information. The BLM does not have a system in place for tracking dispersed visitor use by the local population, transported visitors (predominately non-guided hunters), or independent travelers.

c) Recreation Opportunity Spectrum

As part of this planning effort, the Fairbanks District Office classified existing recreation opportunities available across the planning area using ROS classes. Recreation Opportunity Spectrum (ROS) is a framework for classifying and defining different classes or types of outdoor recreation environments, activities, and experience opportunities. The classification describes the recreational opportunities that currently exist on BLM-managed lands across the landscape (Map 3-31 and Table 3-33).

Table 3-33. ROS Class Acreages and Descriptions

Class (acres / % of planning area)	Description
Primitive 173,000 acres (1.3%)	Area is characterized by essentially unmodified natural environment of fairly large size. Concentration of users is low and no conflicts with users are evident. Sights and sounds of road systems are nonexistent and area is remote. Human-built structures are few and far between, or are inconspicuous. Vegetation and soils remain in a natural state. Example: Higher elevations of the Kigluaik Mountains.
Semi-Primitive Non-Motorized 0 acres (0%)	Area is characterized by a predominantly unmodified natural environment of moderate to large size. Concentration of users is low, but there is often evidence of other area users. Area is generally free of motorized trails and roads. Sights and sounds of transportation systems (mainly air) are encountered. Local traditional subsistence use is evident but impacts are fairly minimal. Vegetation and soils are predominantly natural but some impacts exist.
Semi-Primitive Motorized 12,927,000 acres (98.45%)	Area is 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. Example: Ivan Hoe/Guy Rowe Creek.

Class (acres / % of planning area)	Description
Roaded Natural 33,000 acres (0.25%)	Area is characterized by a generally natural environment with moderate evidence of the sights and sounds of humans. Resource modification and utilization practices are evident, but harmonize with the environment. Concentration of users is low to moderate, and rustic facilities may exist for user convenience and safety. The area is accessible to conventional motorized vehicles and roads are maintained on a rular basis. Sights and sounds of the road system are evident and traffic levels may be highly variable. Areas of localized vegetation and soil impacts exist. User concentrations are low to moderate but may be high in popular recreational sites such as waysides, trailheads, and water access points. Example: Nome-Teller Road, Feather River to Tisuk River, Pilgrim Hot Springs Road, Salmon Lake Campground.
Rural 0 acres (0%)	Area is characterized by a substantially modified natural environment. Resource modification and utilization practices are obvious. Sights and sounds of humans are readily evident and concentration of users is moderate to high. Some facilities may be designed for use by a large number of people. Areas typically are readily accessible to conventional motorized vehicles and are in areas where other camp structures are fairly common. Traffic levels are fairly constant. Areas of modified soil and vegetation exist.
Urban 0 acres (0%)	Area is characterized by a highly modified environment, although the background may have natural elements. Vegetation is often exotic and manicured. Soils may be protected by surfacing. Sights and sounds of humans predominate. Large numbers of users should be expected. Modern facilities may exist for the convenience and comfort of large numbers of people.

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5. Travel Management/OHV

a) Travel Management

Due to the lack of roads, access to BLM-managed lands is limited to human power (foot, skis, snowshoes, bicycle); remote landings by small planes capable of landing on river gravel bars, remote landing strips or adjacent hillsides; helicopters, snowmobiles, or dog teams; river boats; and off-highway vehicles (OHVs).

(1) Roads

There are three major roads leading out of Nome maintained by ADOT totaling nearly 250 miles (Map 3-32). Lesser secondary roads also exist on the Seward Peninsula, which are largely not maintained. These include the Pilgrim Hot Springs Road, Buster Road, Bunker Hill–Kougarok, Candle Creek Road, Tin City-Goodwin Road, Lost River-U.S. Tin Road, Shovel Creek Road, Big Hurrah Road, Casadepaga Road, Deering-Inmachik Road, and Snake River Road. Lands accessed along the three major roads and secondary road systems are primarily in State and private ownership. However, these roads do provide a level of access not found elsewhere in the planning area. Except for local roads within communities, there are no other publicly maintained roads within the planning area either within or adjacent to BLM-managed lands.

(2) Trails, R.S. 2477 Routes, and 17(b) Easements

Other than specific 17(b) easements reserved through Native corporation lands and the Iditarod National Historical Trail, there are no designated BLM trails within the planning area. The State has numerous R.S. 2477 rights of way assertions pending. A significant number of winter trails exist. There are 965 miles of trails within the Northwest Arctic Borough and some 1,326 miles of trails within the Seward Peninsula/Norton Sound area that have been identified by ADOT (Map 3-32). The majority of these winter trails are inter- or intra- community access trails. In many instances, trails used for these purposes are not marked.

(3) Airstrips

All communities within the planning area have established air strips owned and maintained by the State. No remote, public airstrips have been developed by the BLM. Access on BLM-managed lands by air is limited to remote landings by small planes capable of landing on river gravel bars, remote landing strips, or adjacent hillsides.

b) Off-highway Vehicle Management

Under Section 202(c) (3) (E) of the Sikes Act, the Secretary of Interior was instructed to “require the control of off road vehicle traffic” on public lands. Executive Orders 11644 and 11989 established policies and provided procedures to ensure that the use of off road vehicles on public lands (excluding Indian lands, lands under the custody and control of the Tennessee Valley Authority, and lands under control of the Secretary of Defense) would be controlled.

The definition of off road vehicles excluded any registered motorboat, and fire, military, emergency, or law enforcement vehicle when used for emergency purposes, any combat or

combat support vehicles when used for national defense purposes, and any vehicle whose use is expressly authorized by permit, lease, license or contract or official use by an employee, agent, or designated representative of the Federal Government or one of its contractors in the course of his employment, agency, or representation. The Executive Orders required closure of lands to OHV use if the use is “causing considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat or cultural or historic resources.” Federal Agencies were given six months to promulgate regulations to enforce the Executive Order(s).

Under 43 CFR 8360, Visitor Services, the Authorized Officer of BLM has the authority to close or restrict lands under BLM jurisdiction (43 CFR 8364.1). Rules of Conduct on public lands are governed under 43 CFR 8365 and address sanitation, occupancy and use, public health, safety and comfort, property and resources, supplementary rules, state and local laws, and developed recreation sites and areas.

All BLM-managed lands are required to have OHV designations (43 CFR 8342.1) and must be designated as open, limited, or closed. “Open” designations are used primarily for sites selected for intensive OHV recreation, where there are no compelling resource protection needs, user conflicts, or public safety issues that warrant limiting cross-country use. Open areas are where all types of vehicle use is permitted. On lands that are designated as “limited”, the area is restricted for certain times, areas, and/or to certain use. The restrictions can be of any type but generally fall within the following type of categories: number of vehicles; types of vehicles; time or season of use; permitted or licensed use only; use on existing roads and trails; or use on designated roads and trails. Weight class of OHVs has often been used in Alaska to limit use especially in rural areas where ANILCA subsistence use is protected. The authorized officer of BLM must provide information to the public on OHV designated areas and any restrictions placed within areas designated. Lands designated as “closed” are closed to OHV use except for use approved by the authorized officer of the BLM.

Currently, the planning area is undesignated. Although, the Northwest MFP institutes a maximum 2,000 pound gross vehicle weight limit (GVW) without a permit.

The current State policy on casual (non-permitted) OHV use on State lands is addressed by direction in the AAC at 11 AAC 96.020 and 96.025, “Generally Allowed Uses on State Land.” Use of highway vehicles with a curb weight up to 10,000 pounds or recreational-type vehicles (i.e., OHVs) with a curb weight of less than 1,500 pounds 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, prevent erosion and wildlife disturbance or displacement, and provide access to public lands, the ADNR may designate certain State lands as “Special Use Lands.” Restrictions to protect resource values or manage use, in addition to the Generally Allowed Use restrictions, are administratively implemented through regulations implementing a Special Use Land Designation.

OHV use is a nationally recognized, major recreational activity on BLM-managed lands. Regionally, OHV use is increasing. The popularity of the Iditarod Dog Sled and Iron Dog races is drawing visitors to the planning area. Many visitors are enjoying the area’s winter trail systems. Population increases and higher disposable income rates of residents within the planning area will add further OHV use.

Local residents are heavily engaged in subsistence activities and the public lands adjacent to communities throughout the planning area provide ideal opportunities for harvesting renewable resources. Local OHV use is predominately for subsistence harvesting. Snowmobiles are the primary means of transportation within the scattered isolated communities encompassed within the planning area during the winter months (November-May). OHVs, mostly all terrain vehicles, are used in the summer and fall months. Motor boats are commonly used in rivers. Primary inter village trails are along 17(b) easements. Game movements and location of traditional fishing, hunting, trapping, and gathering areas influence access outside of recognized easements.

Summer OHV use is centered on personal recreation, and subsistence based gathering (fish, berries, greens, roots) usually occurring from early June through August. In September, use shifts from recreation-based to use in support of hunting. The beginning of the subsistence, sport, and commercial hunting season brings an increase in OHV use of BLM-managed lands. No OHV use monitoring has been established except for annual inspections of guiding operations within the Squirrel River. OHV use in the Squirrel River has been rising to support of commercial guiding operations.

Types of OHVs used in the planning area take many forms but the vast majority are the standard “4-wheelers.” Larger OHVs (“six wheelers” and Argos) and tracked vehicles are used infrequently. Use of OHVs larger than 2,000 pounds GVW has been targeted by law enforcement and actions have been taken in the past to stop such use on BLM administered lands in the planning area.

Winter snowmobile use within the planning area offers mainly backcountry and hill climbing experiences, with packed trails limited to major travel routes. Most winter activity is subsistence based hunting and trapping. Recreational activities are also supported by snowmobile. Organized events that center on snowmobile use are gaining popularity in the planning area such as the Iron Dog race, and events centered on the Iditarod Trail. This overall increase in use has made quiet winter recreational experiences harder to find except for very remote mountain peaks. Mountainous terrain is limited in the planning area and almost all areas can be accessed by aggressive snowmobile use. The increase is tempered by the remoteness of the area and small resident population base. Snowmobiles and OHVs are now capable of reaching backcountry wildlife habitat that was previously inaccessible.

No inventory of trails on BLM-managed land currently exists within the planning area and aside from recognized easements and a few trails in support of commercial guiding, trail use, and its potential effect on the environment are largely unknown. Continued summer OHV use in a wet environment, dominated by tundra and muskeg vegetation often leads to muddy bogs that become greater obstacles as thermal erosion from vegetation stripping and continued use occurs. This results in users creating detours around the mud holes, creating a braided trail pattern. These widened trails not only leave a visual scar on the landscape, they also contribute to vegetation and soil damage (Meyer 2002).

INSERT 11x17 MAP
3_32_travel_mgmt

6. Renewable Energy

Consideration of renewable energy sources available on the public lands has come to the forefront of land management planning as demand for clean and viable energy to power the nation has increased. To date there has been no demand for development of renewable energy projects on BLM-managed lands within the planning area. 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 reviewed the potential for concentrated solar power, photovoltaics, wind, biomass, and geothermal on BLM, BIA, and USDA Forest Service lands in the West. Unfortunately, Alaska was not included in this report. Following is a brief discussion on renewable energy in the planning area.

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 Fairbanks District Office has not authorized any PV facilities for commercial power production, nor has any interest been expressed by industry in developing such facilities on BLM-managed lands within the planning area.

b) Wind Resources

There is increasing interest in wind energy development in Alaska. The Alaska Energy Authority and rural utilities are considering the development of 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 (http://www.eere.energy.gov/windandhydro/windpoweringamerica/wind_maps_none.asp). Development of this map will increase understanding of Alaska's wind resource and 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 the bush. One issue the Council will address is acceleration of wind turbine generator installations.

The potential to use wind as a supplemental energy source for local communities within the planning area is high. According to DOE the coastal areas of northwestern Alaska have excellent potential for wind energy (DOE 2001b). 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. Several communities in the planning area including Kotzebue, Wales, and Selawik already use wind energy to supplement diesel-powered generating stations.

The potential of a large wind farm within the planning area is low. The population in the area is low and infrastructure to transport electricity outside of the region does not exist. The potential for development of wind energy on BLM-managed lands is also low. 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 the BLM manages very little land along the coast.

c) Biomass

The biomass program is the use of organic matter waste products for production of products such as 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 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. Most of these projects are situated in southeastern Alaska where there is commercial timber and a large commercial fishery.

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 the planning area is very limited. Only 8% of the planning area is forested and there are no commercial logging operations. No vegetative treatments have been conducted in the past and the probability of future treatments is low. The area is roadless, making the economics of accessing the low amount of biomass available questionable. There is no known market for these types of products in the region.

7. Lands and Realty Actions

Land actions constitute resource allocations, and, as such, are made through a variety of means but generally fall into five broad categories: use authorizations, disposal actions, acquisitions, exchanges, and withdrawals. Each proposal or application for a lands action is considered on a case-by-case basis and is either authorized or rejected. Generalized land status for the planning area is shown on Map 1-1 and Map 3-33.

The primary objective of the lands program in the planning area is to provide the public with the land it needs for rights-of-way, land use permits, leases, and sales. The secondary objective is to provide support to other programs to protect and enhance the resources. Overlaying these first two objectives is the need to support the Alaska Land Transfer Acceleration process, which involves the survey and conveyance of lands to the State, Native corporations, Native allottees, and other inholders. The final goal of all these objectives is a balance between land use and resource protection that best serves the public at large.

a) Land Use Authorizations

(1) Unauthorized Use/Trespass

It is the responsibility of the BLM to protect the public's best interest in regards to BLM-managed lands. Over the years, individuals have built structures for various purposes (e.g., occupancy, commercial uses, and recreational uses) on public land without authorization. The BLM attempts to manage this problem through a program of detection, control, and abatement. The size of the planning area makes a complete inventory difficult and a number of trespasses have been identified. Once a trespass has been identified it is handled in one of three ways:

- If the structure is used for allowable purposes as defined by Sec. 302 of FLPMA, and is compatible with other resource management objectives, the trespass can be controlled by authorizing it under a specific set of conditions.
- If the structure is not allowable under FLPMA, but is compatible with other resource objectives, it could be transferred to Federal ownership and maintained as a public use cabin or for administrative purposes.
- If the structure is not allowable under FLPMA and is either unsuitable for public use or is incompatible with other management objectives, it is removed.

(2) Use Authorizations

Use authorizations respond to public demand for specialized and more or less temporary uses of the public lands. Examples are right-of-way (ROW) grants, airport leases, Recreation and Public Purposes (R&PP) leases, and all FLPMA leases, permits, and easements. These do not cause the lands to leave the public domain, although they may restrict or benefit certain uses. They may be set for a period of time or may be open-ended. They tend to cover small, scattered areas and cannot be anticipated through the planning process.

(a) Airport Leases

The Act of May 24, 1928, as amended, authorizes the Secretary of the Interior to lease for use as a public airport any contiguous unreserved and unappropriated public lands not to exceed 2,560 acres in area. In accordance with the regulation, those lands leased for airport purposes will not be subject to appropriation under the public land laws, including the mining laws. There are no pending airport lease applications.

(b) R&PP Leases

The Act of June 14, 1926, as amended, commonly known as the Recreation and Public Purposes Act, authorizes the Secretary of the Interior to lease public lands other than those that are 1) lands withdrawn or reserved for national forests, national parks and monuments, and national wildlife refuges, 2) Indian lands and lands set aside for the benefit of Indians, Aleuts, and Eskimos, and 3) lands which have been acquired for specific purposes under conditions set forth in 43 CFR 2740 and 2912. Under these regulations, lands leased for R&PP are segregated from entry under the public land laws, including the mining laws (43 CFR 2091.3-2). There are no R&PP leases issued or pending.

(c) FLPMA Leases and Permits

Sec. 302 of FLPMA contemplates a wide variety of land uses for lease and permit including, but not limited to, habituation, cultivation, and the development of small trade or manufacturing concerns. In general, leases are for long-term land uses while permits are used to authorize short-term land uses or uses with little impact. This section of the Act is implemented by regulations in 43 CFR 2920 and BLM Manual 2920, which define these uses further to exclude private recreational habitation such as seasonal use cabins. All such proposals are to be reviewed under the criteria established by FLPMA on a case-by-case basis and require a site specific environmental assessment. There are a few permits and no leases authorized in the planning area.

(d) FLPMA Easements

A FLPMA easement is an authorization for a non-possessory interest in lands that specifies the rights of the holder and the obligations of the BLM to use and manage the lands in a manner consistent with the terms of the easement. For example, easements may be used to ensure that uses of public lands are compatible with non-Federal uses occurring on adjacent or nearby land. There are no FLPMA easements authorized or pending in the planning area.

b) Disposal Actions

Discretionary disposal actions are usually initiated in response to public requests or applications. These actions result in a transfer of title, and the lands leave the public domain. Examples are exchanges, airport conveyances, R&PP sales, and FLPMA sales. Disposals such as airport conveyances and most R&PP sales include reversionary clauses if the land is no longer used for the purpose conveyed. FLPMA sales and exchanges are generally absolute.

Non-discretionary disposal actions such as Native and State conveyances, and Native allotments are not subject to the planning process.

(1) Airport Conveyance

The Airport and Airway Improvement Act of September 3, 1982, and 43 CFR 2640 authorize and regulate the issuance of conveyance documents for lands under the jurisdiction of the DOI to public agencies for use as airports and airways. Under the regulations those lands proposed for conveyance are segregated from appropriation under the public land laws, including the mining laws. Furthermore, airport patents contain provisions allowing for reversion of the lands to the United States under certain circumstances. The only pending airport conveyance in the planning area is at Kotzebue.

(2) R&PP Sales

The Act of June 14, 1926, as amended, commonly known as the Recreation and Public Purposes Act, authorizes the Secretary of the Interior to convey those public lands other than 1) lands withdrawn or reserved for national forests, national parks and monuments, and national wildlife refuges, 2) Indian lands and lands set aside for the benefit of Indians, Aleuts, and Eskimos, and 3) lands which have been acquired for specific purposes, under conditions set forth in 43 CFR 2740. Though minerals remain reserved to the United States, there is no provision for mineral entry or development on R&PP patents. R&PP patents contain provisions allowing for reversion of the lands to the United States under certain circumstances; in some cases the reversionary clause is limited to 25 years. There are no pending sales. There are two patented R&PPs with reversionary clauses in the planning area: a Boy Scout camp and a Girl Scout camp in the Nome area.

(3) FLPMA Sales

Section 203 of FLPMA establishes criteria under which public lands may be considered for disposal. In general, all such proposals are to be reviewed under the criteria established by FLPMA on a case-by-case basis and will require a site specific environmental assessment. There are no pending FLPMA sales.

c) Acquisitions

FLPMA authorizes the acquisition of real property where it is consistent with the mission of the department and departmental land use plans. No acquisitions have been made or are pending in the planning area.

(1) Exchanges

Sec. 1302(h) of ANILCA authorizes the Secretary of Interior to exchange public lands or interests (including Native selection rights) for non-Federal lands and interests. No exchanges have been made or are pending within the planning area.

(2) Withdrawals

A withdrawal is a formal action that sets aside, withholds, or reserves Federal lands by administrative order or statute for public purposes. The effect of a withdrawal is to accomplish one or more of the following:

- Segregate and close Federal land to the operation of all or some of the public land laws and one or more mineral laws,
- Transfer total or potential jurisdiction of Federal land between Federal agencies, and
- Dedicate Federal land for a specific public purpose.

Millions of acres in the planning area are withdrawn by public land orders issued pursuant to Section 17(d)(1), 17(d)(2) of ANCSA. In addition various withdrawals have been made under Sections 11 and 14 of ANCSA for Native selections, and under 17(d)(1) for state selections. The withdrawals are a series of public land orders issued since 1972 that placed a protective withdrawal on Federal lands for the purpose of study and review, and to facilitate conveyances.

While some land use plan decisions become effective with approval of the Record of Decision (ROD) for the RMP, others programs have specific requirements that must be taken in order to make certain decisions or recommendations effective. Modification or revocations of any administrative withdrawal orders including those under Section 17(d)(1) of ANCSA requires a formal action that includes Secretarial-level review and approval, resulting in a public land order signed by the Secretary of the Interior that will formally revoke or modify the 17(d)(1) withdrawal order(s). After the ROD is signed, BLM will draft and prepare all the required documents for the "PLO package." The package will also include the relevant parts of the Kobuk-Seward Peninsula Final EIS and ROD which will fully cover NEPA adequacy in assessing the impact of revoking the 17(d)(1) and the opening of land. This PLO package is reviewed by the Solicitor for legal sufficiency before being submitted to the Secretary of Interior for approval.

Public Land Order (PLO) 6744 on October 5, 1983, addressed most of these withdrawals in the planning area south of the North Slope Borough. However, selected lands and lands under the Koyuk and Squirrel Wild and Scenic River study areas were not included in the PLO. Any underlying withdrawals remaining in effect will need to be addressed once conveyance to State and Native corporations are completed. In the case of the wild and scenic rivers, the Koyuk was determined not suitable, and the legislative withdrawal for the WSR study expired. PLO 5180 segregates these lands against mineral entry (except metalliferous minerals) and leasing. The Squirrel River has been recommended to Congress as not suitable, and the study withdrawal

will expire on November 17, 2007 if Congress takes no action. Unselected lands in the study corridor are subject to PLO 5179, which segregates against mineral entry and leasing.

In addition, there are hundreds of acres of administrative, recreation, power site, military, and other withdrawals in place, many of which were created for a specific purpose that may now be obsolete.

A listing of all withdrawals can be found in the tables following this section.

d) Access Corridors

There are two legislatively designated access routes in the planning area. ANILCA Sec. 201(2) designates a winter route on an existing trail between Deering and the Taylor Highway. ANILCA Sec. 201(4)(b) designates access between Bornite and the Dalton Highway. The majority of these routes are not on public land.

Table 3-34. Withdrawals Affecting BLM Land

Withdrawal	Authority	Serial #
(d)(1)	PLO 5169	FF-086061
(d)(1)	PLO 5170*	FF-016298
(d)(1)	PLO 5171	FF-016299
(d)(1)	PLO 5179*	AA 061299
(d)(1)	PLO 5180*	FF 016304
(d)(1)	PLO 5184*	FF 085667
(d)(1)	PLO 5186	AA 061005
(d)(1)	PLO 5187	FF 086064
(d)(1)	PLO 5353	AA 066614
Hot Springs	PLO 399*	AA 064725
Squirrel River	ANILCA 604(a)	FF 085186
Pass Creek PSR	PSR 726	FF 085798
Salmon Lake PSC	PSC 403	AA 006202

*Partially modified by PLO 6477 (1983) which opened most unselected lands south of the N. Slope Borough to the land laws.

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D. Special Designations

1. Areas of Critical Environmental Concern and Research Natural Areas

a) ACECs

(1) Background

Areas of Critical Environmental Concern (ACECs) are a designation unique to the 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 the BLM to 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 nominated ACECs and screen areas for their suitability for ACEC designation.

Currently, there are no designated ACECs within the planning area.

(2) Nominated Areas

During the scoping process for the Kobuk-Seward Peninsula RMP, the Fairbanks District Office actively solicited nominations and comments from the public on areas that should receive consideration as ACECs. A total of eight nominations were received from the public and BLM specialists (Map 3-34). Several of these nominations are in areas that overlap. The nominations were as follows:

- Nulato Hills ACEC – nominated by Western Arctic Caribou Herd (WACH) Working Group[3]
- Inglutalik Watershed ACEC – nominated by the Alaska Coalition
- Ungalik Watershed ACEC – nominated by the Alaska Coalition
- Shaktoolik Watershed ACEC – nominated by the Alaska Coalition
- Kigluaik Mountains ACEC – nominated by BLM specialists
- Upper Kuzitrin River ACEC – nominated by BLM specialists

[3] This Working Group is a regional organization of representative stakeholders with a direct interest in the care and management of the WACH. Establishment of the Working Group was facilitated by ADF&G and several Federal agencies. Resource agencies including ADF&G, FWS, BLM, NPS, and BIA support the Working Group in a non-voting capacity.

- McCarthy's Marsh ACEC – nominated by BLM specialists
- Western Arctic Caribou Insect Relief and Calving Grounds – nominated by the WACH Working Group

(3) Potential ACECs

Based on interdisciplinary review, the following areas met both the relevance and importance criteria and will move forward for additional consideration as alternatives within this Environmental Impact Statement. For more specific information on specific measures proposed for these areas, see the detailed alternative comparison tables in Appendix B.

(a) Nulato Hills

The Nulato Hills are regionally significant. The area is a critical wintering area for the WACH. As of July 2003 this herd numbered at least 490,000 caribou which makes it one of the largest caribou herds on the continent. Although caribou are known for their wandering lifestyle and ever-changing distribution, the Nulato Hills were a critical portion of WACH winter range during the mid 1980s to mid 1990s, and has received heavy use during some winters since that time. Winter in the subarctic is a nutritionally demanding time for caribou. If energy reserves cannot be maintained at a sufficient level during this critical period, caribou cows may abort their pregnancies. This can have serious repercussions on the population dynamics of the herd and therefore the ability of rural residents to be successful in their subsistence lifestyle.

The herd is one of the most important subsistence resources in the entire northwest portion of the state. Approximately 40 villages utilize the herd for subsistence purposes, with 15,000-20,000 animals being harvested annually.

The Nulato Hills offer considerable territory that has not been inventoried botanically. However, surveys covering a small portion of the Nulato Hills conducted during 1996, 1997, and 1998 by BLM and UAF Herbarium botanists discovered five plant species that are currently tracked by the ANHP as rare within the state. Three of these rare plants are listed as BLM-Alaska sensitive species (*Douglasia alaskana*, *Douglasia beringensis*, and *Potentilla stipularis*). The remaining two rare plant species (*Cardamine microphylla* ssp. *blaisdellii* and *Ranunculus auricomus*) will be considered for addition to the BLM-Alaska sensitive species list during future reviews of the list.

The proposed Nulato Hills ACEC also encompasses salmon habitat in the Inglutalik, Ungalik, and Shaktoolik watersheds.

(b) Inglutalik, Ungalik, and Shaktoolik watersheds

Salmon is a critical subsistence resource in the planning area. There are currently three designated ACECs focused on important salmon habitat in the Central Yukon RMP that are immediately adjacent to the planning area: Inglutalik ACEC, Ungalik ACEC, and Shaktoolik ACEC. The upper headwaters of these three watersheds are designated as ACECs in the adjacent planning area. The purpose of these designations is to protect salmon habitat. Since the majority of the salmon habitat in these three rivers is within the planning area, these areas will move forward for additional consideration as ACECs in the alternatives of this plan.

These rivers support populations of Dolly Varden, Arctic grayling, salmon (chum, coho, pink, and, to some degree, Chinook), and whitefish. They provide important habitat for both resident

and anadromous fish. The fisheries in the Ungalik, Inglutalik, and Shaktoolik are among the richest in the region.

These three ACECs also include important winter habitat for the WACH.

(c) Kigluaik Mountains

The Kigluaik Mountains contain unique cirque lakes and associated fish populations, rare plants, sensitive plant communities, Eurasian bird species, and unique geological features. Populations of genetically isolated Kigluaik Arctic char have been identified in several lakes. Glacial Lake is an important spawning ground for red salmon. Two RNAs (Windy Cove and Mount Osborn) have been proposed within this area. Windy Cove includes one of the last segments of tidewater shoreline of the northern Seward Peninsula remaining in public ownership. The Kigluaik fault is the most active and most-recently active of the Seward Peninsula faults. Highly metamorphosed rocks reveal the deepest crustal rocks now exposed at surface in North America. Within the proposed Mount Osborn area are calcareous screes and limestone outcrops, providing alpine habitat for *Artemisia senjavinensis*, a rare plant endemic to the Seward Peninsula and a BLM sensitive species. Three other rare plants are found within the larger area of the proposed Kigluaik Mountains ACEC (Alternative C): *Beckwithia glacialis* ssp. *alaskensis* (also a BLM-Alaska sensitive species), plus *Ranunculus auricomus* and *Primula tschuktschorum*, both of which are tracked by the ANHP. The goldilocks buttercup (*Ranunuculus auricomus*) was discovered as new to North America in 1998

In addition to the important fish, botanical, and geological resources, the Kigluaik Mountains offer some of the most scenic vistas in the planning area. At 4,714 feet, Mount Osborn is the highest point on the Seward Peninsula. The whole range is full of precipitous peaks, picturesque cirques, and wild-running waterways. The Kigluaik Mountains are a storehouse of classic periglacial and glacially sculpted erosiional and depositional geomorphic features. This area is highly accessible to the communities of Nome and Teller, which raises the fragile and unique area's vulnerability to change.

(d) Upper Kuzitrin River

The upper Kuzitrin River is an important wintering area for moose on the Seward Peninsula and is also frequently utilized by wintering caribou of the WACH. Moose and caribou are some of the most important subsistence resources on the Seward Peninsula. Winter in the subarctic is a nutritionally demanding time for ungulates. If energy reserves cannot be maintained at a sufficient level during this critical period, cows may abort their pregnancies. This can have serious repercussions on the population dynamics of moose and caribou and therefore the ability of rural residents to be successful in their subsistence lifestyle.

The upper Kuzitrin River provide important habitat for waterfowl. Based on ground brood counts between 1989 and 1993, the average number of duck broods per square kilometer in the upper Kuzitrin was 10.9. American wigeon, mallard, green-winged teal, northern shoveler, and northern pintail were the predominate dabbling ducks found. Greater scaup, oldsquaw, and black scoters were the most common diving ducks. Other species observed during the surveys included tundra swan, red-necked grebes, Arctic loons, common loons, yellow-billed loons, pacific loons, white-fronted geese, Canada geese, and sandhill cranes (Jandt and Morkill 1994, Anderson and Robinson 1991).

(e) McCarthy's Marsh

McCarthy's Marsh a critical wintering area for moose on the Seward Peninsula and is also frequently utilized by wintering caribou of the WACH. Moose and caribou are some of the most important subsistence resources on the Seward Peninsula. Winter in the subarctic is a nutritionally demanding time for ungulates. If energy reserves cannot be maintained at a sufficient level during this critical period, cows may abort their pregnancies. This can have serious repercussions on the population dynamics of moose and caribou and therefore the ability of rural residents to be successful in their subsistence lifestyle.

The marsh also supports a wide array of bird species during the short summer months. It provides important habitat for waterfowl. This includes the yellow-billed loon, a BLM sensitive species. Based on ground brood counts between 1989 and 1993, the average number of duck broods per square kilometer in McCarthy's Marsh was 9.7. American wigeon, mallard, green-winged teal, northern shoveler, and northern pintail were the predominate dabbling ducks found. Greater scaup, long-tailed duck (previously known as oldsquaw), and black scoters were the most common diving ducks. Other species observed during the surveys included tundra swan, red-necked grebes, Arctic loons, common loons, pacific loons, greater white-fronted geese, Canada geese, and sandhill cranes (Jandt and Morkill 1994, Anderson and Robinson 1991).

(f) WACH Insect Relief and Calving Grounds

The WACH critical insect relief habitat and calving grounds are regionally significant. The area has more than locally significant qualities which give it special worth and meaning. There is cause for concern due to the potential for future development in the area. The area is a critical insect relief zone for the WACH, one of the largest caribou herds on the continent and a very important subsistence resource in northwestern Alaska. This area has been utilized consistently by caribou since the WACH has been tracked by ADF&G.

Most of the calving area is located within the National Petroleum Reserve Alaska (NPR-A). The ACEC is adjacent to high quality coal reserves and there is potential for future development of infrastructure to support development of coal resources. Calving is when caribou are most sensitive to disturbance. Caribou are most prone to predation within the first month of life. Post-calving aggregation is also a demanding time for caribou. If energy reserves cannot be maintained at a sufficient level during this important period, caribou calves may suffer nutritionally and productivity of the herd may be affected. This can have serious repercussions on the population dynamics of the herd and therefore the ability of rural residents to be successful in their subsistence lifestyle. Caribou are plagued by numerous insect pests, such as warble flies, mosquitoes, and nose bots, during this period. They seek windy spots, ground devoid of vegetation, and snow fields to reduce intense insect harassment. In addition to caribou habitat, the ACEC potentially includes habitat for Kittlitz's murrelet, yellow-billed loon, and red knot which are all BLM sensitive species.

b) RNAs

(1) Background

A Research Natural Area (RNA), according to 43 CFR Subpart 8223, is "an area that is established and maintained for the primary purpose of research and education." The land must have at least one of the following characteristics:

- A typical representation of a common plant or animal association,
- An unusual plant or animal association,
- A threatened or endangered plan or animal species,
- A typical representation of common geologic, soil, or water features, outstanding or unusual geologic oil, or water features, or
- The area must be of sufficient number and size to adequately provide for scientific study, research, and demonstration purposes.

According to 43 CFR subpart 8223.1, no person shall use, occupy, construct, or maintain facilities in a research natural area except as permitted by law, other Federal regulations, or authorized under provisions of subpart 8233. In addition, no person shall use, occupy, construct, or maintain facilities in a manner inconsistent with the purpose of the research natural area. Scientists and educators shall use the area in a manner that is non destructive and consistent with the purpose of the area.

Currently, there are no designated RNAs in the planning area. In 1985, four areas were investigated for their potential as Research Natural Areas (RNA): 1) Clear Creek Hotsprings, 2) Camp Haven Gap, 3) Mount Osborn, and 4) Windy Cove. Consideration for designation was postponed until the BLM developed a new land use plan for the area.

(2) Nominated Areas

During the public scoping process, the following areas were nominated for consideration as RNAs (Map 3-34). Two of these areas, Mount Osborn and Windy Cove, are within the Kigluaik Mountains, an area nominated for ACEC designation.

- Clear Creek Hotsprings – nominated by the Alaska Coalition
- Camp Haven Gap - nominated by the Alaska Coalition
- Mount Osborn – nominated by the Alaska Coalition
- Windy Cove – nominated by the Alaska Coalition

(a) Mount Osborn

It was determined that Mount Osborn potentially meets the criteria of an RNA and should be considered for designation in alternatives in the draft RMP. Features of interest in the area include carbonate rock habitats that support rare plants, small glaciers and moranes, well developed periglacial features and classically sculpted glacial erosional and depositional geomorphic features, and exposed, highly metamorphosed rocks from deep in the earth's crust. One of the plant species of interest, *Artemisia senjavinensis* is a BLM sensitive species. The nominated RNA includes the core of the glaciated mountains, the summit of Mount Osborn and the glaciated Grand Central Valley. Garnet peridotite found on the surface of the RNA probably formed at more than 28 miles deep in the earth's crust. This may be the deepest crustal rocks now in surface exposure in North America.

In this Proposed RMP/Final EIS, it was determined that ACEC designation is more appropriate for this area than RNA. The boundary of the Mount Osborn ACEC was modified to include several lakes that support Kigluaik char and additional geologic features of interest.

(b) Windy Cove

Windy Cove meets the criteria for designation. However, the area of most scientific interest is high priority Native selections and will likely not remain in public ownership. In addition, the

area was not large enough to adequately provide for scientific study and research. For these reasons, it will not be considered for designation as a RNA. The upper portion of the proposed Windy Cove RNA is encompassed by the Kigluaik ACEC and the expanded Mount Osborn RNA which are considered for designation under alternatives of this plan.

(c) Clear Creek Hot Springs

It was determined that Clear Creek Hot Springs should not be considered for designation as an RNA. Clear Creek Hot springs meets the criteria for designation however, the parts of the nomination with the highest values (hot spring vents) will not remain in public ownership.

(d) Camp Haven Gap

It was determined that Camp Haven Gap should not be considered for designation as an RNA. It was determined that high priority state selections would limit the potential for future designation, and the values of the area were not unique enough to warrant RNA designation.

2. Iditarod National Historic Trail

The planning area has the only recognized National Historic Trail (NHT) in Alaska, the Iditarod which crosses the southern portion of the planning area between Unalakleet and Nome (Map 3-32). The Iditarod is used for casual recreational use, inter-village travel, and a variety of commercial events and group activities such as the Iditarod Sled Dog Race.

The Iditarod NHT was designated as such in 1978. It is a complex trail system stretching approximately 1,000 miles from Seward in the south to Nome on the Bering Sea. It crosses lands owned by numerous Native corporations, municipal governments, the State, and several Federal agencies.

The Iditarod NHT is managed under a comprehensive management plan prepared by the BLM, the Federal agency appointed as coordinator of the trail. The plan establishes guidelines to promote the preservation, use, and enjoyment of the trail. It also identifies all the trails and sites making up the historic trail system. Iditarod National Historic Trail Inc. is a non-profit, volunteer organization that provides guidance on several aspects of trail management including design of trail markers, cooperative agreements, and competitive events. The Iditarod Trail Blazers and other volunteers provide trail maintenance and construction assistance.

INSERT 11x17 MAP
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3. Wild and Scenic Rivers

This document will provide the review of eligibility and suitability of rivers within the planning area as required by the Wild and Scenic Rivers Act and BLM planning guidance. This Existing Environment section will cover the legal requirements and review process, and list those rivers found legally eligible as potential additions to the National Wild and Scenic Rivers System. The decision on suitability, or which rivers should actually be recommended to congress for inclusion in the national system, will be one of the outcomes of the complete planning process.

a) Laws, Regulations, and Policies

(1) Laws and Policies

Congress has directed the Federal Government to consider potential additions to the National Wild and Scenic Rivers System during land use planning as described below.

(a) Policy Protecting Certain Rivers

Section 1(b) of the Wild and Scenic Rivers Act (WSRA) 16 U.S.C. §1271 et seq. (2001) states:
It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.

(b) Direction to Evaluate Rivers While Planning

Section 5(d)(1) of the WSRA requires:
In all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic and recreational river areas, and all river basin and project plan reports submitted to the Congress shall consider and discuss any such potential. The Secretary of the Interior and the Secretary of Agriculture shall make specific studies and investigations to determine which additional wild, scenic and recreational river areas within the United States shall be evaluated in planning reports by all Federal agencies as potential alternative uses of the water and related land resources involved.

(2) Regulations

Although the WSRA requires the secretaries of Agriculture and the Interior to develop regulations to implement the Act, only Agriculture has done so. That said, the requirements of the act are recognized in many parts of the CFR. A listing of the most important CFR citations for wild and scenic rivers flowing through BLM-managed lands follows:

- 43 CFR 8350, Subpart 8351 – Designated National Area
- 40 CFR 6.302 – Wetlands, floodplains, important farmlands, coastal zones
- 36 CFR 292.47 – Mining activities
- 43 CFR 8351.2-1-- Sec. 8351.2-1 Special rules
- 43 CFR 3400.2-- Sec. 3400.2 Lands subject to leasing
- 18 CFR 292.208-- Sec. 292.208 Special requirements for hydroelectric small power production

- 32 CFR 651-- Part 651—Environmental Analysis of Army Actions (AR 200-2)
- 30 CFR 761.11-- Sec. 761.11 Areas where surface coal mining operations are prohibited
- 43 CFR 36—Part 36 – Transportation and Utility Systems
- 43 CFR 3800—Part 3800 – Mining Claims Under the General Mining Laws
- 50 CFR 100—Part 100 – Subsistence Management Regulations For Public Lands in Alaska
- 43 CFR 3400—Part 3400 – Coal Management: General
- 43 CFR 8351.0-1-- Sec. 8351.0-1 Purpose
- 43 CFR 8351.0-2-- Sec. 8351.0-2 Objective
- 43 CFR 8351.0-3-- Sec. 8351.0-3 Authority
- 43 CFR 2568.100-- Sec. 2568.100 What is a CSU?
- 43 CFR 2547.6-- Sec. 2547.6 Lands not subject to disposal under this subpart
- 43 CFR 8360.0-3-- Sec. 8360.0-3 Authority
- 43 CFR 8340.0-3-- Sec. 8340.0-3 Authority
- 43 CFR 3809.415-- Sec. 3809.415 How do I prevent unnecessary or undue degradation while conducting operations on public lands?
- 43 CFR 3206.11-- Sec. 3206.11 What must BLM do before issuing my lease?
- 43 CFR 2710.0-8-- Sec. 2710.0-8 Lands subject to sale
- 43 CFR 3809.11-- Sec. 3809.11 When do I have to submit a plan of operations?
- 43 CFR 8360-- Subpart 8360--General

b) Background

The Federal government has been directed by congress to identify and recommend worthy additions to the national wild and scenic rivers system during land use planning efforts, as described above. The task of making recommendations on the suitability or non-suitability of rivers as worthy additions to the national wild and scenic rivers system requires agreement on the meaning of several terms used throughout this EIS. The BLM has made every effort to remain consistent to the definitions supplied below.

(1) Definitions

(a) Eligibility

Eligibility is mentioned once in the WSRA (in Sec. 5(d)(1)) but is not defined there. Nevertheless, the term has become synonymous with an initial screening of potential rivers during a wild and scenic river study process (Diedrich and Thomas 1999, BLM 1993). In order to be eligible for designation as a component of the national wild and scenic rivers system, a river must be free-flowing and possess one or more outstandingly remarkable values (see below). An eligible river meets the bare minimum legal requirements for inclusion in the national system, but requires further scrutiny to determine if it is suitable as a worthy addition to the national system. Eligibility is, in legal terms, a determination made by the facts of the matter, and not a planning decision. (See the definition of suitability on page 3-247).

(b) Free-flowing

Section 16(b) of the WSRA contains a good definition of the term:
“Free-flowing,” as applied to any river or section of a river, means existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the

waterway. The existence, however, of low dams, diversion works, and other minor structures at the time any river is proposed for inclusion in the national wild and scenic rivers system shall not automatically bar its consideration for such inclusion: Provided, That this shall not be construed to authorize, intend, or encourage future construction of such structures within components of the national wild and scenic rivers system.

At this writing, all the rivers in the planning area are free-flowing.

(c) Outstandingly Remarkable Values

An *outstandingly remarkable value* (ORV) must be a unique, rare, or exemplary feature that is significant at a comparative regional or national scale. Such a value would be one that is a conspicuous example from among a number of similar values that are themselves uncommon or extraordinary. Only one outstandingly remarkable value is needed for eligibility. For the purposes of this report the BLM considered both a regional scale (the planning area) and the national scale.

While the spectrum of resources that may be considered is broad, outstandingly remarkable values are directly river-related. That is, they should 1) be located in the river or on its immediate shorelands (generally within one-fourth mile on either side of the river), 2) contribute substantially to the functioning of the river ecosystem, and/or 3) owe their location or existence to the presence of the river.

(d) Suitability

One of the outcomes of this EIS will be decisions on the suitability or non-suitability of the rivers within the planning as worthy additions to the national wild and scenic rivers system. In contrast to eligibility, which is based on a factual description of the existing situation, suitability is a decision based on weighing various elements through the planning process. Details on the process used to make suitability decisions are given below. Rivers that are found suitable through the planning process should be recommended for designation by congress. During consideration by congress, rivers determined to be suitable would be managed to protect free-flow, water quality, and identified outstandingly remarkable values. We will examine the potential effects of congressional designation of several rivers as we assess the impacts of the range of alternatives in this document. The State of Alaska indicated in their comments on the DEIS that they do not support designation of any wild and scenic rivers in the planning area.

(2) Key Elements of Suitability Determinations

The decision on suitability will be made after answering the following questions:

- Should the river's free-flowing character, water quality, and ORVs be protected, or are one or more other uses important enough to warrant doing otherwise?
- Would the river's free-flowing character, water quality, and ORVs be protected through designation?
- Would designation be the best method for protecting the river corridor? The benefits and impacts of WSR designation must be evaluated, and alternative protection methods considered.
- Is there a demonstrated commitment to protect the river by any non-Federal entities who may be partially responsible for implementing protective management?

(3) Factors Considered in Suitability Determinations

The WSRA lists several factors that must be addressed in reports on suitability or non-suitability:

- Current status of land ownership and use in the area. This factor is covered in Chapter I, Planning Area section, of this EIS.
- Reasonably foreseeable potential uses of the land and water which would be enhanced, foreclosed, or curtailed if the area were included in the national wild and scenic rivers system. This factor is covered in Chapter II, Resource Uses section, and Chapter IV.
- Federal, State, local, Tribal, public, or other interests in designation or non-designation. This factor is covered in this section and in Chapters II, IV, and V.
- The Federal agency that would administer the river, if it were designated. For the purposes of this EIS, it is assumed that BLM would be the federal agency administering any designated rivers.
- The extent to which the costs of river management would be shared by State and local agencies, if it were to be designated. For the purposes of this EIS, it is assumed that the Federal government would bear all costs of river management for any designated rivers.
- The ability of the BLM to manage and/or protect the river as a wild and scenic river area. This factor is discussed in Chapters II and IV.
- Historical or existing rights which could be adversely affected by designation. This factor is covered in Chapters II, III, and IV.
- The estimated cost to the United States, if the river were to be designated. This factor is covered in Chapters II and IV.

c) Previous Study of the Squirrel River

ANILCA amended the WSRA to designate the Squirrel River for study as a potential addition to the national wild and scenic rivers system. More specifically, this amendment directs the Secretary of the Interior to “study and submit to the President a report on the suitability of nonsuitability [of the Squirrel River] for addition to the national wild and scenic rivers system.” BLM has completed the study and forwarded a report to the President that found the Squirrel River to be non-suitable for addition to the national system. The Squirrel River will not receive further consideration as a potential addition to the national system in this planning effort.

Since all the rivers in the planning area are free flowing, identifying eligible rivers according to the WSRA rest on the existence of outstandingly remarkable values. Throughout the scoping process, in public meetings, and in planning team deliberations, the planning team identified the presence of outstandingly remarkable values. Previous planning and inventory efforts were reviewed. Certain rivers were mentioned in public comments as having outstandingly remarkable values including: the Kivalina, Wulik, Tubutulik, Inglutalik, Shaktoolik, Ungalik, Koyuk, Agiapuk, and Fish rivers. This area of Alaska has many rivers that, taken in a national context have outstanding and culturally important fisheries resources. It may seem repetitive to list 11 streams, all with outstanding fisheries values, but in the context of the entire coast of the United States, these streams do seem outstanding in this regard. The rivers determined to be eligible through the scoping process are listed, along with their outstandingly remarkable values, in Table 3-35 and displayed on Map 3-35. These streams are vestiges of primitive America, generally inaccessible except by trail or by water, and the appropriate tentative classification is for management as wild river areas.

Table 3-35. Eligible Rivers within the Planning Area

River Name	River mileage[1] (miles)	Upstream Terminus	Downstream Terminus	Outstandingly Remarkable Value(s)	Tentative Classification
Kivalina River	160	Headwater Kivalina	Kivalina Inlet	Fish habitat, water quality for subsistence production and domestic use	Wild
Inglutalik River	110	Headwater Inglutalik	Norton Sound coast	Fish habitat, scenery, primitive recreation	Wild
Fish River (McCarthy's Marsh)	80	Confluence with Wagon Wheel Creek	Norton Sound coast	Fish habitat, moose habitat, caribou habitat, waterfowl habitat	Wild
Upper Buckland/ Fish River	160	Headwaters South Fork Buckland, North Fork Buckland and Fish rivers	Confluence of Buckland and Fish Rivers	Fish habitat	Wild
Ungalik River	110	Headwater Ungalik	Norton Sound coast	Fish habitat, scenery, primitive recreation	Wild
Shatoolik River	110	Headwater Shaktoolik	Norton Sound coast	Fish habitat, scenery, primitive recreation	Wild
Koyuk River/ Peace River/ East Fork Koyuk	190	Confluence Koyuk with First Chance Creek; Confluence Peace River with Sweepstakes Creek; Headwater East Fork Koyuk River.	Norton Sound coast	River recreation, fish habitat	Wild
Tubutulik River	80	Headwater Tubutulik	Norton Sound coast	Fish habitat	Wild
Agiapuk River	40	Confluence with American River	Imuruk Basin	Fish habitat, moose habitat	Wild
Kiliovilik River	60	Headwater Kiliovilik and two unnamed tributaries	Confluence with Selawik River	Fish habitat	Wild
Nilik River/ Ipewik River/ Kukpuk River	300	Headwaters of Nilik, Ipewik, and Kukpuk rivers	Chukchi Sea coast	Fish habitat	Wild

[1]Milage is based on available GIS data and may not accurately represent on the ground conditions. Mileage rounded to nearest 10 miles.

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E. Social and Economic

1. Public Safety

a) Abandoned Mine Lands

The BLM's Abandoned Mine Lands (AML) program is a relatively new program that was designed to address water quality issues originating from the vast numbers of abandoned mine sites through a large and programmatic approach incorporating multiple BLM programs to the one specific issue. The program will be phased out in the near future as the numbers of adversely impacted watersheds by past mining activities are cleaned up throughout America. Old mine workings are found throughout Alaska on lands administered by the BLM, USDA Forest Service, FWS, NPS, the State, Native Village and Regional corporations, and private lands patented under the 1872 Mining Law.

These mineral rich mining districts had no environmental protection from early mining practices. Federal land management agencies had no requirements for performing reclamation at the time when most of the mines were abandoned on public lands. Their closures were often inadequate or non-existent. Low mineral prices and exhausted lodes have left many abandoned mine adits, shafts, and pits.

(1) Goals

The BLM's Strategic Plan calls for remediating 375 AML sites nationwide. The BLM's 10-year goal (1996-2006) is to eventually evaluate every known AML site on public lands and address all environmental and physical safety hazards present. BLM-Alaska will continue to assess and characterize all known AML sites on their existing inventory as well as sites that were missed during the initial inventory.

The BLM's priority setting process for reclamation of environmental contaminated sites is based on risk assessments that address threats to human health and the environment. Abandoned mine land sites that impact water quality are usually a greater concern and receive a higher priority for reclamation than sites that do not impact water quality. The Hazardous Materials Management Program addresses issues of environmental quality degradation due to chemical, biological and/or radiological pollution, and/or contamination in coordination with other cleanup activities located on the abandoned mine, such as the reclamation of mine tailings and river geomorphology by the AML program.

The BLM's priority setting process for addressing physical safety threats to the public are AML sites where: 1) a death or injury has occurred, and the site has not already been addressed, and 2) where the mine is situated on or in immediate proximity to developed recreation sites and areas with high visitor use.

BLM policy requires managers to exercise discretion and consider potential impacts to physical safety and environmental risks at AML sites in future recreation management area designations, land use planning assessments, and all other applicable use authorizations.

(2) Hazards/Risks

There may be some hazards and risks to human health and the environment at abandoned mine sites. Some of the threats to human health and the environment are a result of heavy metal contamination, metal contaminated tailings impoundments, stored chemicals and gases, leaking containers, equipment, old buildings, abandoned explosives, petroleum, and improper managed waste(s). An alteration or loss of natural habitat for many native wildlife species can occur because of changes in vegetation or aquatic habitat as a result of soil loss or changes in the chemical composition of soils near AML sites. Abandoned mines may also impact surface and ground water flows and water quality. Impacts to water quality are generally the result of contaminated sediments or metal salts that can affect human health, fisheries, wildlife, and vegetation. Air pollution from contaminated dust can occur on tailings impoundments and waste rock piles near abandoned mill sites. There may also be releases or potential releases of hazardous substances from waste materials and acid drainage beyond AML sites.

Physical safety risks associated with abandoned mines are open features including adits, shafts, pits, and high-walls, and unstable and decayed support structures in mines and buildings.

(3) Reclamation Activities

Because of the multiple hazards, risks and potential impacts to human health and safety and the environment through multiple mediums (e.g., soils, surface waters, wildlife), the program coordinates with other programs that are specialized in a certain field (i.e., the Hazardous Materials Management Program addresses issues of chemical, biological, and/or radiological pollution and contamination; the Fisheries program addresses issues of impacts on fisheries habitat; and the Cultural and Historical program addresses issues of cultural and historical importance).

(4) Current Activities in the Planning Area

Two AML sites were cleaned up in the planning area through the AML program: an abandoned mine on the Tubutulik River near Elim, and the Quartz/Dahl Creek site on the Nome-Taylor Highway. Remediation of both sites has been completed. The Quartz/Dahl site was conveyed to the State. Current status of the Tubutulik site is unknown.

b) Hazardous Materials Management

The Hazardous Materials Management Program is responsible for coordinating efforts addressing hazard(s) management and resource restoration on BLM-managed lands. These efforts are executed through the balance and guidance of numerous laws, regulations, and policies related to pollution activities, contaminated sites, and the environments affected by pollution and/or contamination issues such as the natural environment and human health and safety. The program typically takes into consideration multiple fields in conducting remediation and restoration efforts, such as scientific data (physical, biological, and chemical), legal, economic, political, historical, cultural, and personal perceptions (personal/cultural/social benefits from a site/area).

The goals of the BLM-Alaska Hazardous Materials Management program are:

- To protect public health and safety and environmental resources by minimizing environmental contamination from chemical, biological, and radiological sources on public lands and BLM owned or operated facilities;
- To comply with Federal and State oil and hazardous materials management laws and regulations;
- To maintain the health of ecosystems through assessment, cleanup, and restoration of contaminated sites;
- To manage oil and hazardous materials related risks, costs, and liabilities; and
- To integrate environmental protection and compliance with all environmental statutes into all BLM activities.

(1) Potential Sources of Hazardous Materials

There are currently 14 known contaminated sites in the planning area administered by the BLM's Hazardous Materials Management Program (Map 3-36). Most sites are or were at one time involved and/or connected to past and present mining activities, while the remaining sites are associated with various activities (Federal, military, State, and/or industry) that took place in the past. Due to budget constraints and BLM priorities, remediation efforts of numerous sites have not been started. A few sites, Feather River Dump and Ungalik in particular, are identified to have site characterization conducted in the near future.

Remediation efforts in the planning area include the completion of the Dahl/Quartz Creek site for conveyance to the State of Alaska (August 2004) and the removal of pollution sources at the Ungalik site.

It is anticipated that additional sites will be identified, followed by remediation efforts. Additionally, it is anticipated that numerous potentially contaminated sites have already been conveyed to the State, regional Native corporations, village corporations, and/or tribal governments.

There are potential sources of pollution that are outside the boundaries of BLM-managed lands but may affect BLM-managed resources. Potential sources include abandoned and active military facilities and operations, mining activities and sites (abandoned and active), oil and gas activities and sites, illegal activities, and atmospheric deposition. Because the BLM does not have jurisdiction over resources and/or activities outside its management, the BLM is involved in coordination efforts with other institutions to minimize potential adverse effects to BLM-managed resources. If a potential pollution source does affect BLM-managed resources, the BLM has authority to take actions against responsible parties in order to remedy adversely affected resources. For further information pertaining to responsible parties, see the discussion on potential responsible parties (PRPs) on page 3-258. The hazardous materials that may be encountered as a result of various activities are listed in the following table.

Table 3-36. Activities and Associated Hazardous Materials

Activity	Hazardous Materials
Mining (abandoned and active)	Chemicals associated with processing ore or used in laboratories (e.g. mercury, cyanide) Explosives such as dynamite, ammonium nitrate, caps, and boosters Heavy metals (ore, product, and waste) Asbestos Petroleum (crude, products, and wastes) Contaminated environmental media
Military operations and facilities (past and present)	Unexploded ordinances (UXOs) Aircraft wreckage Formally used Defense sites (FUDS) Other military sites not identified as FUDS Contaminated environmental media
Illegal activities (past and present)	Unauthorized landfills Dumping of barrels or other containers with oil and hazardous substances on public land Drug labs Contaminated environmental media
Oil and gas activities (past and present)	Hydrogen sulfide gas Oil spills Other chemical spills Contaminated environmental media
Facilities on public land either Federal or private (under a right-of-way) (past and present)	Leaky storage tanks (above ground and underground) Asbestos Contaminated environmental media
Facilities off public land (past and present)	Same examples as for facilities on public land above
Atmospheric deposition	Heavy metals (e.g., mercury, selenium, lead, zinc) Contaminated environmental media

(2) Potential Effects and Risks to Environments

Potential effects and risks to environments due to polluting activities and contaminated sites/areas are widespread and touch nearly every program within the BLM. In an attempt to simplify the identification of potentially affected environments two types of effects are identified: environmental media and human activities. Environmental media is a generic term given to cover all basic environmental elements such as air, surface water, subsurface water (groundwater), and surface soils (topsoil). Generally, if one environmental medium is affected through pollution activities and becomes contaminated, another environmental medium is at risk of being contaminated as well. Human activities are any and all possible activities a “person” may desire to conduct on public lands within the planning area. Human activities need not be economically quantifiable to be identified as an activity that takes place on public lands.

(3) Environmental Media

Due to pollution activities and the result of contaminated sites and/or areas, a variety of environmental media are at risk and potentially affected in the present and future for a variety of reasons. The primary effect pollution and contamination has on environmental media is the

degradation of environmental quality. A summary of potential affects and risks to environmental media is listed in Table 3-37.

If an oil spill occurred on the ground near a river, for example, the surface soils would be affected. In a matter of time the subsurface soils and surface waters could be affected. Once those media are affected, the subsurface waters can become affected. Additionally, vegetation and animals that come into contact with the ground surface and/or the surface waters are also at risk of being affected.

For identification of the current conditions and trends of environmental media in the planning area, see the applicable sections within this chapter.

Table 3-37. Potential Effects and Risks to Environmental Media

If this medium is contaminated ...	...then these marked media are at risk of being affected.									
	Surface Soils	Sub-surface Soils	Surface Waters	Sub-surface Waters	Vegetation	Air	Wildlife	Fisheries	Avian Species	Marine Mammals
Surface Soils	X	X	X	X	X	X	X	X	X	X
Subsurface Soils	X	X	X	X	X		X	X	X	X
Surface Waters	X	X	X	X	X	X	X	X	X	X
Subsurface Waters		X	X	X	X		X	X	X	X
Vegetation	X		X	X			X	X	X	X
Air	X		X		X		X	X	X	X

(4) Human Activities

Due to pollution activities and the result of contaminated sites and/or areas, a variety of human activities are potentially affected and placed at risk in the present and the future for a variety of reasons. Table 3-38 summarizes potentially affected human activities from pollution activities and/or contaminated sites/areas. The primary effect pollution and contamination may have on human activities on public lands is the restriction of access and use of any type that may potentially affect the contaminated site (and potentially affect human health and safety) until the site/area is remediated and the BLM determines that a “No Further Action is Needed” action is appropriate.

For identification of the current conditions and trends of human activities in the planning area, refer to the other program sections within this chapter.

Table 3-38. Potential Effects and Risks to Human Activities

Activity	Potential Risks
Subsistence	Human health and safety Alteration of traditional activities Environmental injustice(s)
Cultural landscapes/places	Human health and safety Alteration of traditional activities Environmental injustice(s)
Permitted commercial activities	Human health and safety Economic loss(es)
Private/personal activities	Human health and safety Economic loss(es) Alteration of personal choice(s) Environmental injustice(s)
Recreation	Human health and safety Non-economic loss(es) Alteration of personal choice(s) Environmental injustice(s)
Research	Human health and safety Economic loss(es) Information loss(es)
Land Conveyance	Not meeting the 2009 deadline for conveyance Restricting access and use to contaminated sites/areas
Fire Protection	Human health and safety Economic loss(es)

Any person who qualifies as a PRP may be held liable for some portion of or all of the costs incurred by the BLM, the DOI, or other regulatory entities for cleaning up a hazmat site. These costs include all monies spent for site investigations, sampling, engineering evaluations, pilot studies, alternative remedy analyses, contractor costs, labor costs, enforcement costs, and other activities (not inconsistent with the process outlined in the National Contingency Plan) undertaken to address the release site.

The BLM's policy is to identify PRPs who are or may be liable for hazardous substance releases to the environment affecting BLM-managed resources and pursue all viable parties for the assessment, remediation, and reclamation of the impacted area(s) and resources. If the PRP does not respond in a reasonable amount of time and/or with reasonable effort, the BLM may then clean up the release and pursue cost recovery. If there is no viable PRP present, the BLM will prioritize the site and fund the removal/remediation to mitigate the threat to human health and safety and the environment.

(5) Natural Resource Damage Assessment and Restoration

The objective of the DOI's Natural Resource Damage Assessment and Restoration Program is to restore natural resources injured as the result of oil spills or hazardous substance releases into the environment. In partnership with other affected State, Tribal, and Federal trustee agencies, damage assessments provide the basis for determining the restoration needs that address the public's loss and use of these resources.

The program assesses the damages and injuries to natural resources entrusted to the DOI and negotiates legal settlements or takes other legal actions against the responsible parties for the spill or release. Funds from these settlements are then used to restore the injured resources at no expense to the taxpayer. Settlements often include the recovery of the costs incurred in assessing the damages. These funds are then used to fund further damage assessments.

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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 travel, tourism and recreation, reindeer grazing, and mineral exploration and mining.

a) Social and Economic

(1) Regional Overview

The planning area includes the Northwest Arctic Borough, the Nome Census Area, and the far western portion of the North Slope Borough. Nome and Kotzebue have the largest population and are "gateway communities," trade and transportation centers for the region. Point Hope (population 757) is the second largest city in the North Slope Borough and the fourth largest town in the planning area. It is also a "community of place," primarily as a subsistence whaling center, formerly a nineteenth century commercial whaling center. Twenty-two other villages are within the planning area. These villages range in population from 109 (Kobuk) to 772 (Selawik). Solomon is also included as it is an ANCSA Village Corporation, although its 2000 population was four individuals, and detailed census information is unavailable. All of the villages in the planning area are dependent upon resources for subsistence. Subsistence is probably the "interest" of most universal significance in the planning area.

Nome and Kotzebue have commercial airline service connecting cities outside the region. Regional air service provides the only year-round access to villages in the planning area. Although there are about 200 miles of roads and old rail beds in the Nome area, only Nome and Teller share access along a system built originally to connect mining sites. Many of the villages and towns are incorporated and collect sales tax ranging from 1% in White Mountain to 6% in Kotzebue. Nome and Kotzebue also collect hotel bed tax and liquor tax, and Nome collects property tax.

Northwest Arctic Native Association (NANA), Bering Straight Native Corporation, and Arctic Slope Regional Corporation were formed under ANCSA as were Native village corporations within the planning area.

The planning area can be characterized as a mixed subsistence-market economy. Villages such as Selawik and Kobuk fit this description closely, while Nome and Kotzebue have become closer to the classic industrial-capitalist character.

Recent change agents in the planning area include the opening and operation of the Red Dog Mine, the passage of ANCSA, and the passage of ANILCA, including creation of four conservation units in the area: Noatak National Preserve, Kobuk Valley National Park, Cape Krusenstern National Monument, and Selawik NWR. These events directly resulted in employment and income in the planning area. With the growth of major population centers (southcentral Alaska and Fairbanks), visitation and use of area resources has increased dramatically 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.

Increasing incomes and desire for basic amenities often not available in Bush villages inspire out-migration. In the Nome Census Area, for example, almost one-third of all housing lacked complete plumbing, and almost one-third lacked complete kitchen facilities.

Energy is very expensive in the region. Market basket surveys conducted by the UAF Cooperative Extension Service in 2004 reported Nome area electricity 72% more expensive than Anchorage, and 140% higher than the United States average; heating oil 41% higher than Anchorage; unleaded gasoline 64% higher than Anchorage; and propane 104% higher than Anchorage (UAF 2005a). Census 2000 reported that almost 51% of workers in the Northwest Arctic Borough walked to work, and almost 23% used "other means," referring to personal modes of transportation other than motor vehicles or public transportation. Diesel and a small amount of wind generation provide electricity in local areas. Similarly, food costs are much higher in the planning area than urban centers in Alaska. The market basket for a family of four in Nome cost 2.2 times that of Anchorage and 1.4 times that same basket in Fairbanks in December 2004.

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

(2) 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 Online at http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.htm. More detailed information on planning area communities can be found at this site.

(3) Demographics

The population of the Northwest Arctic Borough, the Nome Census Area, and the communities of Point Lay and Point Hope (within the North Slope Borough) totals 17,686 (ADLWD 2004). According to the Alaska Department of Labor and Workforce Development, the population of the northern region encompassing the two boroughs and one census area is approximately 75% Alaska Native, primarily indigenous Iñupiat and Yup'ik people (Fried and Windisch-Cole 2005). 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 race 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 the northern region communities has slowed to about 1.5% per year in the 1990s. Table 3-39, Table 3-40, and Table 3-41 show historic population 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 in the Fairbanks North Star Borough is relatively low at 7.2% for the decade, which is half the growth rate for the state. Table 3-39 below displays the growth of the Alaska Native population for the state and selected communities.

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, though it is far below the population

growth rate of southcentral Alaska. Most interesting, the northern region's (comprised of the three north-northwest boroughs and the Nome Census Area in the state) median age was 25.5 years, nearly 8 years younger than the state median of 33 years (Fried and Windisch-Cole 2005).

Out-migration is evident with 6.6 to 8.7 persons per year per 1,000 population leaving the Northwest Arctic Borough and the Nome Census Area during 1990-2003. This is similar to the out-migration of the Fairbanks North Star Borough (-11.5/1,000/year), and similar to most of rural Alaska. Net positive migration was reported in Juneau, Anchorage, the Kenai Peninsula, and the Matanuska-Susitna Borough (with the highest rates at 25.5/1,000/year) during the same reporting period (ADCCED 2005).

Table 3-39. Growth of Alaska Native Population

Location	Population by Year		Percent growth
	1990	2000	
Alaska	85,698	98,043	14.4
Anchorage	14,569	18,941	30.0
Fairbanks	5,330	5,714	7.2
Matanuska-Susitna Valley	1,939	3,264	68.3
Nome Census Area	6,148	6,915	12.5
North Slope Borough	4,336	5,050	16.5
Northwest Arctic Borough	5,209	5,944	14.1

Source: U.S. Census Bureau, Census 1999, 2000.

Table 3-40. Population per Community, Historic U.S. Census Data

Community	Population by Year				
	1960	1970	1980	1990	2000
Ambler	70	169	192	311	309
Brevig Mission	77	123	138	198	276
Buckland	87	104	177	318	406
Council	0	35	19	8	0
Deering	95	85	150	157	136
Elim	145	174	211	264	313
Golovin	59	117	87	127	144
Kiana	253	278	345	385	388
Kivalina	142	188	241	317	377
Kobuk	62	54	54	69	109
Kotzebue	2,054	1,696	1,290	2,751	3,082
Koyuk	129	122	188	231	297
Noatak	275	293	273	333	428
Nome	2,316	2,488	2,544	3,500	3,505
Noorvik	384	462	492	531	634
Point Hope	324	386	464	639	757
Point Lay	0	0	68	139	247
Selawik	0	0	0	596	772
Shaktoolik	348	429	535	178	230
Shishmaref	187	151	164	456	562
Shungnak	135	165	202	223	256
Solomon	0	0	4	6	4
Teller	217	220	212	151	268
Wales	128	131	133	161	152
White Mountain	151	87	125	180	203

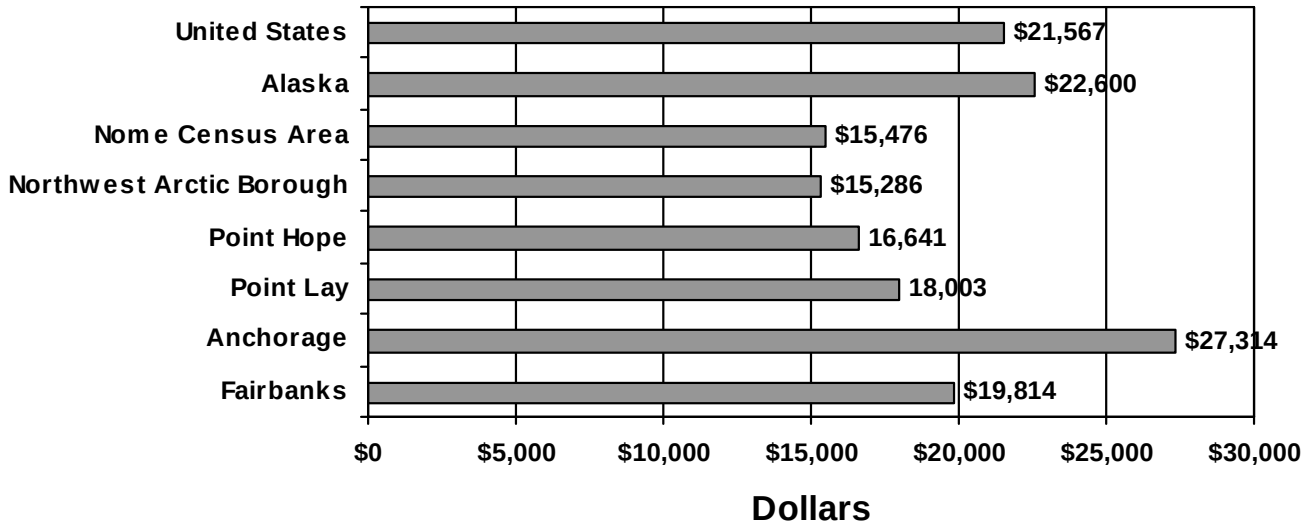
Source: Alaska Department of Commerce, Community, and Economic Development.

Table 3-41. Population of Selected Boroughs

Community/Borough	Population by 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
Northwest Arctic Borough	3,560	4,434	4,831	6,113	7,208
North Slope Borough	2,133	2,663	4,199	5,979	7,385

Source: Alaska Department of Commerce, Community, and Economic Development.

Figure 3-8. Comparison of Per Capita Income (2000)



Source: U.S. Census Bureau, Census 2000.

Table 3-42. Employment by Sector

Employment by Sector	Percentage of Total Employment by Area				
	Northwest Arctic Borough	Nome Census Area	Point Hope	Point Lay	Alaska
Agriculture, forestry, fishing, hunting, mining	14.3	1.5	3.0	7.3	4.9
Construction	4.5	3.0	9.7	24.0	7.3
Manufacturing	0.2	0.9	0	0	3.3
Wholesale trade	0.3	0.1	0	4.2	2.6
Retail trade	6.8	9.6	7.2	5.2	11.6
Transportation, warehousing and utilities	11.1	10.3	12.2	11.5	8.9
Information	1.6	2.3	0	0	2.7
Finance, insurance, real estate, rental and leasing	3.0	2.3	0	0	4.6
Professional scientific, management, administrative and waste management	1.7	1.8	0.4	3.1	7.6
Education, health and social services	33.4	38.1	36.3	25.0	21.7
Arts, entertainment, recreation, accommodation and food services	3.3	7.9	5.1	0	8.6
Other services	7.5	5.8	2.5	0	5.6
Public administration	12.4	16.4	23.6	19.8	10.7

Source: U.S. Census Bureau, Census 2000.

(4) Employment and Income

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 Northwest Borough School District, Bering Strait School District, and Borough government and school districts in Point Lay and Point Hope.

The Red Dog Mine run by Teck Cominco Alaska is the largest private source of employment in the planning area and the third largest employer in the Northwest Arctic Borough. Teck Cominco Alaska provided 412 direct jobs to employees and contractors in 2003. This is slightly over 14% of all wage and salary employment, and 22% of non-government employment in the Borough. Employees of Teck Cominco Alaska live in 11 villages in the planning area, as well as in various locations outside the planning area. 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 (Schaffer 2005).

Free range reindeer management is an industry that has become unique to the Seward Peninsula. Although reindeer were introduced in several Alaskan locations under the impetus of Sheldon Jackson in the 1890s, the only currently active herding occurs within the planning area. In 1996, the UAF Agriculture and Forestry Experimentation Station estimated that 14 herds grossed $1.1 million in income in 1996; however, BLM data indicate that the number of herders and size of herds has dropped since that time. There were a total of approximately 7,500 reindeer corralled by the only five active herders in 2004. As free range grazers, the reindeer move throughout the intermingled State, private, and various Federal agency lands. This makes it difficult to determine the exact income derived from grazing on BLM-managed lands. The BLM does not charge a fee for the right to graze.

ANCSA corporations, subsidiaries, and non-profits, and various tribal organizations have invested in services and provide employment for local residents and shareholders. The Arctic Slope Regional Corporation provides diverse employment including oil field services and construction. The Arctic Slope Native Association provides health service, social services, and hospital management. Ilisagvik College is a independent non-profit foundation. Maniilaq Association is a regional non-profit organization providing health, social services, public assistance, training, and a 25-bed hospital. Kawerak provides social and educational services for Alaska Natives, and is the third largest employer in the Nome area with 217 employees. Maniilaq Association is the second largest employer in the Northwest Arctic Borough. Norton Sound Health Corporation is a non-profit tribal health consortium of 20 Alaska Native communities employing over 400 people.

The Nome area benefits from a small but viable commercial fishery targeting salmon, halibut, crab, and herring. Although providing only a very small portion of fish harvest value in the state of Alaska, it provided $828,498 in 2003. Independent placer mines employ small numbers in the area. However, NovaGold Resources Inc. has identified two deposits estimated to hold one million ounces of gold. Neither of these deposits is located on BLM-managed lands. Production may begin in 2006.

Kikiktagruk Iñupiat Corporation (Kotzebue's village corporation) is a large employer in the visitor industry. NANA Management Service operates Nullaguik Hotel and Tour Arctic Corporation. NANA also operates hotels in Anchorage and Fairbanks.

Non-resident employment is similar to that in other areas of the state except in the North Slope Borough, where the percentage of non-local and non-Alaskan residents is very high. Private sector non-resident employment ranges from a low of 11% in Nome, to 13% in the Northwest Arctic Borough, to 28% in the North Slope Borough. The North Slope Borough workforce is comprised primarily of oil field-related jobs. Non-local Alaska residents also comprise a significant portion of the workforce in the planning area: only 10% in the Nome area, but 22% in Northwest Arctic Borough, and 58% in the North Slope Borough (Hadland and Wink 2005).

Unemployment in the planning area is considerably higher than in urban centers in Alaska and higher than the state average. According to State of Alaska data for 2003, unemployment ranged from a low of 15.2% in the Nome Census Area to 23% in Northwest Arctic Borough, while the state average was 8% (Fried and Windisch-Cole 2005). According to Economic Profile System data, there is no significant seasonal fluctuation in the rate of unemployment (Sonoran Institute 2005).

Labor force participation rates are low as is typical in Bush Alaska. Census data shows that White Mountain has the lowest participation rate in the planning area, with over 60% of the population not in the labor force in 2000. This percentage underscores the relative scarcity of jobs and emphasizes the role and importance of subsistence activities.

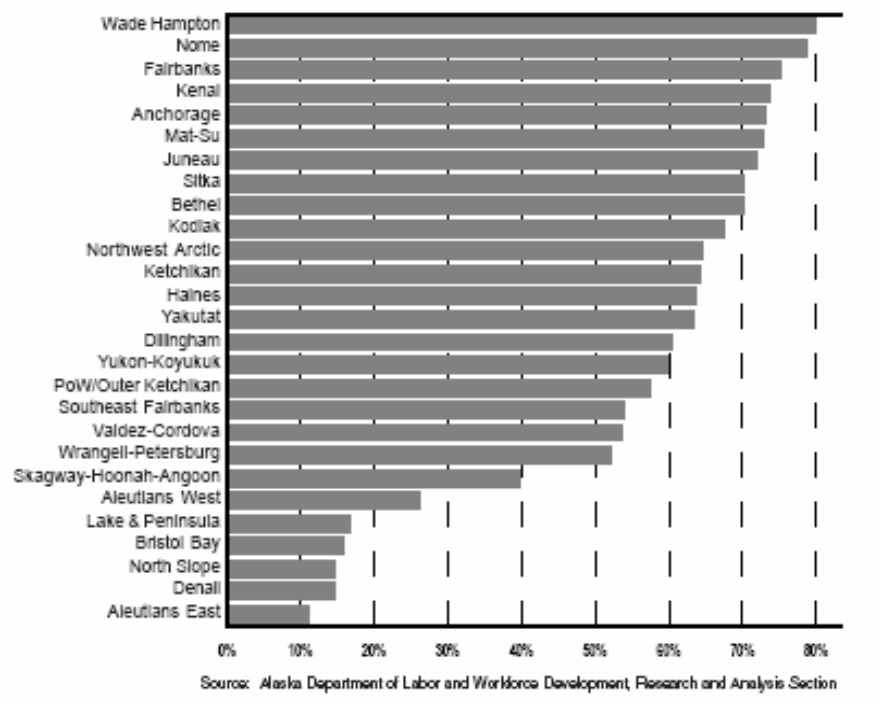
The educational attainment curve lags in Bush villages. Over 60% of residents of Alaska have some college, while in the planning area between 60 and 70% of residents completed high school or less. The difference may be exaggerated by the out-migration of more highly educated, and therefore, employable residents.

Per capita income in the planning area ranges from above the Alaska average in Nome and Kotzebue, to under $8,000 per year in smaller villages (see Figure 3-8 on page 3-267, and Table 3-44 on page 3-273 in the Environmental Justice section). Per capita income reflects the relatively lower age of the planning area population. Only in the regional centers does per capita income begin to respond to the high cost of living.

The extent of individuals considered at or below poverty level has improved since 1990. Poverty level and change for the three boroughs has been reported by the Alaska Department of Commerce. In the Northwest Arctic Borough 17.4% of individuals were below poverty level in 2000, whereas 18.4 percent were below the level in 1990. In the Nome Census Area 17.4% of individuals were below poverty level in 2000, whereas 22% were below the level in 1990. In the North Slope Borough, 9.1% of the population was below poverty level in 2000, whereas 8.6% were below the level in 1990. In comparison, 9.4% of individuals in Alaska were below the poverty level in 2000.

There is definite income outflow evident in the Northwest Arctic Borough, which experienced an increase from 5.5% in the 1980s to 24.5% in 2000. The Nome Census Area has experienced little outflow and little change as income outflow has dropped from 3.5% to 2.65% (Sonoran Institute 2005).

Figure 3-9. Percent of Private Sector Workers Who Are Local Residents



Source: Hadland et al. 2005.

(5) 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 North Slope Borough and city of Nome collect property tax, and the Northwest Arctic Borough collects a payment in lieu of property tax by agreement with Teck Cominco Alaska and the NANA Regional Corporation.

Table 3-43 on page 3-271 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. 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. Point Hope and Point Lay are the only villages in the planning area that are within the North Slope Borough, and they collect no taxes. Anchorage, Fairbanks North Star Borough, Matanuska-Susitna Borough, and the city of Fairbanks are included in the table for comparison purposes.

Table 3-43. 2004 Per Capita Tax Revenues in Dollars

Municipality*	Property Tax (Inc. Oil & Gas)	Sales Tax	Other Taxes	Total Taxes Reported	Population	Per Capita Revenue
Northwest Arctic Borough	4,900,000***	N/A	N/A	N/A	N/A	N/A
North Slope Borough	199,804,529	N/A	N/A	199,804,529	7,228	27,643
Anchorage	322,352,907	N/A	19,681,861	342,034,768	273,565	1,250
Fairbanks North Star Borough	71,382,439	N/A	1,375,192	72,757,631	82,131	886
Matanuska-Susitna Borough	55,571,134	N/A	716,992	56,288,126	67,526	834
Fairbanks, City**	8,685,154	N/A	3,748,522	12,433,676	29,002	429
Kotzebue	0	2,423,193	61,754	2,484,947	3,070	809
Nome	2,410,511	3,484,362	94,741	5,989,614	3,414	1,754
Noorvik	0	109,032	N/A	109,032	648	168
Deering	0	19,120	N/A	19,120	131	146
Koyuk	0	34,788	N/A	34,788	341	102
Brevig Mission	0	29,781	N/A	29,781	313	95
Elim	0	29,031	N/A	29,031	342	85
Selawik	0	63,565	N/A	63,565	820	78
Ambler	0	22,470	N/A	22,470	291	77
Teller	0	15,098	N/A	15,098	242	62
Kiana	0	24,937	N/A	24,937	408	61
Shishmaref	0	34,129	N/A	34,129	594	57
Buckland	0	20,602	N/A	20,602	409	50
White Mountain	0	10,472	N/A	10,472	214	49
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 2005.
* Only those municipalities that levy a sales, severance, property, or other type of local tax are included in this table.
** Both the city of Fairbanks and the borough in which it is located levy taxes.
*** Figure represents Payment in Lieu of Taxes (Schaffer 2005).

b) Environmental Justice

Iñupiat and Yup'ik Natives are the predominant minority population of the planning area. Demographic characteristics for communities within the planning area are presented in Table 3-44 on page 3-273. Data shows that all villages and towns have very high minority populations, all 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.

Environmental Justice is an initiative that culminated with President Clinton's February 11, 1994, EO 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," and an accompanying Presidential memorandum. The EO requires that each Federal agency consider environmental justice to be part of its mission. Its intent is to promote fair treatment of people of all races, so no person or group of people bears a disproportionate share of the negative environmental effects from the country's domestic and foreign programs. While the EO focuses on minority and low-income populations, the EPA defines environmental justice as the "equal treatment of all individuals, groups or communities regardless of race, ethnicity, or economic status from environmental hazards" (Envirosense 1997, U.S. Department of Energy 1997). Specific to the EIS process, the EO requires that proposed projects be evaluated for "disproportionately high adverse human health and environmental effects on minority populations and low income populations."

Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments," requires the BLM to consult with Athabaskan and other tribal governments of 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. As one way to foster 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. Nine scoping meetings were held during January through April 2004 at communities in the planning area, and Fairbanks and Anchorage. During this scoping process, the 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 increased recreational or sport hunting and fishing activities.
- Management of the WACH's important habitats and migration routes.
- A more detailed discussion of public concerns is provided in the Kobuk-Seward Peninsula Resource Management Plan Scoping Report (August 24, 2004).
- Subsistence activity is an important source of food and material which offsets high cost of living and high unemployment.

Table 3-44. 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
Ambler	$13,712	84.8	14.3	19.0	20.6	26.6
Brevig Mission	$7,278	90.6	48.4	43.3	1.3	46.4
Buckland	$9,624	95.8	11.9	7.9	21.8	35.5
Deering	$11,000	93.4	5.8	0	9.9	41.8
Elim	$10,300	92.7	7.9	8.0	14.4	44.6
Golovin	$13,281	84.0	4.3	0	2.4	32.1
Kiana	$11,534	92.5	11.2	5.6	6.4	44.8
Kivalina	$8,360	96.6	26.4	25.4	11.9	53.2
Kobuk	$9,845	93.6	28.6	32.0	0.0	44.6
Kotzebue	$18,289	71.2	13.1	9.2	6.9	29.9
Koyuk	$8,736	91.9	28.0	29.3	20.0	42.2
Noatak	$9,659	93.7	22.0	25.0	14.0	45.0
Nome	$23,402	51.0	6.3	5.4	7.4	32.0
Noorvik	$12,020	90.1	7.6	9.4	10.1	48.2
Point Hope	$16,641	87.1	14.8	13.9	16.6	34.7
Point Lay	$18,003	82.6	7.4	11.4	2.9	27.5
Selawik	$8,170	94.8	34.4	34.6	15.2	55.6
Shaktoolik	$10,491	94.3	6.1	0	16.6	40.1
Shishmaref	$10,487	93.2	16.3	16.2	9.5	42.3
Shungnak	$10,377	94.5	35.8	21.7	16.0	33.9
Teller	$8,618	92.5	37.7	33.9	6.1	58.3
Wales	$14,877	83.6	18.3	17.2	13.3	29.5
White Mountain	$10,034	83.7	22.4	16.3	7.0	62.8

* Native Alaskan/Native American is the dominant minority.
** The poverty level is $8,794 for individuals and a family of four is listed at $17,603 nationally (2000).
Sources: http://www.census.gov/hhes/www/poverty.html and U.S. Census Bureau, Census 2000.

c) Socio-cultural Systems

Unlike the socio-economic section, in which the current demographics of the region are discussed in terms of economics (e.g., population, employment, per capita income), this section focuses on the cultural differences that exist in the planning area. A socio-cultural system is a complex cultural structure consisting of a definable population within a determinable territory, characterized by shared and interrelated ways of life including beliefs, norms, values, and technologies, which are shared within the population and passed on from generation to generation. This system comprises the fundamental traditions, ideas, behavioral patterns, and tools that humans use to adapt to their surroundings, and forms the basis of each unique way of life and culture.

The planning area is the traditional home of the Iñupiat Eskimo, an indigenous people who have lived in the area for at least the past 2,000 years (Anderson 1984). Today, the Iñupiaq culture continues to flourish and succeed, despite over a hundred years of pressure in the form of continuous contact with mainstream American culture. The following sections describe the historical sociocultural circumstances of the Iñupiat before contact, an overview of the primary motivators of change that has occurred since contact, and a description of the sociocultural context as it exists today.

(1) Culture History: Traditional Social and Political Organization

In the past, the entire planning area was populated by several[4] autonomous groups, each of which occupied a specific region that included at least one permanent winter village. These autonomous groups have been variously called regional groups, tribes, societies, and nations in the anthropological literature (Burch 1975, 1980, 1998; Ray 1984). Burch (1998) however, provides the most compelling rationale in referring to these prehistoric populations as nations, in that they 1) had dominion over separate territories, 2) regarded themselves as separate peoples, and 3) engaged each other in war and trade, all aspects that define them as analogous to modern nations.

Each Iñupiaq nation had its own unique designation, with most consisting of a territorial or place name designation coupled with the suffix -miut, meaning “people of.” For example, the Iñupiat who live in the Shishmaref area are also known as Tapqaamiut and Qigiqtaamiut, both ethnonyms that refer to place names affiliated with the area, Tapqaq being the entire northwestern coast of the Seward Peninsula, and Qigiqtaq referring to the village of Shishmaref itself (Koutsky 1981, Simon 1998). Many communities located in the planning area have an Iñupiaq name in addition to the common name found on maps, and most of the current villages can be directly correlated to a historic Iñupiaq nation.

Most of the historic Iñupiaq Nations had a similar settlement pattern, consisting of several communities that were populated in either the spring for a duration until summer, or in the late

[4]The number of autonomous groups varies according to different authors. See Ray 1967, 1975, 1984; Burch 1990, 1998; and Simon 1998.

fall for a duration through the winter, and were located in the same general area from year to year (Burch 1998, Ray 1964). Most of these settlements were small, consisting of only two to five houses, but each nation also had a few regional settlements that were more densely populated and served as the primary destination for such events as Trade Fairs, Messenger Feasts, or other festivals and holidays. During those times when the spring or winter settlements were not occupied, most residents traveled with their families to locations of abundant resources (which frequently changed from year to year), where they camped in temporary shelters.

The total number of the more or less permanent settlements varied by nation, as populations aged, merged, or split. Burch (1998) estimates that some nations, such as the Akuniġmiut who occupied the central Kobuk River area, had as few as eight permanent settlements, while others nations had as many as 20. Because of the ability to harvest and store an abundance of food, the few Iñupiaq Nations of the planning area who participated in whaling were able to concentrate themselves into a single settlement for at least part of the year (Burch 1990, 1998). Like settlements, pre-contact population estimates varied by nation, with the lowest being 264 and the highest 792. A total pre-contact population estimate for the entire planning area ranges betweens 6,700 and 8,200 residents (Burch 1998, Ray 1964).

Politically speaking, the Iñupiaq Nations did not have a formal government, characterized by a “chief” or other political position that had the responsibility for making decisions for the entire population. Instead, the basic socio-political unit of the group was the household, with household being defined as all of the people living together under one roof, and frequently consisted of extended families containing three or more generations. Ellanna (1983) describes the social organization of the Bering Strait region, stating that the domestic family unit or household traditionally contained membership beyond that of the nuclear family, including multiple wives, grandparents, and married siblings and their families. Kinship categories included those related by blood, by marriage, by adoption, and other socially defined categories that extend through generations. Kin relationships were and are considered very important, and, in the past, people without kinsmen were frequently perceived as dangerous or as a stranger (Bogojavlensky 1969, Ellanna 1983). Ultimately, kinship was the means by which the rules of interpersonal behavior, such as alliances, obligations, and responsibilities, were defined.

The other primary socio-political unit of importance was the qargi (also referred to as karigi, kashim, kashigi, and kazgi), or communal men’s house (Burch 1990, 1998; Ellanna 1983; Ray 1964). The qargi was a large, centrally located gathering place, similar to a community hall, and the presence of a qargi defined whether a settlement was permanent (used repeatedly from year to year). During the day, men would use the qargi for a variety of activities, including carving, relating hunting tales, or educating young men. The qargi was also considered a forum for economic alliances, as it was where many community-wide ceremonies or feasts with neighboring groups took place. Politics, both within and outside the community, were discussed and decided upon in the qargi. Affiliation to a qargi was closely associated with kinship, hunting partnerships (such as skinboat crew participation in whaling communities), and other important political alliances, such as trade partnerships or war parties (Ellanna 1983).

(2) Major Historical Changes in Northwest Alaska in the 20th Century

Changes that took place in the Kobuk-Seward Peninsula Planning Area during the 20th Century can be broken down into three separate but related categories: Economy, Social Life, and Politics. It is safe to say that every major change experienced by the nations of the region is a direct result of foreign, primarily Euroamerican, contact.

By the late 19th century, commercial whaling was the economic activity of most importance in the far north, especially along the northwest and northern coast of Alaska. Whale oil was sought for the tanning of leather, as lamp oil and lubricant, and baleen, or "whalebone" was used to make corset stays and buttons (Chance 1990). Trade with the Iñupiat primarily occurred by independent traders who followed the whalers to provide them with goods and services. This trade included ammunition, flour, black tobacco, matches, lead, and molasses for whalebone (baleen), caribou meat, and fur clothing. Although outlawed by the American government, whiskey was also a popular trade item. At the main whaling stations of Point Hope and Point Barrow, whaling was such a profitable enterprise that many Alaska Natives worked for white crews, or began commercial crews of their own. In 1908, it was reported that in Barrow several Iñupiat crews were able to pay their men wages equal to those of the white crews, basically $200 for the six-week season (Chance 1990). Whaling continued after the turn of the century, but by 1908 the decimation of whale stocks, the advent of synthetic whalebone and the rise of the petroleum industry all resulted in the end of whaling as a commercial enterprise.

Chance (1990) describes the impact of whaling and trade from 1848 to the turn of the century as dramatically changing the Iñupiat economic and social life:

"With newly obtained repeating rifles, Iñupiat and whites together had so reduced the number of sea and land mammals that the old subsistence economy was severely jeopardized. The introduction of whiskey as a trade item disrupted and demoralized village life. The spread of new diseases such as measles, smallpox, and influenza, to which the Iñupiat had no immunity, took a devastating toll."

The presence of trading posts and access to white commodities, in addition to missionization, resulted in a slow change from a nomadic existence to a more sedentary one.

Missionization began in Northern Alaska in 1890, and by 1910 nearly every Alaska Native was Christian (Burch 1994). Many of the Alaska Natives in Southwestern Alaska had been converted by the Russians and practiced Russian Orthodox. However, when Alaska was transferred to American control a new wave of missionaries entered the last frontier to spread their version of Christianity. The Reverend Sheldon Jackson was appointed General Agent of Education for Alaska in 1885. Jackson established missions of various denominations at Barrow, Point Hope, Wales, and Unalakleet by the fall of 1890, each of which included a school, a nursing station, and a church.

In 1896, missionaries Johnson and Uyaraq visited a massive trade fair in the Kotzebue area that had brought together over 1,000 Iñupiat from the surrounding area for several weeks (Burch 1994, 1998). The impression made by the two missionaries was such that when Sheldon Jackson passed through on his inspection of the school the Alaska Natives asked him to establish a mission in the area, which he did in 1897. The missionaries at Kotzebue preached against the use of alcohol and tobacco, challenged the Native shamans, persuaded people to

abandon ancient burial customs, promoted Christian marriage and attacked polygyny, and ordered a halt to Native dancing (Flanders 1991).

Missionization is acknowledged as the most influential historical change for the Iñupiat, due to the active agenda of westernization. Charles Brower et al. (1994) assert that the missionaries at Barrow were the primary driver of culture change for the Iñupiat by making the people of Barrow move out of their comfortable semi-subterranean homes and into drafty frame houses, keeping the residents in the village year-round so that their children went to school, and disallowing the practice of shamanism. However, in Northwest Alaska, a case has been made that the role of the *anatguk*, or shaman, has simply been transformed, and is still found in Iñupiat communities today (Ganley 1996).

Another important contribution to the change in traditional Iñupiat lifestyle was the introduction of reindeer during the 1890s. Sheldon Jackson saw reindeer as being the solution to providing the Iñupiat with a large, permanent wealth-producing industry while at the same time addressing the problem of the decline in subsistence resources in the north (Chance 1990, Koskey 2003, Simon 1998). Approved by the American government, over the next ten years herds were imported, and Chuckchi, Lapp, and Saami herders were brought over to teach the Alaskans the reindeer trade. Herds were supervised by the missions, and later by the schools. A man began as an apprentice and was loaned a small herd, which he paid back as the herd multiplied.

Between 1892 and 1902, 1,250 reindeer were imported to Alaska from Siberia, and by 1932 they had increased to over 600,000 (Chance 1990). Over the next two decades, the amount of reindeer declined to such an extent that by 1940 only 200,000 remained, and by 1950 the number was reduced to 25,000. There are several reasons for this decline, including disease and predation, changes in government administration and policies, new opportunities for the Iñupiat to gain a cash income, and changing attitudes of the Iñupiat to subsistence hunting and wage labor. Today, reindeer herding still occurs in a limited area on the Seward Peninsula (see Livestock Grazing section beginning on page 3-149).

Trapping, especially for fox fur, became an important enterprise for the Iñupiat during the 1920s. Pelts often sold for between 50 and 100 dollars, and people needed money to buy what were now considered essentials: flour, tea, cloth tents, iron tools, and tobacco. The new commitment to trapping also brought about a number of changes to the social life of the Iñupiat, due to the replacement of traditional hunting patterns based on strong cooperative ties linking several related hunting partner families, with a trapping pattern characterized by a more individualistic enterprise, involving, at most, two families (Chance 1990).

With missionization, and more importantly, with the coming of whalers, prospectors, and trappers, came disease. In 1900, more than 200 inland Eskimos died of influenza after trading in Barrow, due to the visit of a whaling ship. Not two years later at least 100 Barrow people died of a measles epidemic (Chance 1990). In Wales in 1918, over two-thirds of the population died in one week after an Iñupiaq man with influenza arrived in town, and in Teller over 197 adults died from the same illness. So much death, especially of adults, led to a more rapid decline of doing things in the traditional way.

During the 1930s, a number of new social policies established by the United States Government continued the conversion of the Iñupiat to a more cash based lifestyle. These included old-age pensions, Aid for Dependent children allotments, and other relief funds. The establishment of Post Offices in every community with a school provided jobs in the form of postmasters, secretaries, and janitors (Hughes 1965). In the 1940s numerous Alaska Natives joined the

military, both as defenders of the country in the Army or Navy, and as defenders of the state in the Alaska National Guard.

After the war a number of new economic opportunities appeared. Oil exploration on the North Slope brought with it a number of jobs, as did the installation of numerous military bases and communication outposts. Chance (1990) describes numerous features of change in the social life of the Iñupiat due to the change toward reliance on cash. Small things like a switch to bottle feeding of infants, and the wearing of diapers occurred. Larger changes, such as the undermining of women's autonomy due to the incorporation of the western view of womenhood, the distancing of teenagers from their parents due to the adoption of popular American culture, and changes in marriage and courtship due to the new economic environment occurred (Chance 1990). Similarly, the problems of alcoholism and drug abuse, the high rates of suicide in the villages, and death due to heart attacks, as a result of high cholesterol with the substitution of American foods such as Crisco for seal oil, are all a direct result of acculturation.

The mid-to-latter half of the 20th century has been extremely important in the history of Northwest Alaska and Alaska in general. In 1931 the BIA was established, which provided Alaska Natives with a variety of human services and programs, from health care to education and welfare payments. In 1934, the establishment of the Indian Reorganization Act, and its amendment in 1936, gave Alaskan Native communities the right to organize their tribal governments under Federal constitutions and to establish Federally chartered businesses and cooperatives (Case 1984). This meant that Alaska Natives have had to become extremely familiar with American government and political procedure, in order to be successful. In 1958, the Statehood Act added to the levels of government regulating small communities, but also allowed for the creation of municipalities at the local and regional level.

ANCSA permitted the conveyance of some 44 million acres of land to Alaska Native corporations along with a cash payment of over $1 billion, in exchange for the alleged extinguishment of aboriginal Native claims in Alaska. The Alaska Native Allotment Act (actually established in 1906) and ANILCA, passed in 1980, gave individuals and family groups the right to land, although not specifically ownership per se (Case 1984).

(3) Local and Regional Sociopolitical Organization Today

For the Iñupiat, kinship networks and the role of the family are just as important today as they were before contact. Although living in nuclear family units comprised of parents and children is more customary than the extended family households of the past, relatives are still the fundamental pool from which partnerships, support, and aid are sought, and to which obligations are due. Kin networks continue to be the basis of alliance and affiliation in modern Iñupiaq culture.

All of the communities in the planning area have a two-branch political system, the local municipal government of the city (or the "city office"), and the local tribal government, consisting of the Native village Tribal council (formerly the IRA Traditional Council). For example, the two local government offices in Shungnak include the city of Shungnak and the Native Village of Shungnak, each with their own responsibilities for the community. Municipal services, such as water and sewer, electrical and power, public safety, and cable TV, are handled by the City Office. Social services such as child care, language revitalization programs, or Elder Councils, including any issue that has the potential to affect the tribe or the Iñupiaq culture, are handled by the Native village. These include issues about land, hunting, subsistence, livelihood, local

research (biological and social), and other important social concerns like local hire, substance abuse, and the importance of maintaining traditional Iñupiat values.

The passage of ANCSA resolved land claims between the indigenous Alaska Natives, the State, and the Federal government. Under ANCSA, Alaska was divided into 12 regions, with each region having a for-profit corporation responsible for managing the land entitlement and money derived from ANCSA. A thirteenth corporation was also created for those Alaska Natives living outside of the state. Three regional corporations are present in the planning area: the Bering Straits Regional Corporation based in Nome, the NANA Regional Corporation based in Kotzebue, and the Arctic Slope Regional Corporation based in Barrow. The regional corporations in Alaska today are some of the most successful businesses in the state, holding diverse investment portfolios including properties such as hotels or apartment complexes, industries such as oil and gas or construction, and stocks or other capital investment.

Most of the communities in the planning area also have a local for-profit village corporation. Village corporations are responsible for managing the land and money each individual community received with the passing of ANCSA, and are also able to bid on contracts, create investments, and engage in other for-profit activities for their shareholders. Every Iñupiaq resident living in the planning area in 1971 qualified for 100 shares each of their regional and local village corporation. Every year in which a profit is made, local and regional corporations distribute dividends to their shareholders, similar to the traditional system of reciprocity in which resources are shared within regions and communities.

The three regional corporations of the planning area also have an associated non-profit social services entity: Kawerak on the Seward Peninsula, the Maniilaq Association in the Kotzebue area, and the Arctic Slope Native Association in Barrow. The non-profit organizations primarily provide health, social, and tribal services to the resident communities of the region, including educational and cultural preservation opportunities for regional shareholders. It should be noted that the regional corporations, village corporations, and regional non-profits are all “owned” by the indigenous population of each region, not the populations at large.

Additional Alaska Native non-profit organizations which serve to represent a variety of indigenous issues are also located in the three regional centers of Barrow, Kotzebue, and Nome. Examples of these include the Bering Straits Foundation, dedicated to the preservation and protection of the cultural heritage of the region, including cultural sites and property management; and the Alaska Eskimo Whaling Commission, formed in 1977 to represent the whaling communities, and protect and preserve the subsistence hunt of bowhead whales. Additional non-profit entities that are subsumed within the overarching regional nonprofits, such as the Eskimo Walrus Commission or the Reindeer Herders Association, serve specific roles relative to maintaining the traditional way of life of Alaska Native residents in the planning area.

Two additional regional governments are also present in the planning area, the Northwest Arctic Borough, with its main offices in Kotzebue, and the North Slope Borough, with its main offices in Barrow. The Northwest Arctic Borough was formed in June 1986, is a home rule borough and the local political subdivision of the State. The borough is comprised of 11 communities in northwest Alaska, has an 11 member assembly, a 7 member planning commission, and a 15 member staff. Borough formation has allowed these 11 communities to work cooperatively to receive state funds for transportation infrastructure, telecommunications systems, and other services for the benefit of the people of the region. The North Slope Borough was formed in 1972, and is the largest home rule borough in the country, comprising 86,000 square miles. The borough consists of eight communities located north of the Brooks Range, two of which

(Point Hope and Point Lay) are located in the planning area. Though officially members of the North Slope Borough, many municipal services such as health care that are provided to Point Lay and Point Hope originate from the Northwest Arctic Borough given the proximity of these communities to Kotzebue.

F. Subsistence

Subsistence in Alaska is the traditional way of life of Alaska Natives, and, under the terms of the Federal subsistence provisions in ANILCA, for other rural Alaskans as well. While many hold the view that subsistence is simply the taking of fish and game resources for nutrition, in actuality it is about the harvest, processing, distribution, and consumption in a traditional way that can not be separated from other aspects of the Alaska Native culture. Subsistence is the connection that the Iñupiat have with the land, weather, and resources of the planning area, and, as such, it comprises the core of Iñupiat culture as much today as it did in the past.

State and Federal law define subsistence as the “customary and traditional uses” of wild resources for food, clothing, fuel, transportation, construction, art, crafts, sharing, and customary trade. Subsistence uses are central to the customs and traditions of the indigenous cultural groups in Alaska, including the Iñupiat. Subsistence hunting and fishing are important sources of employment and nutrition in almost all rural communities, and the opportunity to engage in a subsistence lifestyle is guaranteed for rural residents by ANILCA.

1. Traditional Subsistence Use Patterns in the Planning Area

The majority of the resources exploited in the planning area are seasonal, which means that there are periods of scarcity and abundance during the yearly cycle. To take full advantage of the resources of the area, settlements were moved with the seasons. For example, in the Shishmaref area, the people followed a sedentary seasonal subsistence pattern, distinguished by a cycle of economic pursuits and movements within a specific geographic region. “Each year at freeze-up, members returned from small, scattered settlements to a central base, or home village, usually located on the coast. The people remained at their home villages through the winter, engaged in subsistence activities. In the spring they relocated to inland areas and moved up rivers and streams to pursue the seasonal resource” (Koutsky 1981).

Three traditional subsistence patterns have been defined by Ray (1983) for the Bering Strait Region of Alaska. The first is designated the Whaling Pattern and consists of whale, walrus, and seal hunting and fishing. The second is the Caribou Hunting Pattern and included caribou hunting, fishing, and some small marine-mammal hunting of seal and beluga. The third is the Small Sea Mammal Pattern consisting of the harvest of seal, beluga, fish, and caribou. These subsistence patterns have three important aspects: 1) the seasonal mobility of the inhabitants for food gathering purposes, 2) the flexibility of the food quests and the variety of principle foods utilized in one subsistence area, and 3) the many alternatives offered in all subsistence patterns, especially the Small Sea Mammal and the Caribou Patterns (products not available within the patterns were usually obtainable through trade) (Ray 1983).

On the Seward Peninsula, most of the communities conformed to Ray’s *Small Sea Mammal* Pattern. A seasonal year for most Seward Peninsula pre-contact nations, began in the winter with people returning to their home village which was usually located in an area with good winter resources. At this time, people went seal hunting on the ice, fishing for tomcod, flounder, and bullheads, and snared small mammals and ptarmigan. A successful early winter hunt, supplemented by food in storage, allowed long trips for visits with relatives in other villages and for seasonal festivities.

Ugruk, or bearded seal, hunting occurred in the early spring. When the ice began to break up, people traveled to their ugruk hunting camps on the coast, and if they were lucky, they also harvested walrus and beluga whales. Ground squirrels and hares were also snared at this time.

During the summer, most people moved to fishing camps located along the rivers, when they gathered and processed fish, greens, migrating waterfowl, and eggs. Small animals were also snared, and berries were picked when they became ripe. In the fall cooperative hunts were organized to take advantage of the migrating caribou herds that passed through the area.

The only community on the Seward Peninsula to participate in whaling (conforming partially to Ray's *Whaling Pattern*) is Wales, a result of its close proximity to the migration route of bowhead whales through Bering Strait. Whaling occurred primarily in spring, and required a well-organized cooperative effort on a yearly basis.

In the Kotzebue-Northwest Area, defined by most researchers as the area north of Seward Peninsula, most communities either conform to Ray's *Small Sea Mammal Pattern* or the *Caribou Hunting Pattern,* depending for the most part on a community's proximity to the ever-changing migration routes of the WACH. As was mentioned above, the flexibility inherent in any subsistence strategy that follows the seasonal availability of a variety of resources results in the adaptability of a community to focus on those resources that are the most abundant in any given time or place.

The generic traditional seasonal round for the Kotzebue Sound-Northwest Area is described as follows. During breakup, most people occupied small settlements on the outer coast. As breakup proceeded men hunted ringed and bearded seals, first individually in kayaks, and then in crews using umiaks as the large pans of ice began to separate. While the men were hunting, the women dried meat and skins, making sealskin rope and storing the dried meat and blubber in pokes. Food eaten during the spring consisted of fresh and just-dried seal meat, supplemented by eggs and waterfowl that were snared and shot in the lakes behind the beach. People who needed to put new covers on their boats did so during the spring.

When all of the ice was gone, people packed up their boats and headed south, joining other travelers in boats along the way, all of them heading for Sheshalik and the great trade fair (located to the north of Kotzebue, near the mouth of the Noatak River). Time was spent hunting ducks and geese, an occasional stray beluga, and fishing for salmon and whitefish.

In early August the trade fair was over, causing most of the foreigners to leave for home. The local residents at this time stayed where they were, spreading out along the northern shore of Kotzebue Sound and the western side of Kotzebue (Baldwin) Peninsula, and began harvesting salmon in earnest. Whitefish were caught as the salmon run ended. Women fished, dried fish, and picked greens, Eskimo potatoes (*Hedysarum alpinum*), and berries. Burch (1990) states that most of the men went caribou hunting, using both snares and bows and arrows, and also got a number of bears using spears. Hunters returned about the middle of September, at which time families returned to their fall winter settlements.

As the water began to freeze, attention focused on fishing for tomcod, Arctic cod, sculpin, and flounder using hooks in holes in the ice. Some people set nets made of willow bark in lagoons or lakes for whitefish. Others went out and began netting sheefish under the ice, but because of a taboo that didn't allow bringing these fish home until midwinter, they were usually left in a pile

in the ice until then. Other fall subsistence activities include hunting caribou, snaring ptarmigan, and setting traps for furbearing mammals.

During the winter, Kotzebue seems to have been better off than most of the other communities/villages south on the Seward Peninsula, and north up the coast. The reason given for this is the fact that fish could be harvested year round in the Kotzebue area (Burch 1990). Ptarmigan and caribou were still around, and seals could be caught off the northern shore of Kotzebue Sound. The months of November to January were considered the holiday season. Activities mostly included dances and feasts, with people moving back and forth from village to village.

The communities of Point Hope, Wales, and Kivalina are the three communities in the planning area that practiced Ray's *Whaling Pattern* in the past, and all three are considered active whaling communities today. Whaling is a communal effort, and it is customary for an entire village to participate in the process. In this way, whaling requires the role of a lead organizer, someone to ensure that labor is properly utilized and that prescriptions are followed to ensure a successful hunt. This role is filled by the *umialik*, or boat captain, who had the responsibility of providing all of the needed gear, materials, and supplies. The status of *umialik* is achieved through wealth or having access to the raw materials needed to construct a boat, lookout camp, and provide food for the crew, as well as through prestige, which is successful leadership denoted by making sure that the proper respect is shown to ensure a safe and successful hunt.

While whales provide a large amount of food that could be shared by an entire community and sustain them on a year-round basis, the act of whaling required supplies and equipment derived from a wide variety of resources including caribou skins for sleeping pads, small seal skin floats, antler for harpoon heads and foreshafts, and walrus or bearded seal skins for boat covers, to name just a few. As a result, while whaling allowed for a relatively more sedentary lifestyle where entire nations would come together twice in a year to harvest whales, whaling communities also practiced a seasonal round of harvesting, traveling to where the resources could be harvested or obtained through trade.

A typical year for whaling communities begins in the spring, when whaling crews and their wives would begin to go through the gear in order to see what needed to be replaced, mended, or created anew. As soon as leads, or areas of open water, began to appear in the ice, lookouts would be posted and camps would be established on the ice after the sighting of the first whale, usually in March or April. Spring whaling in the communities of the planning area would be over by the beginning of May, at which time hunters, still working as a crew as during whaling, would focus their efforts on walrus and bearded seals (Spencer 1959, 1984).

During summer, the whaling crews tended to break up, and travel inland in family units, to either hunt caribou or harvest fish, or both. Late summer was a time to come together at trading centers and exchanging needed commodities such as seal oil, caribou skins, and other resources not readily available. During the fall people returned to their established sedentary villages, and shore-based whaling occurred, especially if spring whaling was not that successful, and if the conditions were right (Foote 1960). Once winter set in, men would hunt small seals on the ice at their breathing holes, and fishing would occur through the ice in rivers or lakes near the village. Like the other subsistence patterns, winter was also a time of festivity and feasting, a time for communities to come together and celebrate the success of the past year, and ensure a continued bounty.

2. Subsistence Patterns Today

For the most part, the resources that were utilized by the residents of the planning area in the past are still utilized by the residents of today, albeit harvested with modern technology. The primary sea mammal resources of the planning area consist of bowhead whale, beluga, bearded seal, ringed seal, harbor seal, and walrus (Map 3-39, Map 3-42, and Map 3-45). Migratory waterfowl are still the primary fresh meat of the spring, and fishing occurs year-round. Caribou, and lately, moose and musk-oxen comprise the primary large land mammals actively hunted in the planning area. Additionally, small mammals such as ground squirrel, Arctic hare, snowshoe hare, and muskrat are used both for their meat or fur. Other animals presently harvested from the planning area include porcupine, martin, red fox, white fox, wolverine, weasel, mink, river otter, wolf, lynx, marmot, ground squirrel, hare, grizzly bear, polar bear, and mountain sheep (Map 3-37, Map 3-40, and Map 3-43).

According to Burch (1990, 1998), elders of the Kotzebue region consider fish to be the most important resource of the area, an assertion that is reflected in the large per capita harvest of this resource (see Table 3-45). Whitefish is located throughout the lagoon, and salmon runs occur on both the Noatak and Kobuk rivers. Char migrate through the Sound during the summer, heading for the Agashashok and Noatak rivers. Fresh water fish include blackfish, suckers, grayling, and pike, and ocean varieties include tomcod, blue cod, flounder, smelt, sculpin, capelin, and herring (Map 3-38, Map 3-41, and Map 3-44).

Although most residents of the planning area live a sedentary life in organized communities, hunters and fishers still travel great distances to subsist. The incorporation of new technologies such as snow mobiles, OHVs, and gas-powered boats allow hunters access to larger areas of land with less time and effort. In this way, it is possible to work within a wage-based economy, while still practicing a subsistence lifestyle. Likewise, it is still customary for most communities to relocate to seasonal camps for specific activities, such as the putting up of bearded seal meat or fish, even if these seasonal camps are only located a short distance from the permanent village. Additionally, as part of the land claims settlement of ANCSA, many of the residents of the planning areas have allotments, or small tracts of private land located in their traditional harvest areas within their region. Travel to, and extended stays at, family allotments is still a yearly occurrence throughout the planning area.

During the scoping process for the current plan, the BLM received numerous comments related to subsistence, specifically, that subsistence use of resources is the priority for all communities in the planning area, and that the protection of this use from other uses or from resource development is integral to the well-being of the Iñupiat who live within the planning area. One major concern that arose during scoping was the issue of competition between subsistence hunters and sport hunters. Some areas within the planning area, such as the Squirrel River corridor, have become especially attractive to sport hunters who fly in from cities that do not have a Federal rural subsistence priority such as Anchorage or Fairbanks. This increase in competition for resources has resulted in subsistence hunters being marginalized within the area.

Many comments received during scoping identified locally important subsistence use areas such as the headwaters of the Koyuk, Ungalik, and Inglutalik rivers; Nulato Hills; and Norton Bay. Norton Bay was also identified as an area that is important for subsistence on a statewide level. This area supports fish and wildlife resources that migrate to other areas of the state. Although the highest subsistence use areas were selected by the Native corporations to protect

those lands, all of the Federal lands outside of Native corporation boundaries in the Nulato Hills are also important for subsistence use.

Table 3-45 lists the most complete harvest information by community currently available for the planning area. It should be noted that for many of the communities, harvest information is lacking. It is important to note that this lack of data is not a reflection of the importance of subsistence resources to residents or communities. For many of the other communities, the numbers represented in the table from the mid-to-late 1980s still represent the most current numbers for the area. Data on subsistence harvest in the planning area is lacking simply because research in this area has been slower to become initiated, this region has experienced less pressure for industrial activity or other development, and there is less user-conflicts than areas located on or near the main road corridors.

Table 3-45. Resources Harvested and Reported Per Year

Community	Pounds of Resources Harvested Per Capita				
	Birds	Fish	Sea Mammals	Land Mammals	Vegetation
Ambler	15.02	ND	ND	ND	ND
Brevig Mission	18.93	190.86	326.81	25.54	15.78
Buckland	15.28	ND	ND	ND	ND
Deering	23.61	33,681	221.10	189.46	9.44
Elim	10.71	ND	ND	123.24	ND
Golovin	24.61	242.87	191.35	105.48	29.47
Kiana	6.10	ND	ND	187.30	ND
Kivalina	10.79	253.29	318.02	165.25	14.03
Kobuk	19.8	ND	ND	ND	ND
Kotzebue	3.52	237.72	157.71	177.46	16.23
Koyuk	17.63	ND	ND	174.76	ND
Noatak	4.48	179.49	47.67	224.40	4.85
Nome	5.13	ND	ND	ND	ND
Noorvik	16.79	ND	ND	ND	ND
Point Hope	ND	ND	ND	ND	ND
Point Lay	48.40	24.74	637.41	177.71	1.85
Selawik	7.35	ND	ND	298.47	ND
Shaktoolik	16.91	ND	ND	144.36	ND
Shishmaref	27.64	157.53	441.45	150.38	12.86
Shungnak	10.5	369	1.5	249.2	10.2
Teller	6.54	ND	ND	ND	ND
Wales	11.62	98.72	580.33	25.53	4.69
White Mountain	32.53	ND	ND	102.53	ND

Source: Alaska Department of Fish and Game, Community Profile Database—most representative reporting year; Magdanz et al. 2004.
ND = no data

3. Federal Subsistence Management

Title VIII of ANILCA establishes both a conservation mandate (conserve healthy populations), and an allocation mandate (priority for non-wasteful subsistence uses by rural residents) for subsistence on public lands in Alaska. These mandates are implemented through the Federal Subsistence Program, which is comprised of the Federal Subsistence Board (FSB), 10 Regional Advisory Councils (RACs), and interagency staff specialists. The Federal Subsistence Program provides for 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;
- The making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption; and
- Barter, sharing, and customary trade.

ANILCA Title VIII also ensures reasonable access by rural residents to subsistence resources on public lands, and mandates a priority for subsistence use over the taking of fish and wildlife for other purposes (such as commercial or recreational use).

The FSB consists of the Regional or State Directors for the FWS, BLM, USDA Forest Service, NPS, and BIA, and is chaired by a subsistence user representative appointed by the Secretary of the Interior. The FSB is tasked with management of subsistence resources on public lands relative to population health and maintenance, including setting bag limits, seasons of harvest, means of taking, regulatory and public processes, and providing a rural priority.

Under Alaska's Federal subsistence regulations, which only apply to Federal public land, a person must be a rural Alaskan resident to harvest fish and wildlife. All communities and areas within the planning area are designated as rural, therefore, all permanent full-time residents of the planning area are eligible subsistence harvesters. Under these regulations, seasonal residence does not constitutes a primary permanent residence, and is therefore not sufficient to qualify a person as a rural resident.

The FSB also determines which communities and areas have customarily and traditionally taken specific fish and wildlife populations. These customary and traditional use determinations are listed along with seasons and harvest limits for each management unit in the Federal regulations. If there is a positive determination for specific communities or areas, only those communities and areas have a Federal subsistence priority for that particular species in that management unit. If no customary or traditional use determination for wildlife/fish population in a management unit has been made 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. This means there is no Federal subsistence priority and, therefore, no Federal subsistence seasons or bag limits for that area and population.

The planning area has within its borders more than 20 Federal qualified subsistence communities, and encompasses wholly or in part three Game Management Units. Each management unit or subunit has multiple species, multiple populations, intense allocation claims by commercial, sport and subsistence user groups, intensive inter and intra community competition for subsistence resources, and multi-cultural user groups.

The BLM is responsible for administering the Federal Subsistence Program on BLM public lands in the planning area, including data collection and analysis, and implementing and enforcing regulations. The overall objective is to provide for rural subsistence use, while maintaining healthy populations of subsistence resources within the bounds of recognized fish and wildlife management principles.

DOI goals are found in *Department of Interior Strategic Plan 2003-2008*. No specific goals exist for subsistence; however, mention is made of the unique trust responsibility and relationship that exists between the DOI and the 562 Federally recognized American Indian and Alaska Native tribal governments. The strategic plan states that:

"Each possesses a right to tribal self determination and self-governance, in accord with their sovereign authority. The Department represents the Federal side of that relationship. Our responsibilities are to work with Tribal groups and governments to improve and protect their land and natural resource assets, manage Indian trust accounts, fulfill treaties and the mandates of Federal law, and help create educational opportunities and improve the quality of life (DOI 2003)."

BLM's national goals are outlined in the *Bureau of Land Management Strategic Plan 2000-2005* (BLM 2000) The mission goals related to subsistence are to preserve natural and cultural heritage resources, understand and plan for the condition and use of the public lands, and restore at-risk resources and maintain functioning systems.

4. Economics of Subsistence

In the previous section (Subsistence) we note the significance of the harvest of natural resources for personal use. In this section we examine the value of the harvest. Table 3-47 shows that where data is available, every community participates in all traditional subsistence harvest activities. This table displays the only relatively recent reliable data available on the subject. Data gaps appear, but where the data is complete, it is relatively consistent. Census data from 1990 is used, as the data is from various years, it is closest to the 1990 census. The value per pound of resource is taken as an average of $4.00 based upon valuations published by Colt (2004) and Wolfe (2000). It is important to note these valuations are not adjusted for local cost. The market basket cost of food in the planning area is much higher than urban communities in Alaska, and still higher than most communities in the United States. Table 3-46 shows the UAF Cooperation Extension Service market basket cost for a family of four (two children 6-11 years of age) for a week in December 2004.

Table 3-46. Market Basket Comparison

Location	Nome	Anchorage	U.S.
Market basket cost	$233.19	$107.37	$98.70

Source: http://www.uaf.edu/coop-ext/index.htmlAlaska Food Cost Survey UAF Cooperative Extension Service, January, 2005 (http://www.uaf.edu/coop-ext/fcs/2004q4data.html)

The market basket is more than twice the cost of comparable goods in either location compared. UAF Cooperative Extension Service supplies data collected quarterly in 21 Alaskan communities. Nome is the only community in the planning area where market basket data is

collected. The significance is that the value of subsistence resources to villages in the planning area may be understated by the accepted valuation.

Table 3-47. Subsistence Resource Harvest and Economic Significance

Community	Population (1990)	Birds*	Fish*	Sea Mammals*	Land Mammals*	Vegetation*	Per Capita Use (pounds)	Value ($4/pound)
Ambler	311	4,955	ND***	ND	ND	ND	NA**	NA
Brevig Mission	198	3,473	35,016	59,958	4,685	2,895	536	$2144
Buckland	318	5,787	ND	ND	ND	ND	NA	NA
Deering	157	3,481	33,681	32,603	27,937	1,392	634	$2525
Elim	264	2,870	ND	ND	38,540	ND	NA	NA
Golovin	127	4,158	41,038	32,332	17,823	4,979	790	$3160
Kiana	385	2,415	ND	ND	71,351	ND	NA	NA
Kivalina	317	3,708	87,068	109,339	56,803	4,823	810	$3240
Kobuk	69	2,020	ND	ND	ND	ND	NA	NA
Kotzebue	2751	12,852	867,354	575,419	647,478	59,207	786	$3144
Koyuk	231	4,969	ND	ND	48,402	ND	NA	NA
Noatak	333	1,698	68,068	18,078	85,099	1,838	525	$2100
Nome	3500	18,014	ND	ND	ND	ND	NA	NA
Noorvik	531	10,400	ND	ND	ND	ND	NA	NA
Point Hope	639	ND	ND	ND	ND	ND	NA	NA
Point Lay	139	5,836	2,983	76,853	21,426	223	790	$3160
Selawik	596	4,088	ND	ND	210,190	ND	NA	NA
Shaktoolik	178	3,692	ND	ND	33,923	ND	NA	NA
Shishmaref	456	15,481	88,216	247,212	84,215	7,204	956	$3824
Shungnak	223	4,345	ND	ND	87,914	ND	NA	NA
Teller	151	1,964	ND	ND	ND	ND	NA	NA
Wales	161	1,770	15,043	88,431	3,890	714	610	$2440
White Mountain	180	7,139	ND	ND	21,653	ND	NA	NA

*Pounds harvested per community.
**NA = not applicable due to inconsistent or absent data
***ND = No data available

Source: ADF&G Subsistence Division Community Profile Database
http://www.subsistence.adfg.state.ak.us/geninfo/publctns/cpdb.cfm

INSERT 8½x11 MAP
3_37_sub_nw_mammals

INSERT 8½x11 MAP
3_38_sub_nw_fish

INSERT 8½x11 MAP
3_39_sub_nw_marine

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3_40_sub_sew_mammal

INSERT 8½x11 MAP
3_41_sub_sew_fish

INSERT 8½x11 MAP
3_42_sub_sew_marine

INSERT 8½x11 MAP
3_43_sub_kobuk_mammal

INSERT 8½x11 MAP
3_44_sub_kobuk_fish

INSERT 8½x11 MAP
3_45_sub_kobuk_marine

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Chapter IV: Environmental Consequences

A. Introduction

The analysis of impacts associated with the alternatives is required by BLM planning regulations and by the Council on Environmental Quality (CEQ) regulations at 40 CFR 1500-1508 implementing the National Environmental Policy Act (NEPA). The analysis presents best estimates of impacts. As required by NEPA, direct, indirect, and cumulative effects are discussed.

When quantitative information is available, impacts have been calculated primarily through GIS applications. Since the alternatives generally describe overall management emphasis, the environmental consequences are most often expressed in comparative, general terms.

Impact analyses and conclusions are based on interdisciplinary team knowledge of the resources and the planning area, information provided by experts in the BLM or in other agencies, and information contained in pertinent existing literature. The baseline used for the impact analysis is the current condition or situation described in Chapter III, Affected Environment. Analysis assumptions have also been developed to help guide the determination of effects. These assumptions are outlined beginning on page 4-5. Since the Proposed RMP/Final EIS provides a broad management framework, the analysis in this chapter represents best estimates of impacts since exact locations of development or management are often unknown. Impacts are quantified to the extent practical with available data. In the absence of quantitative data, best professional judgment provides the basis for the impact analysis.

1. How to Read this Chapter

Chapter IV presents the potential impacts to the natural and human environment in terms of environmental, social, and economic consequences that are projected to occur from implementing the alternatives presented in Chapter II. Chapter IV contains nine main sections:

- Introduction
- Resources
- Resource Uses
- Special Designations
- Social and Economic
- Cumulative Impacts
- Irreversible or Irretrievable Commitment of Resources
- Unavoidable Adverse Impacts
- Short-term Use vs. Long-term Productivity

The Introduction section includes analysis assumptions, defines the types of effects that will be projected throughout the impact sections, discusses the availability of data, and identifies the BLM's Critical Elements.

The Resources, Resource Uses, Special Designations, and Social and Economic sections contain detailed analyses of impacts by alternatives. The order of these sections does not reflect their level of importance.

The sub-section under each heading entitled Impacts Common to All Alternatives describes impacts that will not vary by alternative. This information is presented to avoid repetition in the Impacts by Alternative section. Some sections may also include another section entitled Impacts Common to All Action Alternatives (Alternatives B, C, and D); again, inclusion of such a section is to avoid repetition. Impacts that are included in either of these two sections will not be repeated later. In some instances, a discussion of the environmental consequences for a given subject may be addressed completely under a description of Impacts Common to All Alternatives, in which case there will be no further enumeration. Where there are impacts that vary between alternatives, these are broken down by alternative. Only those impacts that are applicable to that alternative are discussed; conversely, if there are no impacts to a given resource, there will be no heading or discussion for that subject. Where the resulting impacts from several programs are very similar, they may be grouped under a single subheading (e.g., the Air Quality and Soil and Water Resources section).

During impact analysis, each resource specialist considered management activities resulting from the following programs: Air, Soil, Water, Vegetation, Fish and Wildlife, Special Status Species, Fire Management and Ecology, Cultural Resources, Paleontological Resources, Visual Resources, Wilderness Characteristics, Forest Products, Livestock Grazing, Minerals, Recreation, Travel Management, Renewable Energy, Lands and Realty Actions, Special Designations (including Areas of Critical Environmental Concern, Iditarod National Historic Trail, and Wild and Scenic Rivers), Public Safety, Social and Economic Conditions, and Subsistence. If no impacts were identified either by the resource specialist or by the public during scoping, the programs are not discussed further. In cases where impacts may potentially occur, the impacting resource or resource use is discussed in more detail.

Standard operating procedures resulting from Federal laws, regulations, and policies would continue to be followed under all alternatives. These standard operating procedures constitute day-to-day implementation of policy and management, and may result in certain projects being mitigated, redesigned, or dropped from consideration. Associated limitations or complications they may present to programs (e.g., increased processing times or costs) are not considered impacts and are not discussed further in this document. Since ROPs and Oil and Gas Leasing Stips have been included in Alternatives B, C, and D as design features, many impacts are reduced or eliminated up front.

Separate sections at the end of this chapter describe Special Designations (beginning on page 4-245), Social and Economic (beginning on page 4-240), Cumulative Impacts (beginning on page 4-209), Irreversible or Irretrievable Commitment of Resources (beginning on page 4-236), and Unavoidable Adverse Impacts (beginning on page 4-241) and Short-term Use vs. Long-term Productivity (beginning on page 4-246).

2. Analysis Assumptions

Several assumptions were made to facilitate the analysis of potential impacts. These assumptions set guidelines and provide reasonably foreseeable projected levels of development that would occur within the planning area during the life of the plan. These assumptions should not be interpreted as constraining or redefining the management objectives and actions proposed for each alternative and described in Chapter II. If no assumptions were made for a particular resource, the heading is not included in the following sections.

a) General Assumptions

- Sufficient funding and personnel would be available for implementation of the final RMP decision.
- Implementation of actions from any alternative would be in compliance with valid existing rights, Federal regulations, bureau policies, and other requirements.
- Appropriate maintenance would be carried out to maintain the functional capability of all developments.
- The discussion of impacts is based on best available knowledge. Knowledge of the planning area and professional judgment, based on observation and analysis of conditions and responses in similar areas, are used to predict environmental impacts where data is limited.
- Acreage figures and other numbers used in analysis are approximate projections for comparison and analytic purposes only. Readers should not infer that the acreage figures reflect exact measurements or precise calculations.
- State and Native entitlements will be met sometime during the life of the plan, reducing the amount of BLM-managed land in the planning area by as much as 6.6 million acres (11.9 million acres are currently managed by BLM).
- The life of the RMP will be 15 to 20 years.
- Climate change is occurring and may affect surface resources in the planning area. Some changes resulting from climate change will likely not occur during the life of the plan.
- State-selected and Native-selected lands are segregated from mineral entry. These lands will become available for mineral entry or leasing only when they either are conveyed out of Federal ownership or are returned upon rejection of land selection.

b) Resources Assumptions

(1) Air Quality and Soil and Water Resources

(a) Air Quality

Air quality throughout the planning area is pristine or nearly so, except for seasonal influences such as smoke, wind-blown dust, and Arctic haze. During the summer, smoke from wildland fires may occasionally exceed EPA limits for airborne particulates; smoke can originate from as far away as Canada or Siberia. Another factor that affects seasonal air quality is airborne particulates from outside Alaska. During the winter and spring, winds transport pollutants from industrial Europe and Asia across the Arctic Ocean to Alaska causing a phenomenon known as

Arctic haze. Despite this seasonal long-distance transport of pollutants into the Arctic and smoke from summer fires, the planning area is still considered an attainment area because it meets the standards of the Clean Air Act. It is assumed that there will be no non-attainment areas within the planning area during the life of the plan.

(b) Soil Resources

Climate change will impact soils in the area, probably to a greater extent than any other activity analyzed in this EIS. This change will occur through the decrease of permafrost in the area, with subsequent impacts on evapo-transpiration, runoff, fire frequency, and vegetation.

(c) Water Resources

Demand for water (both quantity and quality), in the planning area's springs and spring-fed streams and rivers, will increase as a result of increasing recreation use, increasing population in the planning area, and increasing mineral exploration and development. Water quality could be impacted by thermokarst resulting from global warming. Water quality requirements will be achieved through the use of ROPs.

(2) Vegetation

Healthy forests and woodlands will become increasingly more important for productive wildlife habitat, as will maintenance of healthy upland communities to support watershed health and support sustainable production of forest products such as firewood and house logs. Subsistence uses associated with these vegetation types may increase slightly. These uses include personal firewood and house log gathering, berry-picking, collection of greens, and collection of plant materials such as grasses, birch bark, and diamond willow for arts and crafts.

Climate change will continue, with potential for significant changes in Arctic and sub-Arctic vegetation over time. Warming has the potential to cause land cover changes in high latitude regions through both vegetation replacement and increasing frequency of disturbance.

The riparian vegetation in the planning area is primarily in a natural state, healthy plant communities are present in various seral stages from early succession to climax, showing adaptation to natural disturbances.

Inventory efforts will be initiated to identify specific occurrence of noxious and invasive plants. The number and type of noxious and invasive plants will increase during the life of the plan, but will be concentrated around areas of human activity. The demand for control of noxious and invasive plants will increase as public knowledge of the detriments of these plants increases.

(3) Fish and Wildlife

(a) Fish

The demand for fisheries resources from sport, subsistence, and commercial fishing will increase during the life of the plan, resulting in increased pressure on fish populations in the planning area. There is a direct correlation between the amount of quality habitat and fish populations. Potential impacts to habitat quality will increase during the life of the plan. The

BLM will continue to manage fish habitat to protect important spawning, rearing, overwintering, and migratory habitat for resident and anadromous fish species.

(b) Wildlife

There is a direct relationship between the quantity and quality of habitat and the size, diversity, and viability of species populations. Habitat requirements for any particular species cannot be met everywhere as species specific needs are often very site-specific. Habitat may be only seasonally available due to elevation, aspect, type of vegetation present, and proximity of human disturbance. Habitat conditions will vary due to natural processes, even if human-caused influences are reduced or eliminated. Climate change will result in increased stress on some species of wildlife. Habitat quality or availability may decrease slightly for some species. Other species may see an increase in availability of habitat due to changes in the vegetation associated with climate change.

Management actions intending to benefit a specific habitat for a given species will influence any other species occurring in that same habitat. Impacts to wildlife populations and habitat are not discrete since actions may benefit one species while having an adverse, or beneficial, impact on another. Maintaining high quality habitat conditions can influence the severity of outbreaks of and subsequent losses from diseases, but the prevalence in the environment of various diseases cannot be fully controlled, particularly at chronic levels of occurrence.

Because wildlife are not aware of administrative boundaries and move freely between BLM land and land owned by others, impacts on wildlife may also occur on non-BLM lands, particularly with migratory species. Population level impacts would affect the population regardless of whose land they are on. Disturbance effects may cause animals to move off of BLM-managed land and onto land managed by others.

Demand for the improved health of wildlife habitat will increase during the life of the plan given the increase in demand for hunting and subsistence opportunities within the planning area.

(4) Special Status Species

Continuing inventory will identify additional Special Status Species on BLM-managed lands, and will likely include the expansion of known ranges and numbers of populations of species on the BLM-Alaska Sensitive Status Species list. Nationally, demand for the protection of species listed under the Endangered Species Act, as well as for species not yet listed but of concern, will likely increase. There are two threatened species, one proposed species, one candidate species, and numerous sensitive species known or suspected to occur in the planning area. Demand for protection of these species will increase as inventory indicates specific habitat niches or requirements, and as increased visitor use or development places demands on associated habitats.

(5) Fire Management and Ecology

Cooperative interagency fire planning and suppression will continue. Fire will continue to be recognized as a critical natural process on a landscape scale and across agency boundaries. The circumstances under which a fire occurs, and the likely consequences on firefighter and public safety and welfare, natural and cultural resources, and values to be protected, will continue to dictate the appropriate response to the fire. The full range of fire management

activities will be used to achieve ecosystem sustainability including its interrelated ecological, economic, and social components. Fire suppression efforts will continue in areas of urban interface and where wildland fire would produce undesirable effects. Management option designations will change over time to respond to specific resource or urban-interface concerns. Fuels management projects may be implemented occasionally to achieve desired ecological conditions or to meet land use and hazard fuels reduction objectives. Rehabilitation will follow the guidelines in 620 DM 3 and the Emergency Stabilization and Rehabilitation Handbook. Prevention and education programs will be initiated as warranted and as funding allows. Climate change may result in changes in fire frequency or severity.

(6) Cultural Resources

Federal undertakings and unauthorized uses have the potential to cause irreversible disturbance and damage to non-renewable cultural resources. The BLM will continue to mitigate impacts to significant cultural resources from authorized uses through avoidance and, if necessary, data recovery in accordance with the 1997 BLM National Programmatic Agreement for Section 106 Compliance and the 1998 Implementing Protocol with the Alaska State Historic Preservation Officer for managing cultural resources on lands administered by BLM-Alaska.

New cultural resources will continue to be found and evaluated for eligibility to the National Register of Historic Places as additional inventories are completed. Eligible cultural resources will continue to be treated similarly and equally in terms of type, composition, and importance, but many will continue to deteriorate through natural agents, unauthorized public use, and vandalism. The BLM will consult with Native and village corporations on traditional cultural properties and values that are of concern to them.

All archaeological resources will be assessed according to BLM use categories. The demand for uses of lands on which cultural resources occur may increase slightly during the life of the plan.

(7) Paleontological Resources

Federal undertakings and unauthorized uses have the potential to cause irreversible disturbance and damage to non-renewable paleontological resources. The BLM will mitigate impacts to significant paleontological resources from authorized uses through avoidance and specimen recovery. Geologic formations with exposures containing vertebrate and non-vertebrate fossils will continue to be impacted from natural agents, unauthorized public use, and vandalism. The demand for use of both vertebrate and non-vertebrate fossils may increase slightly during the life of the plan.

(8) Visual Resources

Scenic resources will remain in demand from local residents who want to maintain scenic quality, local businesses that depend on tourism, and an increasing level of recreational users within the planning area. Increasing tourism will increase the value of scenic views, undeveloped landscapes, and open spaces.

(9) Wilderness Characteristics

Wilderness characteristics of naturalness, solitude, and primitive and unconfined recreation is expected to remain in demand from local residents and those visitors who want to experience the primitive and unspoiled nature of the local landscape. Businesses that depend on natural landscapes for their excursions (e.g. ecotourism, guided hunting, and fishing) will favor an area that possesses wilderness characteristics. Recreationists who depend on a backcountry experience for their endeavors will pursue lands that have wilderness characteristics.

(10) Resource Management Activities

The following table shows anticipated levels of activities related to wildlife and fish management, vegetation management, cultural resource management, and recreation.

Table 4-1. Anticipated Levels of Activity for Resource Management

Activity	Alternative			
	A	B	C	D
Aircraft Use (fixed wing and helicopters) This use does not include flights directly associated with oil and gas development, mineral exploration or development, or special recreation use permits.				
Point-to-Point	Occasional	Regular, but not daily	Occasional	Common
Wildlife Survey	10 days during March	21 days during March and June	10 days during March	15 days during March and June
Fire detection flights	June-August 5-6 flights/month	June-August 5-6 flights/month	June-August 5-6 flights/month	June-August 5-6 flights/month
Other Aerial Surveys	5-7 days June-August	14-21 days June-August	5-7 days June-August	14-21 days June-August
Ground Activities These camps support inventory, monitoring, and clearance work for permitted activities. Large camps are more than 10 people.				
Small Camps	6 weeks	12 weeks	6 weeks	6-12 weeks
Large Camps	0	4 weeks	0	4 weeks
Recreation Special Recreation Use Permits (SRPs)				
Hunting and Guiding SRPs	12-14	14-16	10-12	12-14
OHV and Sled Dog Race SRPs	3	3-5	3-5	3-5

c) Resource Uses Assumptions

(1) Forest Products

Insects and disease will continue to affect forest resources in the planning area. Climate change, including the current trend to warmer, drier growing season conditions in the planning area, has increased the proportion of standing dead timber (beetle-killed trees), and may contribute to more severe wildland fires. Treeline advances could also be expected due to climate warming, although during the 15-20 year life span of the RMP, these changes may be difficult to detect. Due to the inaccessibility of the area, a large commercial sale would be unlikely to occur during the life of the plan. Forest product sales would be small and the level would be similar to that which has occurred over the past 15 years. Authorized use of forest products in the planning area over the last 14 years has totaled less than 10 free use permits and one small sales vegetative contract for the entire period. Access has been restricted to winter with a minimum snow cover of 6-12 inches, using snowmachines, sleds, and chainsaws to harvest. Areas were selectively cut to target larger diameter trees and standing dead timber. In one case, access was by ski-equipped bush plane. Typically, 25 acres or less have been disturbed (stumps and scattered piles of slash) per permit.

(2) Livestock Grazing

The demand for livestock forage will follow market trends and conditions, and will increase somewhat during the life of the plan. An increase in reindeer is inversely related to the number of caribou. A decline in the caribou population would make the conditions to support industry growth more favorable, but would not result in an immediate increase in the number of reindeer.

Although some alternatives allow for reindeer grazing outside of the Seward Peninsula, grazing would be unlikely to be authorized because of the presence of caribou throughout the remainder of the planning area. If bison grazing were permitted, the bison would be authorized only within existing grazing areas on the Seward Peninsula. The numbers in the following table show assumed grazing activity on BLM, State, and National Park Service land. Not all of the activity described below would occur on BLM-managed lands.

Table 4-2. Livestock Grazing Assumptions

Alternative	Type of Grazing	
	Reindeer	Bison
A	Existing situation: 7,500 reindeer and 5 active herders; # of reindeer could increase by 50% during life of plan; # active herders would increase	None authorized
B	Same as A	3 small herds, each < 50 bison; no more than 100 bison total during life of plan
C	# reindeer could increase by 10% over existing level; # herders might increase but not as much as under A	None authorized
D	Same as A	None authorized

(3) Minerals

(a) Leasable Minerals

1. Oil and Gas

For all alternatives, development would be preceded by geophysical exploration. A reasonable foreseeable development (RFD) scenario was developed to project long-term oil and gas related activity in the planning area (BLM 2005j). BLM's policy regarding reasonable foreseeable development of fluid mineral resources in frontier areas requires that a minimum level of exploration and development activity be projected for the purpose of impact analysis. For these areas, and for areas of low development potential, an assumption is made that a baseline discovery will involve certain exploration activity leading up to discovery and subsequent development of oil and gas. The timing of discovery and subsequent development within the planning area is difficult to predict. However, it is not likely to occur during the life of this plan. The high potential area in the northern quarter of the planning area is the only area likely to receive interest from industry. The following assumptions should be considered for Alternatives B and D only.

In Alternative C, only seismic exploration could occur, but would be unlikely, as high potential lands would be closed to leasing. If geophysical exploration activities were to occur, it would be within the same timeframe as outlined in Alternatives B and D. Additionally, fewer miles would be shot because high potential lands closed to leasing would also be closed to exploration.

Ideally, field development would include the following phases; exploration, development, production, and abandonment. Exploration drilling would occur after the issuance of a lease. If a discovery was made, construction of oil and gas facilities would come subsequent to the announcement. A discovery could be announced at any time within a 10-year period (assumed primary lease term) following the lease sale. Delineation and development activities usually take 3 to 6 years after a discovery. Production operations would continue year-round for 10 to 30 years, depending on field size and field characteristics. Field abandonment, including well plugging and site restoration, can take from 2 to 5 years after production ends.

2. Exploration

Seismic survey work is likely to precede exploratory drilling for oil and gas. Onshore seismic acquisition on the North Slope occurs during the winter months after the federal, state and local governments issue permits authorizing tundra travel. Specialized low-impact tundra travel vehicles weighing more than 10 tons are used. However, the tracks are long and wide, spreading the pressure over a large area to protect the tundra from damage. Travel speed in overland vehicles such as a Tucker (1.2 psi) or Rollogon (2-5 psi) range from 6 to 12 mph.

Land-based seismic surveys are typically conducted using truck-mounted vibrators or helicopters for remote operations. The method involves sending energy into the earth using an explosive charge or other energy wave-generating device, such as Vibroseis. Vibroseis generates energy waves of continuously varying frequency using metal plates lowered to the ground from beneath each vehicle. With the entire weight of the truck resting on the plate, a hydraulic system vibrates the plate which transfers the energy into the ground. Depending on rock density, waves bounce back from the various formation layers and are received by listening devices called geophones arrayed along the line of survey. Two to eight trucks are used in

tandem. Unless the topography is relatively flat and open, the trucks are restricted to existing roads and trails. An instrument truck equipped with a seismograph records the seismic information on a computer which is subsequently processed and displayed in the form of a seismic reflection profile. The Vibroseis technique works best on a hard surface, as a spongy surface does not transmit the output energy very well.

It is assumed that seismic exploration within the planning area would range from 150 to 800 seismic (2-D) line-miles every four years over the life of the plan. This range is based on a four-year, 600 line-mile seismic exploration program that led to the discovery of the Alpine field, and on historic seismic exploration in the NPR-A from 1972 to 2000. During that period, about 21,000 line-miles were shot over an area of about 23 million acres. If an area proved geologically interesting, 3-D surveys would be conducted to help establish a drilling location. In either 2-D or 3-D seismic events, aircraft would be used as support for supplies and crew changes. Aircraft would also be used as the primary transportation mode in the summer. During the exploration phase, ground and aircraft activity would be greatest during the winter months after tundra travel has been opened. Additionally, overland vehicles and aircraft use would be the lightest of the three phases (exploration, development, and production).

After seismic surveys are completed and an area has been secured by a lease, the lessee may conduct exploration in the form of drilling. Ice pads and ice roads would be constructed where feasible. Air traffic would increase during this time. Transport of the drill rig could take anywhere from 50 to 150 flights using a C-130, depending on the type of rig. Pre-drilling site preparation and rig set up for a 10,000 foot well takes one to four weeks. Drilling the well could take three to four weeks due to the lack of specific subsurface knowledge regarding the stratigraphic succession. If there are favorable oil and/or gas indicators, testing and additional sidetracking for coring and sampling can take another month.

Permanent airstrips and staging areas could be constructed to accommodate supplies and major equipment. This is much more likely in areas where water is not readily available or the terrain is too steep for building ice pads or roads. The mining of gravel would take place during the winter months to reduce impacts. Permanent airstrips and staging areas could also be constructed if a discovery were made from exploratory drilling and the oil company decided to pursue development. Permanent staging areas act as a remote base camp that can be used year-round and typically consist of facilities housed on gravel. These camps contain storage tanks for fuel, warehouses for supplies, housing for personnel, and permanent airstrips capable of handling large capacity aircraft, such as the Hercules C-130. With the lack of infrastructure, any permanent facility would provide a concentrated aircraft destination for other resource activities, in addition to oil and gas activities. Air traffic support associated with winter drilling would be limited to several aircraft flights per week. Size of aircraft would be large enough to accommodate crew changes and haul supplies.

Once drilling concluded for the season, extra personnel would be needed to break down the camp and drill rig. This could be accomplished with a couple extra flights per week. The drill rig would not necessarily need to be transported back to Deadhorse if the company was willing to pay to keep it over-summer. If not, than an additional 50 to 150 C-130 flights would be made. Subsequent to winter drilling, aircraft activity in the summer would be limited to smaller aircraft and helicopters, not necessarily associated with oil and gas operations. Overall aircraft activity would be light in the summer until the operation moved into the development phase. Frequency of use would be substantially less than that associated with winter drilling, possibly as little as several flights per month.

Approximately 6.3 million acres of high occurrence potential lands within the planning area would be made available for leasing on the North Slope. The RFD projects 710,000 total acres leased. Development is not likely within the life of the plan. However, if industry showed interest in the area, 43 to 55 exploration wells are projected to be drilled during winter months using ice roads, ice pads, and low-impact vehicles.

3. Development

If an economically viable field were discovered, which is unlikely during the life of the plan, up to 186 development wells totaling 417 acres of disturbance are projected. Development following a discovery would require more logistical support over a longer period of time. Under the RFD scenario, assuming a 1 billion barrel field with 500 million recoverable, it is assumed 23 delineation wells (330 acres of short-term disturbance) would be drilled. One or two additional drill rigs (depending on availability) would be needed to accommodate the number of holes needed for development. Transport of the rigs could take anywhere from 50 to 150 flights per rig using a C-130. Extra equipment and personnel would be transported by aircraft as well. Once on the ground, the rig modules and other equipment would be redistributed to the proper pads by ice or gravel road. The roads would need to be at least 32 feet wide to accommodate wide-loads such as a drill rig or modules. The delineation wells would require the construction of 6 acre pads. Typically, after analyses of the data and subsequent geotechnical description of the reservoir, exploration wells are not used for production purposes. Following test completions, wells are plugged with cement to seal off zones capable of flowing hydrocarbons or formation waters. The rig and its support constructions are then moved to the next location.

Aircraft traffic would increase as development progressed. Supplies would be needed for the construction of gathering lines and constructing a central processing facility (CPF). A total of 36 miles of gathering lines for produced fluids (327 acres of short-term disturbance) would be needed. Gathering lines would range from 3 to 12 inches in diameter, and run from a remote satellite pad to the central processing facility. The CPF is the long-term operational hub facility. It consists of oil production equipment comprising three phase separators (oil, gas, water). It also contains gas-conditioning equipment which separates/strips natural gas from the liquid stream, and the pipeline gathering and monitoring system which maintain pressure regulation and well monitoring and control systems. Equipment supplies and support of the CPF would be accomplished through the use of larger aircraft (C-130s or DC-6). Once constructed, gathering lines and access roads would be monitored by helicopter or vehicle on a scheduled routine. During the development phase, flights could average one or more per day with occasional spikes for drill rig or large equipment moves.

Gravel extraction needed to support development is projected to be approximately 1,000,000 cubic yards of material. Acreage disturbance is difficult to determine based on a number of qualifiers that need to be factored including the amount of material available, the source of the material, and the depth at which the material is located. Three gravel pits would be utilized to support the six separate pads and connecting roads. Resulting in approximately 50-100 acres of disturbance with most occurring at surficial deposits. River beds or beach gravels would have a higher surface acreage disturbance than a gravel pit.

4. Production

Production would be spread out from 10 to 30 years, the RFD assumes a production life of 25 years. During the production phase, aircraft traffic would be used for hauling pipe for a 24” pipeline and vertical support members (VSM) that would connect to existing infrastructure at Alpine (350 miles of pipeline and 4,322 acres of short-term disturbance). The pipeline would be

constructed during the winter. Overland vehicles, helicopters, and medium sized aircraft for transporting crews would be necessary to build the pipeline. The pipeline would be elevated 7 feet off the ground with a VSM spaced every 50 to 70 feet apart. Approximately 50-75 miles of pipeline would be within the planning area.

Satellite fields would be connected by constructing gravel roads. The satellite fields are expected to be contained within 25 miles of the main pad/CPF. The discovery of each satellite field is assumed to require three exploration wells and two delineation wells, and contain 10 production wells and 7 injection wells. Each field would have a production life of 10 years. No permanent camp facilities would be required for development of the satellite fields. The main pad/CPF would be upgraded to accommodate the increase in workers necessary to operate the additional satellites. However, temporary camps would be used during construction. Once drilling operations has been completed, approximately 2 round trips per day, per roaded production pad would be accomplished by truck. In addition, there would be intermittent heavy equipment traffic associated with maintenance and supply (BLM 2004e). Workers would continue to be shuttled by fixed-wing aircraft.

Aircraft traffic would be heaviest during the time it overlaps with production. Once production phase is completed and the pipeline is functional, aircraft support would decrease. The use of larger aircraft would be less frequent. However, the amount of smaller fixed-wing and helicopter traffic would remain the same. Unscheduled helicopter traffic, mostly in summer, would likely occur. This traffic would largely be associated with scientific studies and monitoring of development. The frequency of this traffic and the areas in which it would take place are unpredictable (Arco Alaska Inc. et al. 1997).

5. Abandonment

Abandonment can occur at any point after a well has been drilled. Reclamation of a pad would involve a slight amount of increased activity over a short period of time. Cement would be brought in by aircraft and transported by ground vehicle to the well site. Personnel would be needed to set the cement plugs at the various zones throughout the hole and pour cement. The use of heavy equipment would be needed to reclaim or recontour the gravel. The abandonment process could take from 2 to 5 years per well.

6. Oil Spills

Under Alternatives B and D, one large oil spill, 220 small refined product spills and 89 small crude oil spills could occur in conjunction with oil and gas development (BLM 2006). A large spill is defined as 500-900 barrels (bbl). The analysis of the effects of large spills are based on the following assumptions:

- All the oil reaches the environment and the gravel pad absorbs no oil.
- The spill starts at the gravel pad or along a pipeline.
- There is no cleanup or containment.
- The oil chemistry is similar to that of Alpine Field oil.
- The spill could occur at any time of year.
- A spill under lake ice does not move substantially until the ice breaks up.
- Spill locations and dates used in the analysis are those that would result in the greatest impact.

Small spills are defined as less than 500 bbl in size. Onshore or offshore refined-oil spills can occur along ice roads, from barges, from helicopters and airplanes, from gravel pad facilities, or

from trucks along the road system. Most refined-oil spills are contained and cleaned up. Typical refined products spilled are aviation fuel, diesel fuel, engine lube oil, fuel oil, gasoline, grease, hydraulic oil, transformer oil, and transmission oil. Analysis of effects of small spills are based on the following assumptions:

- The average crude oil spill size of 3 bbl.
- The average refined product spill size of 0.7 bbl.
- Small crude spills can begin anywhere on the gravel pad facilities or along the pipeline.
- Small spills on gravel pads occur in contained areas or are cleaned up and do not reach the environment.
- Small spills from pipelines are likely to reach the environment.

Table 4-3. Crude Oil Spills Estimated Over the Production Life of the RMP

Alternative	Resources (Bbbl)	Spill Rate (spills/Bbbl)	Assumed Spill Size (bbl)	Estimated Mean Number of Spills[1]	Estimated Total Volume of Spills (bbl)[2]
Large spills – Crude oil					
A	0	0	0	0	0
B	0.5	0.64	500 or 900	0.16 ≈ 1	500 or 900
C	0	0	0	0	0
D	0.5	0.64	500 or 900	0.16 ≈ 1	500 or 900
Small spills – Crude oil					
A	0.5	0	0	0	0
B	0.5	178	3	89	267
C	0.5	0	0	0	0
D	0.5	178	3	89	267

[1]The estimated mean number of oil spills is based on the estimated resource volume multiplied by the spill rate.
[2]The estimated total spill volume is the total volume for all of the estimated spills for the given alternative and price of oil.

Table 4-4. Small Refined Oil Spills <500 bbl Estimated Over the Production Life of the RMP

Alternative	Resources (Bbbl)	Spill Rate (Spills/Bbbl)	Assumed Spill Size (bbl)[1]	Estimated Mean Number of Spills[2,3]	Estimated Total Spill Volume (bbl)
A	0.5 Bbbl	0	0	0	0
B	0.5 Bbbl	440	0.7	220	154
C	0.5 Bbbl	0	0	0	0
D	0.5 Bbbl	440	0.7	220	154

[1] The mean spill size for refined spills on the Alaska North Slope from 1989–2000; equivalent to 29 gal.
[2] The fractional estimated mean spill number and volume are rounded to the nearest whole number.
[3] The integers represent the estimated number of spills at the produced activity level with $33/bbl oil.

Table 4-5. Assumed Size Distribution for Small Crude Oil Spills for the Production Life of the RMP

Spill Size Range[1]	Estimated Number of Spills Under Each Alternative[2,3]			
	Alternative A	Alternative B	Alternative C	Alternative D
<1 bbl				
≤ 1 gal	0	19	0	19
> 1 gal and ≤ 5 gal	0	31	0	31
> 5 gal and < 1 bbl	0	17	0	17
Total spills < 1 bbl	**0**	**67**	**0**	**67**
≥ 1 bbl and < 500 bbl				
> 1 bbl and ≤ 5 bbl	0	17	0	17
> 5 bbl and ≤ 25 bbl	0	4	0	4
> 25 bbl and < 500 bbl	0	1	0	1
Total spills > 1bbl and < 500bbl	**0**	**22**	**0**	**22**
Total number of spills	**0**	**89**	**0**	**89**

[1]Spill-size distribution is allocated by multiplying the total estimated number of spills by the fraction of spills in that size category from the ADEC database
[2] Estimated number of spills is rounded to the nearest whole number.
[3] The integers are presented as the estimated number of spills at the predicted activity level with $33/bbl oil.

7. Coal

The objective for management of the Federal coal resources is to provide both short- and long-range development of Federal coal in an orderly and timely manner, consistent with the policies of the Federal Coal Management Program, environmental integrity, national energy needs, and related demands. In addition to observing the general obligations and standards of performance set out in current regulations, the coal lessee/licensee will comply with and be bound by the applicable ROPs outlined in Appendix A.

a. Exploration

With appropriate limitations and mitigation requirements for the protection of other resource values, all unleased BLM-managed lands in the planning area, excluding the northern Nulato Hills and the 300-foot setback on select rivers under Alternatives C and D, would be open to coal resource inventory and exploration as described under 43 CFR 3480. Opening lands to these activities would provide necessary information to assess the coal development potential and help refine the limited existing data on coal resources within the planning area. The information obtained from exploration programs will ultimately be used to determine the feasibility of developing the coal resources in the region.

Coal exploration includes drilling, excavating, and geological, geophysical or geochemical surveying operations designed to obtain detailed data on the physical and chemical characteristics of Federal coal and its environment. All exploration of coal resources, including the drilling of strata above and below the coal, drilling to assess conditions of coal hydrology, and drilling of overburden and of adjacent, non-coal bearing strata, requires an exploration license as described in 43 CFR 3410. Before an exploration license is issued, a NEPA analysis would be prepared to assess the potential effects on the natural and socio-economic environment. Each license would include requirements and stipulations to protect the

environment and associated natural resources, and ensure reclamation of the lands disturbed by exploration.

Coal exploration activities are expected to be minimal during the life of this plan on most BLM-managed lands, with increased potential on Federal lands within the Kukpowruk River Coal Field and the Cape Beaufort Coal Field. The lack of a transportation infrastructure is a primary obstacle. Since geology is not an exact science, the scope of work for proposed exploration activities could vary and would be refined as data is collected and evaluated. The types of activities and methods used to complete a typical exploration program include geologic mapping, preparation of drill sites, exploratory drilling, hydrologic monitoring wells, trenching, coal removal, drill hole abandonment, removal of equipment, backfilling and grading, and revegetation.

- **Geologic mapping:** The geology of the exploration area would be mapped using aerial photographs and topographic maps. Coal seam outcrops or other exposed geologic features identified during the mapping may be surveyed to provide more accurate locations. Travel will be limited to existing roads and trails, off-road vehicles, or other appropriate transportation mechanisms including helicopter or small fixed-wing aircraft. Most of the mapping and survey work would be done on foot.

- **Drill sites:** Wherever possible, drill sites will be located on relatively flat terrain to avoid excavating a level area for the drilling equipment. Excess vegetation will be removed to provide an adequate working area. If leveling is required, a small dozer will be used. Normally, an area approximately 50 feet by 40 feet is required to set up the drilling equipment. The actual size of the area may vary depending upon the type of equipment used.

- **Exploration drilling:** The drilling equipment for exploration work will be similar to that used for the construction of domestic water wells. In addition to the drill rig, equipment may include an air compressor and a carrier with drill pipe and support tools. In most cases, the maximum diameter of the drill holes will be 6 inches. Depths will vary based on the location and intended objective of each hole. In areas where surficial gravels or overburden occur, the hole may be cased with steel pipe from the surface down to bedrock to keep it open. At some drill sites, a nontoxic biodegradable drilling mud or foaming agent may be used to stabilize the walls of the hole and increase circulation. Relatively small quantities of water would be required for drilling.

  After drilling has been completed, the hole may be logged using geophysical tools to measure rock and coal characteristics such as resistivity, gamma ray, formation density, and hole diameter (caliper). Personnel handling the logging equipment will be properly licensed. To evaluate the physical and geochemical characteristics of the coal groups and rock types in each hole, samples of cuttings from selected intervals may be collected and sent to a laboratory for analyses. As an alternative to using cuttings, a drill rig may be used to retrieve samples of core from selected holes. Upon completion of the drilling work, each drill hole will be surveyed to provide accurate locations.

- **Monitoring wells:** To acquire data on the groundwater resources within the exploration area, some of the drill holes may be developed into groundwater monitoring wells. Actual well designs will be determined on site after a thorough review of the geologic and geophysical logs. Standard well installation procedures will be used to make certain that accurate and reliable monitoring data are collected.

- **Trenching:** Trenches may be excavated to more accurately understand the stratigraphy within the exploration area. Each trench may disturb an area up to 250 feet by 250 feet. After removal of the vegetation, salvageable topsoil will be stored on site. A backhoe will trench to depths of 25 to 30 feet and place the overburden material alongside the trench. If the backhoe cannot efficiently remove the material, small scale blasting procedures may be used. The length of the trenches may vary and could range up to 250 feet. The floor of the trench will be up to 5 feet wide. During the excavation work, appropriate erosion control measures will be used to contain excess off site sediment transport. Control measures may include ditching, silt fences and/or hay bales. After the coal seam has been exposed, geologists will map the sections and collect samples for laboratory analyses. The trench will be backfilled and reclaimed.

- **Coal removal:** Small amounts of coal may be taken from core samples and/or cuttings for quality analyses. In addition, larger amounts of coal obtained from trenching may be removed from the site to be used for laboratory analyses.

- **Drill hole abandonment:** After a drill hole has been completed or a monitoring well is no longer needed, the surface casing (if present) will be cut off approximately one foot below the ground surface. The hole will be filled with dry cuttings or sand to within 12 feet of the surface. A mixture of clay (bentonite), and drill cuttings or sand will be used to fill the next 10 feet of the hole. The top 2 feet will be filled with topsoil or overburden material. Temporary hole markers may be left at the hole collar until the survey work on the hole location has been completed.

- **Equipment removal:** All equipment and supplies would be removed from the exploration area upon completion of the exploration activities.

- **Backfilling, grading, and revegetation:** A small dozer will be used to backfill and regrade the drilling and trenching sites. Subsoil materials will be placed in the deepest portion of the excavations and all available topsoil will be applied to the surface. Water bars or ditches may be used to provide adequate drainage. Trenches may be left open for annual studies. Drainage from the disturbed area at each site will be directed into the trench or to a local sediment control structure. The disturbed areas, including the slopes of the overburden and topsoil piles, will be revegetated according to the most current and applicable standards.

b. Leasing

Under the Federal Coal Leasing Program, Federal coal lands are screened for coal development potential, unsuitability criteria, and multiple use constraints including consultation with all surface owners who meet certain criteria. The coal screening process is designed to identify areas of Federal coal that are acceptable for further leasing consideration under the procedures listed in 43 CFR 3420.1-4(e)(1-4). Areas that pass these screens are available for further consideration for competitive coal leasing. At present, BLM has deferred the coal screening process until a Lease-by-Application (LBA) is filed or industry expresses an interest in developing additional coal resources within the planning area. Leasing by application involves the submittal of an application, preparation of a NEPA document including appropriate stipulations and required operating procedures, a public hearing, and consultation with the Alaska State Governor. If the application satisfactorily meets the requirements of these steps,

an amendment to the RMP would need to be completed before a lease sale could be held subject to 43 CFR 3422.

The two existing preference right coal leases located in the planning area would be managed under all alternatives according to the individual lease terms and conditions and those established in 43 CFR 3470. Prior to commencement of mining operations, a detailed exploration plan would be submitted and approved by the BLM as described in 43 CFR 3482. The plan would include the location and type of exploration to be conducted, environmental protection procedures, present and proposed roads, and reclamation and abandonment procedures. The exploration activity would be similar in scope to those described in the Exploration section above. It is assumed that no development would occur on these leases.

Prior to commencement of any Federal coal development or mining operations, the lessee or operator would submit and obtain approval from the BLM a resource recovery and protection plan (R2P2). The plan would show that the proposed coal operation meets the requirements of 43 CFR 3480 as well as the Mineral Leasing Act of 1920, as amended, for: 1) development, 2) production, 3) resource recovery and protection, 4) diligent development, continued operation, and maximum economic recovery, for the life of the mine.

8. Geothermal

No development of geothermal resources on BLM-managed lands is anticipated within the life of the plan.

9. Coalbed Natural Gas

Coalbed natural gas (CBNG) exploration is not expected to occur on BLM-managed lands in the planning area. The western Colville Basin near Point Lay has been identified as a highly prospective CBNG coal basin. However, the economic viability of the Kukpowruk coal basin's CBNG resources is highly uncertain because sufficient data on gas and water productivity does not yet exist. Under the cumulative case, CBNG exploration and development may occur on private lands within the planning area as described in the RFD (BLM 2005j).

Within the planning area, 11 CBNG wells could be drilled close to a village (most likely Point Lay). The drill pads, access road, and monitoring well may disturb up to 20 acres. In support of production, a CBNG field compressor station with access road would be needed as well as gathering pipelines and utilities (23.5 acres of disturbance). A water disposal facility would also be required, resulting in approximately 10 acres, due to the construction of a pad, access road, pipelines, and utilities.

(b) Locatable Minerals

Chapter III summarizes the activity levels in the planning area based on surface disturbance tabulated from mining plans and notices of mining operations submitted through the Annual Placer Mining Application and Permit process from the 1989 to 2004 mining seasons for both placer and hard rock operations. The RFD for locatable minerals (BLM 2005g) summarizes the historical data characterizing mineral occurrences by commodity and genetic ore deposit modeling, as well as differentiating between placer and hard rock mining methods. Based on this information, a placer mine scenario was developed around a medium-scale (250 cubic yards per day) placer mine as the most likely mining activity to occur in the planning area in the reasonable future. The typical placer mine would result in a maximum of 10 acres of surface

disturbance at any given point in time. A similar hard rock mining scenario was dropped from further consideration as it was determined that due to the length of time needed to bring a hard rock deposit to production and the undeveloped nature of the potential hard rock deposits, there would be no development, particularly on BLM-managed lands, during the life of the plan.

1. Placer Mining

Placer mining for gold and, to a lesser extent, placer tin and nephrite jade is the most common type of mining to occur in the planning area. Of the three primary commodities, placer gold is the most likely development target. Placer tin and nephrite jade both require substantial transport limitations due to their bulk and requirements for further processing beyond the mine.

Since 1989, mineral resource development and mining in the planning area has occurred primarily on private lands and State lands. This can be attributed to the patenting of large numbers of Federal mining claims staked during the gold rush era, to the State and Native corporations targeting mineral resources for selection under the Alaska Native Claims Settlement Act (ANCSA) and low metals prices. An additional factor was the switch from annual labor fining requirements to payment of a $100 per claim rental fee to the government on Federal lands.

Filing and reclamation requirements instituted in 1980 rose steadily to a high of 34 notices and 10 plans in 1984 within the planning area. By 1997, this had declined to 13 notices and four plans. Each year one to two new notices would start up and the same number or greater would be closed out. For the past three years, the BLM has been left with one active notice and three inactive/abandoned notices/unapproved occupancies along with one inactive plan and one plan level record of non-compliance and unapproved occupancy.

Table 4-6. Anticipated New Placer Mines

	Alternative			
	A	B	C	D
Anticipated Placer Mines on BLM-Managed Lands	0	3-5	0	3-5

2. Hard Rock Exploration and Development

Historic producers of hard rock for gold and tin, both with tungsten by-product and base metals with silver byproduct operated on a small scale in the early part of the twentieth century. Today, development projects involve gold from a past producer and a developing new prospect. Both of these are located on private lands surrounded by State lands and are located on the existing seasonal road network out of Nome. Hard rock exploration is up in the region, generated by the increasing price of gold and increased interest in mineral occurrences on private and Native lands.

Around the State, exploration focused on deposits of rare metals (nickel and platinum group elements [PGE]) has occurred in the Broxson Gulch area north of the Denali Highway, East Central Alaska Range. Exploration results in this area indicate that there is the potential for a significant discovery of these metals. This interest, coupled with the rising price of platinum, has

sparked recent exploration efforts on the Seward Peninsula at Trilby and Dime creeks where platinum and PGE are known to occur.

If additional exploration should prove that development of a project at Dime Creek, Trilby Creek or another unspecified property in the planning area is feasible, the deposit would probably develop in a similar manner to the Pogo Mine (near Delta Junction), which is being developed as a cut and fill underground mine. Surface disturbance will vary depending on the mine design, construction of roads, power line corridors, selection of tailing disposal method, and other factors. An order of magnitude estimate would be in the range of 800-1,600 acres. Road building, airstrips, and associated material sites account for the largest surface disturbance followed by mine, mill, tailings disposal site, and camp facilities. While most of these disturbances would occur on State lands, some road construction or power lines would be across BLM-managed lands.

Currently in pre-production phase of development is the Rock Creek Mine on private and Native lands near Nome. This plan is a hard rock, open pit mine with a mill that combines free milling processes with floatation and vat cyanide leach circuits to recover gold. This mill will include ore from two locations, the Rock Creek Mine and the Big Hurrah Mine (a past producer on private and Native lands). More than 130 employees would contribute to the Nome economy and the mine mill complex would draw more than 7 megawatts of power from the Nome Joint Utilities grid. This 20-year-old project is still more than a year away from production.

(c) Mineral Materials

Demand for gravel, rip-rap and other mineral materials is expected to increase during the life of the plan as road maintenance and construction continue on State highways, and State, Native corporation and private lands. Sharp demand spikes may occur around Nome and Kotzebue depending on the availability of Federal or State funds for infrastructure improvement projects. Should the Rock Creek and Big Hurrah mines go to production, a sharp increase in mineral material needs for road improvement and maintenance would be required along the existing Nome to Council road. It is anticipated that these materials would come from private and State resources and not from BLM-managed lands.

Mineral material sales would occur under Alternatives B and D in association with oil and gas development. These impacts are discussed under leasable minerals.

(4) Recreation

Demand for recreational use of public lands will increase during the life of the plan. Increases will be focused on sport fishing, sport hunting, recreational OHV use (including snowmachines), hiking, canoeing and rafting, bird watching, highway tourism off the Nome Road System, and regional promotion of tourism. Commercial recreation applications will increase slightly in number. In a typical year, there are 12-14 hunting/guiding operations and three permits for snowmachine and dog races such as the Iditarod and Iron Dog.

Under some alternatives, a recreation management plan for the Squirrel River Special Recreation Management Area will be completed. This plan will address recreational use levels in the area during the big game hunting season (August-September) and will provide the BLM with greater flexibility in addressing conflicts and managing use levels.

(5) Travel Management

Demand for access–the physical ability and legal right of the public, agency personnel, and authorized users to reach public lands–will increase during the life of the plan. The need for access to public lands may increase slightly as Native corporation entitlements are met and if restrictions on use of those private lands are implemented by the Native corporations. Public easements reserved through Section 17(b) of ANCSA will become more important during the life of the plan. The need to identify and maintain these easements on the ground will increase.

The use of OHVs for recreational purposes will increase. The use of OHVs for subsistence will increase slightly. Changes in OHV design and technology will continue, enabling OHV users to range into areas that were once thought inaccessible due to terrain and water or soil features. For the purposes of this document, OHVs include snowmachines. However, most impacts described in this analysis result from OHVs used during snow-free months. Where impacts are specific to snowmachines, they are described as such.

Demand for roads and transportation rights-of-way on BLM-managed land will increase slightly during the life of the plan. Road development is contingent upon the economic viability of resource development, primarily minerals, and the needs of the State to plan and carry out transportation access in northwest Alaska. If the State does not obtain land selections designed as road corridor access from Interior Alaska to the northwest, the BLM will have to address these access needs through a right-of-way.

(6) Renewable Energy

Considering such factors as the amount and intensity of sunlight, wind velocity, proximity to roads and electric transmission facilities, population size, and the degree to which State and local policies support renewable energy development, no applications will be received to permit or lease commercial construction of facilities on BLM-managed lands.

(7) Lands and Realty Actions

There would be continued demand for land use authorizations such as rights-of-way (ROW) and various types of leases and permits within the planning area. The demand for these land use authorizations would fluctuate with the degree of economic growth and development occurring within or near the planning area, but would generally remain minimal.

Land conveyance to the State and Native corporations would be completed within the life of the plan. There would be a limited demand for land ownership adjustments to improve the manageability of both Federal and non-Federal lands. Land exchange would be the preferred method of land ownership adjustment.

Withdrawal review will be completed within five years of plan approval. All recommendations for lifting of (d)(1) withdrawals will be implemented as described in each alternative.

Recommendations for new withdrawals will be implemented during the life of the plan. Existing withdrawals in these areas will be retained until a new withdrawal is in place.

d) Special Designations Assumptions

(1) Areas of Critical Environmental Concern

Areas designated as Areas of Critical Environmental Concern (ACECs) will be managed to maintain the values for which they were designated.

(2) Iditarod National Historic Trail

The INHT will continue to be managed to promote the preservation and use of the trail. Use levels will increase slightly over the life of the plan.

(3) Wild and Scenic Rivers

Congress will accept the BLM's recommendation of non-suitable on the Squirrel River and the legislative and administrative withdrawals will be lifted, allowing State selections to attach to lands within the study corridor.

Eligible rivers will be managed to protect water quality, free-flowing nature, and outstandingly remarkable values from the time the draft RMP is published, until a suitability decision is reached with the publication of the Record of Decision.

Rivers found to be suitable for addition to the National Wild and Scenic Rivers System with the publication of the Record of Decision will be managed to protect water quality, free-flowing nature, and outstandingly remarkable values until such time as Congress acts on proposed designation legislation.

e) Social and Economic Assumptions

(1) Public Safety

Public health and safety issues will receive priority consideration in the management of public lands. Demand for safe visits will increase with increasing numbers of public land users.

(2) Social and Economic Conditions

The population within the planning area will increase during the planning period. The rate of change in population in this area is lower than the state average. This will continue to be the case, as out migration will continue to offset births. The plan assumes no change in borough status or boundaries.

The economic impact analysis is based on changes resulting from BLM management decisions. Other factors that would affect the local economy, such as population growth, tourism trends, taxes, or resource extraction on other lands, are assumed to be the same for all alternatives.

(3) Tribal Treaty Rights

As a government agency, the BLM will maintain a special government-to-government relationship with Federally-recognized Indian Tribes. Residents of these areas utilize Native and village corporation lands as well as BLM-managed public lands for traditional subsistence activities, and will continue to do so. Through this planning process, the BLM has initiated consultation with different village entities. This consultation will continue throughout the planning period.

f) Subsistence Assumptions

The BLM will continue to play a major role in the management of subsistence resources on public lands. The demand for subsistence resources will increase during the life of the plan.

3. Types of Effects

Direct, indirect, and cumulative impacts are considered in effects analysis, consistent with direction provided in 40 CFR 1502.16.

Direct impacts are caused by an action or by implementation of an alternative and occur at the same time and place as that action or implementation.

Indirect impacts also result from an action or implementation of an alternative, but usually occur later in time or removed in distance from the action or implementation.

Cumulative impacts result from individually minor but collectively significant actions over time. A cumulative impact is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

Actions anticipated during the life of the plan on all lands in the planning area, including private, State, Native corporation, and Federal (FWS and NPS) lands, have been considered in the analysis to the extent reasonable and possible. Decisions about other actions occurring within the planning area could be made by many public and private entities, though the location, timing, and magnitude of these actions are not well known. Assumptions about actions outside of the BLM's jurisdiction that are considered in the cumulative effects analysis include:

- ANCSA and State land entitlements will be fulfilled within the life of the plan.
- The BLM will retain 20-40% of the lands currently selected by the State or Native corporations; conversely, 60-80% of these lands will be conveyed.
- Land sales (settlement and remote settlement areas) will continue on State lands consistent with Alaska Department of Natural Resources area plans.
- Mineral exploration and development will increase on State and Native lands.
- Mineral exploration and development will remain minimal in National Parks, Preserves, and Monuments within the planning area, and in Selawik National Wildlife Refuge.

- National parks, preserves and monuments within and adjacent to the planning area will continue to manage for remote, primitive recreation experiences. Access into parks will continue to be primarily by air, boat, or snowmachine.
- National wildlife refuges within or adjacent to the planning area will continue to be managed for wildlife and compatible remote, primitive recreation experiences. Access into refuges will continue to be primarily by air, boat, and snowmachine.
- Road construction will increase on State and Native corporation lands in support of local communities, and mineral exploration and development.
- Use of communication sites will increase.

Irreversible or irretrievable commitment of resources and unavoidable adverse impacts, and short-term uses versus long-term productivity are discussed after the Cumulative Impacts section. **Irreversible commitment of resources** result from actions in which resources are considered permanently changed. **Irretrievable commitment of resources** result from actions in which resources are considered permanently lost. **Unavoidable adverse impacts** are those that remain following the implementation of mitigation measures, and include impacts for which there are no mitigation. **Short-term uses versus long-term productivity** refers to the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity of the resources.

4. Critical Elements

BLM's National Environmental Policy Act (NEPA) Handbook, as supplemented with BLM Instruction Memorandum No. 99-178, identifies 14 "Critical Elements of the Human Environment" that must be addressed during environmental analysis (BLM 1988b Appendix 5; BLM 1999):

1. Air Quality
2. Areas of Critical Environmental Concern
3. Cultural Resources
4. Environmental Justice
5. Floodplains
6. Hazardous or Solid Wastes
7. Invasive, Non-native Species
8. Native American Religious Concerns
9. Prime or Unique Farmlands
10. Threatened or Endangered Species
11. Water Quality
12. Wetlands/Riparian Zones
13. Wild and Scenic Rivers
14. Wilderness

There are no Prime or Unique Farmlands, designated Wild and Scenic Rivers, designated ACECs, or designated Wilderness on BLM-managed lands within the planning area. Impacts related to proposed designations or findings are described. The remaining elements are identified and addressed in the pertinent sections of this chapter.

5. Availability of Data and Incomplete Information

The best available information pertinent to the decisions to be made was used in development of the RMP. Considerable effort has been taken to acquire and convert resource data into digital format for use in the plan. Data has been acquired from BLM sources and from outside sources such as the State.

Some information was unavailable for use in developing this plan, usually because inventories have either not been conducted or are not complete. Specific data that was unavailable include:

- Inventory and assessment of trails
- Detailed soil surveys
- Invasive weed occurrence for areas outside of Nome and Kotzebue
- Definitive sensitive species occurrence (plant and animal)
- Certain wildlife data (specific crucial habitat locations for many species)
- Upstream limits of anadromous fish for many rivers
- Watershed assessments
- Riparian assessments
- Forest inventory
- Vegetative land cover at 30 meters resolution for the entire planning area

As a result of these deficiencies, impacts cannot be quantified given the proposed management of certain resources. In these instances, impacts are projected in qualitative terms or, in some instances, are described as unknown. Subsequent project-level analysis will provide the opportunity to collect and examine site-specific inventory data necessary to determine the appropriate application of the RMP level guidance. In addition, inventory efforts identified in Chapter II will continue to update and refine the information used to implement this plan.

B. Resources

1. Air Quality and Soil and Water Resources

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to air quality and soil and water resources management: Cultural Resources, Paleontological Resources, Visual Resources, Wilderness Characteristics, Special Status Species, Social and Economic Conditions, Special Designations, Renewable Energy, Public Safety, and Subsistence.

a) Impacts Common to All Alternatives

(1) Impacts to Air, Soil, and Water from Vegetation Management

Implementation of mitigation measures to protect vegetation, both terrestrial and wetlands, on a project specific basis, would limit disturbance and thermokarst subsidence to permafrost soils, reduce sediment runoff that impairs water quality, limit airborne dust particulates, and aid in the recovery of both terrestrial and aquatic habitat from permitted uses.

(2) Impacts to Air, Soil, and Water from Fire and Fire Management

Fire has impacts to air quality and soil and water resources as described in detail in the Land Use Plan Amendment for Wildland Fire and Fuels Management for Alaska (BLM 2004b). Fire helps maintain a mixture of vegetation types and age classes that provide soil stability and limit water quality degradation. Fire removes some vegetative species while allowing for establishment of others. Certain species, such as willows and alder, will sprout soon after burning and initiate soil stabilization. Over time, vegetation recovers from fire disturbance as successional stages of vegetation develop. Fire is less prevalent in the planning area, where the dominant ground cover is herbaceous or shrub vegetation which is less prone to wildland fire, as compared to the boreal forests of the Interior. Therefore the effects of fire on soil, water, and air resources are less in the planning area than may be anticipated for Interior Alaska.

Wildland fire occurrence and impacts to air quality and visibility vary widely from year to year. Fires occurring in Canada or Siberia also may affect air quality within Alaska. Impacts are usually short term. The Alaska Department of Environmental Conservation (ADEC) has statutory authority for air quality and issues air quality alerts and advisories when needed. State air quality regulations distinguish between impacts from wildland fire and those from prescribed fire. Written authority is required from ADEC for a prescribed burn of 40 or more acres.

(3) Impacts to Air, Soil, and Water from Livestock Grazing

Grazing by reindeer can impact air quality, and soil and water resources by degrading habitat or reducing the viability of vegetative ground cover. Reindeer herders tend to keep their animals in the same general area to limit their wandering away with the migrating caribou. This has resulted in reduction of ground cover in limited areas, which could possibly cause soil erosion, sedimentation and water quality changes, and increased airborne particulates in windy areas.

With the trend towards a reduction in both size and number of reindeer herds, reduction of ground cover and associated issues is not likely to be an increasing problem for the foreseeable future.

(4) Impacts to Air, Soil, and Water from Locatable Minerals

Mining exploration can occur on existing Federal or State claims under any alternative. The range of potential impacts to soil and water resources include disturbance and redistribution of gravel, overburden, and soil materials. The structure of the soil profile as well as the stability of the floodplain could be destroyed and may require decades for recovery. The soil removal could also cause an increase in stream sedimentation and turbidity and a decrease in stream channel stability. Air quality deterioration is thought to be very localized, limited to the immediate mined area and access roads. Airborne deposition of heavy metals from ore trucks and mining-related activities has been observed on both sides of the Red Dog Mine haul road. The pattern of deposition is probably driven by topography and wind patterns. (Hasselbach et al. 2004). Despite localized impacts, overall air quality in the planning area should remain in attainment. The BLM has detailed impacts from surface mining to both terrestrial and wetland habitats in the Minto Flats Placer Mining EIS (BLM 1989). These impacts should be minimal due to the very low level of activity anticipated (less than four notices per year), the very minimal amount of acres disturbed (less than 20 acres per year), and the seasonal and temporary nature of the expected activity.

ROPs that protect soil, water, and air resources may include: separating organic strippings from mined gravels for future reclamation, constructing adequately sized bypass channels and/or retention ponds to contain a 50-year flood event, covering heavy metal concentrate to limit airborne dispersion, backfilling all mining pits with tailings as the mining progresses, and spreading the remaining vegetation and overburden piles on the floodplain up to the reconstructed stream channel at the conclusion of the mining activity.

(5) Impacts to Air, Soil, and Water from Mineral Materials

Mineral material excavation and disposal may degrade soil resources, may cause an increase in stream sedimentation and turbidity, or increases airborne particulates in windy areas. Depending on the location of the materials, some sites may recover to the original vegetation cover within a relatively short time frame. Other sites may never recover to the original vegetative cover due to loss of soil from the site. Additionally, construction of access roads to the site may add considerably to impacts, depending upon length, terrain, and permafrost. Impacts would be reduced under all alternatives with implementation of ROPs and mitigation measures developed during NEPA analysis of specific material site disposal actions.

(6) Impacts to Air, Soil, and Water from Recreation Management

There are minor impacts to air quality and soil and water resources from both commercial and non-commercial recreation activities. These include temporary disturbance of the vegetative cover due to recreational camps or to recreation associated with access (aircraft takeoff and landing on remote airstrips or gravel bars). In areas that are repeatedly used for camping sites, there may be minor, site-specific degradation of soils and vegetation. Given the low level of recreational use on most BLM-managed lands, these impacts would be minimal and overall the soil, water, and air quality in the planning area should remain pristine.

(7) Impacts to Air, Soil, and Water from Travel Management

OHV use, including snowmachines especially in high-use areas, can adversely affect soil and water through impacts to riparian and wetland resources. Where OHV trails traverse wetlands, the vegetative cover can become disturbed or destroyed, leading to thermokarst subsidence, water diversions, and ponding. Where trails cross streams, riparian soil and vegetation may be altered or destroyed, increasing soil loss and sedimentation into aquatic habitats and resulting in diminished water quality. Given the low level of recreational use on the remote BLM-managed lands, these impacts would be minimal overall and degradation of air quality and soil and water resources should not increase in the foreseeable future.

(8) Impacts to Air, Soil, and Water from Lands and Realty Actions

There are minor impacts to air quality and soil and water resources from lands and realty actions under all alternatives. The exception to this would be a right-of-way that authorized road construction. Roads typically have a major local impact. The road footprint destroys soil resources, bridges and culverts may create diversions and ponding, and sediment can be transported by wind and water, which may adversely impact air and water quality. Additionally, the material sites necessary for road construction may also impact soil, water, and air resources, as noted above. The magnitude of potential impacts would depend on the scale and methods of road construction and use. While these types of impacts would affect a very small percentage of BLM-managed land in the planning area, impacts from road construction could be reduced under all alternatives with implementation of ROPs and mitigation measures developed during NEPA analysis of specific realty actions.

b) Alternative A

(1) Impacts to Air, Soil, and Water from Vegetation Management

Impacts to air quality and soil and water resources from vegetation management would be the same as discussed under Impacts Common to All Alternatives.

(2) Impacts to Air, Soil, and Water from Livestock Grazing

Impacts to air quality and soil and water resources from livestock grazing would be similar to those discussed under Impacts Common to All Alternatives. Under this alternative, applications for grazing permits would be considered throughout the planning area but would likely not be approved outside of the Seward Peninsula due to the presence of caribou and the difficulty of managing reindeer within occupied caribou habitat. Impacts from grazing would be slightly higher than under Alternative C and D, but less than under Alternative B.

(3) Impacts to Air, Soil, and Water from Leasable Minerals

There would be no impacts to air quality and soil and water resources from leasable minerals under this alternative as no leasing would occur.

(4) Impacts to Air, Soil, and Water from Locatable Minerals

Impacts to air quality and soil and water resources from locatable minerals would be the same as discussed under Impacts Common to All Alternatives.

(5) Impacts to Air, Soil, and Water from Mineral Materials

Impacts to air quality and soil and water resources would be the same as discussed under Impacts Common to All Alternatives.

(6) Impacts to Air, Soil, and Water from Recreation Management

Under this alternative, impacts to air quality and soil and water resources from recreation management would be similar to those discussed under Impacts Common to All Alternatives.

(7) Impacts to Air, Soil, and Water from Travel Management

Impacts to air quality and soil and water resources from OHV use and travel management would be similar to those discussed under Impacts Common to All Alternatives. The planning area would remain undesignated and cross-country use of OHVs weighing 2,000 pounds or less Gross Vehicle Weight Rating (GVWR) would be allowed throughout. Sensitive habitat areas would not receive additional protection from OHV impacts.

(8) Impacts to Air, Soil, and Water from Lands and Realty Actions

Impacts to air quality and soil and water resources from lands and realty actions would be the same as discussed under Impacts Common to All Alternatives.

c) Alternative B

(1) Impacts to Air, Soil, and Water from Vegetation Management

Since Alternative B promotes exploration and development activities, impacts to air quality and soil and water resources from vegetation management would likely increase somewhat, due to a projected increase in surface-disturbing activities. In addition to the impacts described in Impacts Common to All Alternatives, management of vegetative resources under Alternative B would implement ROPs to preserve a protective cover on soil and permafrost, reduce sediment runoff that degrades water quality, and keep dust from forming wind-borne particulates.

(2) Impacts to Air, Soil, and Water from Livestock Grazing

Alternative B would likely have impacts to air quality and soil and water resources from reindeer grazing similar to those discussed under Impacts Common to All Alternatives. Even if the entire planning area would be open to reindeer grazing, it is unlikely that many new reindeer grazing operations would be established outside of the Seward Peninsula for the foreseeable future due to the presence of caribou throughout most of the planning area, and the difficultly of managing reindeer in caribou occupied habitat.

In addition, grazing by bison could be authorized on the Seward Peninsula under this alternative. Potential impacts to air quality and soil and water resources are likely to be minimal due to the probable small numbers of animals and limited extent of grazing areas.

(3) Impacts to Air, Soil, and Water from Leasable Minerals

(a) Seismic Exploration

Seismic surveys involve seasonal occupation and transport of seismic equipment and camps using sledge-drawn trailers (wanigans) at transitory locations when the snow cover accumulation is sufficient to insulate the tundra and after lakes and rivers are frozen. Historically, the principal effect of seismic activities on soil and water resources has been diversions of shallow water tracks and ponding in places where track depression compresses the organic mat sufficiently to alter the thermal regime, melt surficial ground ice, and alter the native vegetation (Emers and Jorgenson 1997). More recently, modern seismic lines, with newer low-ground pressure equipment have less impact on the tundra than older, outdated types, but impacts to the tundra are more likely to occur during the camp-move (WesternGeco 2003). A 2D operation covers less line miles, but the camp moves virtually every day; while a 3D seismic operation covers more line miles, but the camp moves less often (WesternGeco 2003). While extensive thermokarst erosion along recent winter seismic trails is seldom observed, impacts to vegetation and surficial compaction are still in evidence (Jorgenson et al. 2003a). Adequate protection of the tundra requires a uniformly distributed snow pack with a hard surface crust. Often, the less than ideal snow conditions on the North Slope, particularly where the snow pack is influenced by wind scour and drift, could expose tussock tundra to surface disturbance (Walker et al. 1987). Varying levels of disturbance have been documented even where the snow depth exceeded two feet (Felix and Raynolds 1989).

Observations by the BLM and others (National Research Council 2003) indicate that short-term transitory impacts, such as surficial compaction, diversions of shallow water tracks and limited ponding, are estimated at about 1% of the proposed seismic lines per season, though newer, low-ground pressure equipment could reduce this significantly. Since tundra vegetative mat has been shown to recover in 7 to 10 years where damage is not severe (Abele et al. 1984, Jorgenson et al. 2003a), the long-term impacts due to thermokarst erosion, such as permanent diversions of shallow water tracks and limited ponding, are estimated at only about 1% of the short-term impacts. These impacts are strongly influenced by snow depth and distribution and may only happen when seismic activities occur under less than ideal snow conditions (National Research Council 2003). Where disturbance does occur, it could take from several years to several decades for the effects to be ameliorated (Walker et al. 1987).

These types of impacts would be reduced by implementation of the ROPs, including limiting most seismic exploration to those times during the winter when the ground is frozen and snow cover is adequate.

(b) Exploratory Drilling

Because exploratory drilling occurs in the winter, the principal effects on air quality and soil and water resources would be the construction of ice roads and pads. Construction of ice roads allows winter overland transport of the equipment and material used in exploration and delineation well drilling. Ice pads are constructed to support drill rigs and staging activities. While this is preferable to summer surface activities, the ice roads and pads require large quantities of water–an estimated 1-1.5 million gallons per mile of road, and 2 million gallons per

pad. Water supply for drilling as well as for camp use also would be significant–up to 1.6 million gallons per site (BLM 2003b). While there are a multitude of lakes in the planning area, many of these lakes are shallow and either freeze solid or have very limited free water during the winter when exploration takes place (Sloan 1987). Based on remote sensing (Mellor 1987) and other surveys, a typical large tundra lake (about a mile or more in length and 8 to 10 ft deep) used as a winter water source could have from less than 10 acre/ft to more than 100 acre/ft of water available for pumping. This estimate assumes the Alaska Department of Natural Resources (ADNR) drawdown limitation of 15% of the under-ice water volume. While water withdrawal from riverine pools is generally not permitted by the Alaska Department of Fish and Game (ADF&G), it is not prohibited. Given that the seasonal fluctuation of water depth in rivers is much greater than that of lakes, and that the variability of overwintering fish population is also greater in rivers than it is in lakes, it is significantly harder to determine safe amounts of water removal from isolated deep pools within the largely frozen (up to 95%) rivers. Depending on the areas leased, number of exploratory wells drilled and length of ice roads, annual water usage for exploration could require pumping water from one to many lakes during a winter's exploration season. If more than 15% of the under-ice water volume is removed, as is possible, then fewer lakes would be required, but less of the critical overwintering aquatic habitat would remain in pumped lakes.

Removal or compaction of snow cover can increase the depth of freezing, often a foot or more, greatly reducing the water quantity within a lake or river pool. Since the ice thickness may approach seven feet on undisturbed lakes, significant amounts of additional water would be lost as the ice thickness increases from snow compaction or clearing. Altering travel to avoid crossing or clearing deep lakes and augmenting snow cover by using snow fences would reduce ice buildup on lakes and rivers, and melted snow could be used in camps and for drilling. Use of aggregate ice chips created from crushed lake ice could reduce water usage on ice roads, but would greatly increase the depth of freezing in the lakes used in this process. Shallow lakes and ponds that normally would freeze to the bottom are the best source for this ice aggregate. Taking aggregate from the frozen areas of deep lakes would increase the ice thickness of the unfrozen area and could eliminate marginal aquatic habitat.

After each season of use, ice roads are abandoned and allowed to melt in the spring. Ice ramps or bridges that cross streams or lakes should be removed or breached before spring break-up. While some ponding might occur during a rapid onset of snowmelt, melt-water channels, similar to the melt-water channels that cut through naturally occurring river aufeis (overflow icing), would develop in the ice-road surface and rapidly drain the impounded water (Sloan et al. 1975). If the location of ice roads is offset from year to year, the effects of these short-term impoundments should be negligible. Ice roads and pads created to last several years have a greater impact on the underlying tundra mat, compacting and killing larger areas of vegetation (Walker 1996). Because this could cause more thermokarst and subsequent drainage alteration, multiple-year ice roads should be avoided. Multiple-year ice pads show fewer impacts, since their limited size results in less disruption of flow and subsequent ponding, so effects are usually limited to minor vegetative impacts around the margins.

Overland ice road construction becomes impractical over 50 miles on low-relief terrain such as the coastal plain. Due to the relatively short length of the winter season for construction and drilling, overland moves using low-ground-pressure vehicles and trailers (rolligons) can be used to haul drilling rigs to ice pads without an ice road. In some cases, where distances are too great for drilling to be completed in one season, the ice pad is insulated and the drill rig stored over the summer. In these cases, the amount of water required is greatly reduced. However,

hauling heavy loads on snow roads could expose tussock tundra to surface disturbance, impact the tundra wetlands, and expose stream banks and lake shorelines to increased erosion.

The preferred and normal means of disposing of drilling wastes, including muds and cuttings, is by reinjection into disposal wells. Cuttings may be stored temporarily to facilitate reinjection and/or backhaul operations. Use of mud pits may be allowed by the Authorizing Officer. If mud and cuttings are stored on the surface, sediments and other contaminants could be flushed into the watershed. However, requirements that wastes be stored in lined and bermed areas and disposed of before spring break-up would reduce the potential of sediments and other contaminants being flushed into the watershed. Adherence to the ROPs and Stips by all permitted operations would help prevent pollution to any stream or lake.

(c) Development

Oil and gas development activities would involve constructing ice roads to haul equipment and gravel for the construction of production pads, connecting roads, and landing strips. The potential impacts of such development on air quality and soil and water resources may include disturbance of stream banks or shorelines and subsequent melting of permafrost (thermokarst), blockages of natural channels and floodways that disrupt drainage patterns, increased erosion and sedimentation, and removal of gravel and water from riverine pools and lakes.

Thermokarst refers to ground subsidence that occurs when the removal of surface cover exposes ice-rich permafrost soils to a higher temperature regime and subsequent melting. Stream banks and lakeshores are particularly vulnerable to thermokarst, because the wave action of the water would accelerate the soil removal once the protective vegetative cover is degraded (Sellman 1975). Erosion and sedimentation can also be caused by construction or other activities that disturb the streambed, stream banks, or remove protective shoreline vegetation. Inadequate design or placement of structures, culverts, or bridges can alter natural sediment transport and deposition, creating scour holes or channel bars. Improper placement or sizing of gravel fill can result in erosion from pads or roadbeds adjacent to streams or lakes. Natural drainage patterns can be disrupted when activities or structures divert, impede, or block flow in stream channels, lake currents, or shallow-water tracks. Blockages or diversions to areas with insufficient flow capacity can result in seasonal or permanent impoundments. Diverting stream flow or lake currents also can result in increased bank or shoreline erosion and sedimentation that degrades water quality. Proper location and adequate design capacity of culverts, bridges, pipelines, and other control structures would minimize drainage problems. Winter or low-water construction and transport activities and adequate armoring of fill would minimize erosion and sedimentation problems.

Consumptive water use in the summer seldom is a problem on the coastal plain, as water generally is abundant. Exceptions would be in smaller coastal streams or most foothills streams during late summer, when shallow pools might be pumped dry. In the winter, however, all but the largest lakes and riverine pools are subject to dewatering if consumptive use is high. Depending on the areas leased and number of development wells drilled, annual water usage for development activities under Alternative B would vary considerably. Because of the continued need for ice roads, annual water use during development could be similar to that for exploration, assuming the ADNR drawdown limit of 15% of the under-ice water depth. If more than 15% is removed then fewer lakes would be required, but less of the critical overwintering habitat would remain in the pumped lakes or rivers. Removal or compaction of snow cover also can increase the depth of freezing, greatly reducing the water quantity within a lake or pool. Augmenting snow cover by using snow fences not only would reduce ice buildup on lakes and

rivers, but melting snow also could be used as a supplemental water source for camps and drilling. Adherence to the ROPs and Stips for all permitted operations would prevent the unlimited drawdown or pollution of any stream or lake.

While some of the gravel used for the construction of permanent facilities may be obtained from non-BLM managed lands, some of the material sites would probably be located on BLM-managed lands within the planning area. Improper location of gravel-removal operations can result in alteration or destruction of soils, stream channel or lake configuration, stream-flow hydraulics or lake dynamics, erosion and sedimentation, and ice damming and aufeis formation. Locating gravel pits far enough away from streams and lakes to avoid break-up or storm flooding would greatly minimize these effects to water resources.

If oil pipelines result from the development under Alternative B, they could affect soil and water resources, primarily through temporary impoundments, diversions, and sedimentation during construction. Winter or low-water construction and transport activities and adequate armoring of fill would minimize erosion and sedimentation problems. Again, adherence to the ROPs and Stips for all permitted operations would prevent the unnecessary disturbance to soils, sedimentation in streams or lakes, and increased airborne dust particulates.

Under the potential development activities, spills and spill cleanup would involve both crude oil and refined petroleum products, probably from fuel-storage areas or handling operations. Storage of fuel in lined and bermed areas and the onsite availability of absorbents and removal equipment would help ensure that the size of any area affected by a spill and cleanup efforts is kept to a minimum. Crude oil spill cleanup associated with production operations and pipelines is possible and could adversely affect streams and lakes. While the petroleum residue from a spill could be flushed from streams within a few years, the impacts to lakes and ponds could persist for decades. Spill cleanup in a watershed would involve containing the spill, diverting or isolating it within the waterbody, skimming off the oil, and treating the remaining oil-contaminated water and sediments. Prevention and rapid response with adequate removal equipment would minimize effects. The ROPs associated with Alternatives B, C, and D are designed to prevent or otherwise mitigate oil spills in the planning area.

Spills of chemicals and saline waters would be rapidly diluted in a large lake or river. In small lakes, tundra ponds, and shallow water tracks, the impacts would be greater, with waters remaining toxic to sensitive species for several years. These spills could be pumped out of the waterbody, if confined, or neutralized and then diluted with uncontaminated freshwater.

Air quality impacts may result from the emissions of hydrocarbons and byproducts of combustion or wind-borne particulates. Ambient air quality on the North Slope of Alaska, however, is relatively pristine even though oil and gas exploration, development, and production have been under way for more than 30 years. Arctic haze is a phenomenon resulting from elevated concentrations of fine particulate matter found over the Arctic, primarily in winter and spring. Scientists believe that most of the pollutants contributing to Arctic haze are from combustion sources in Europe and Asia. It is not known to what extent local sources in Alaska contribute to Arctic haze. However, the Arctic haze phenomenon was first observed in the 1950s, long before oil development started on the North Slope. Emissions in the general area of the North Slope oil production have not been shown to violate air quality standards; therefore, any possible contribution from local sources to Arctic haze would be minimal. Emissions from development resulting from the Alternative B would be small compared to the emissions from Prudhoe Bay and Kuparuk oil field production; and therefore, would account for a minimal percentage of the emissions generated by total North Slope oil production.

(d) Effects of Spills

Spills could occur from pipelines, production and exploration pads, airstrips, and roads. Spills that leave the pads and roadbeds could reach one or more of several habitat types, including wet and dry tundra, tundra ponds, lakes, flowing creeks and rivers, and potentially the adjacent nearshore Chukchi Sea. Spills could occur anytime during the year. This analysis would examine the time of year and location that would have the most adverse impact on the soil, water and air resources.

1. Air Quality

As noted in the Northeast Integrated Activity Plan (IAP) and EIS (BLM and MMS 1998), the volatile component of an oil spill from offshore facility or pipeline oil spills likely would evaporate almost completely within a few hours after the spill occurred. The EIS discusses the rate of evaporation, ambient concentrations, and the types of compounds the EPA classifies as hazardous air pollutants. This summary showed that these compounds evaporated relatively quickly after the spill occurs. Ambient concentrations peak within the first several hours after the spill starts and are reduced by two orders of magnitude after about 12 hours. The heavier compounds take longer to evaporate and may not peak until about 24 hours after spill occurrence. Total ambient concentrations are significant in the immediate vicinity of an oil spill, but concentrations are greatly reduced after the first day. In the event of an oil spill on land, the air-quality effects would be less severe than offshore (because some of the oil could be absorbed by vegetation or into the ground), but some effects might last longer before the volatile compounds were completely dissipated.

Diesel fuel oil could be spilled either while being transported or from accidents involving vehicles or equipment. A diesel spill would evaporate faster than a crude oil spill. Ambient hydrocarbon concentrations would be higher than with a crude oil spill, but would also persist for a shorter time. Also, since any such spill would probably be smaller than potential crude oil spills, any air-quality effects from a diesel spill likely would be even lower than for other spills. Oil or gas blowouts may catch fire. In addition, in situ burning is a preferred technique for cleanup and disposal of oil spilled into water. This type of burning would be less likely in case of oil spilled on land, but the effects on air quality if some of the oil should be burned would be similar. Burning could affect air quality in two important ways. For a gas blowout, burning would reduce emissions of gaseous hydrocarbons but slightly increase emissions of other pollutants. If an oil spill were ignited immediately after spillage, the burn could combust most of crude oil or diesel that otherwise would evaporate. On the other hand, incomplete combustion of oil would create an oily soot of unburned hydrocarbons, and minor quantities of other pollutants, into the air.

In situ burning as part of a cleanup of spilled crude oil or diesel fuel would temporarily adversely affect air quality, but the effects would dissipate as the fuel source is exhausted, so that only an extremely large spill would have long-lasting effects. Air pollution would be limited because of atmospheric dispersion. Also, large fires create their own local circulating winds--toward the fire at ground level--that affect plume motion. Accidental emissions likely would have a minimal effect on air quality. Other air quality effects from cleanup activities would include emissions from vehicles and equipment used in the cleanup effort; these should be very low.

2. Soil Resources

Oil spills could impact soils, primarily when the surface vegetation is altered. The oil would decrease vegetation growth, but leave the organic mat largely intact, though likely saturated with oil to a depth dependent on the amount of oil spilled, ambient temperature, and the

presence or lack of snow cover. Snow, ice, and a frozen ground surface would limit oil absorption into the surface organic mat and simplify cleanup. Spill cleanup, however, is more likely to damage soils when the ground surface is not frozen. Cleanups are not always well controlled; heavy traffic and digging are common, resulting in damaged soils. Oil-spill cleanup mitigates impacts on soils only if cleanup methods and operations are very carefully controlled and minimize surface disturbance. Thermokarst, or ground subsidence, occurs when the removal of surface cover exposes ice-rich permafrost soils to a higher temperature regime and subsequent melting. The impacts to soil resources from surface disturbing activities during oil-spill cleanup when the tundra is unfrozen may be greater than the impact of the spilled oil, as the area affected may not be limited to that area immediately adjacent to and covered by the spill.

3. Water Resources

Small crude or diesel spills (< 1 bbl and smaller) are projected to occur onshore (Table 4-3, Table 4-4, Table 4-5). Likely, all small fuel spills would occur on or near pads or roadbeds, though some fuel may possibly reach adjacent waters. Spill response during the winter, likely would remove almost all of a spill from the frozen tundra prior to snowmelt. During that part of the year when the tundra is unfrozen, late May through late September, spills could reach and adversely impact tundra waters before oil-spill response is initiated or completed. Storage of fuel in lined and bermed areas and the onsite availability of absorbents and removal equipment would help ensure that the size of any area affected by a spill and cleanup efforts is kept to a minimum. Since most oil exploration and development activities, as well as pipeline and facilities construction, would occur during winter when the ground is frozen, it is likely that most anticipated small fuel spills would be largely contained and removed prior to reaching tundra waters.

In the case of a larger spill, the Northeast NPR-A IAP/EIS (BLM and MMS 1998), analyzed the effects of a 325-bbl spill reaching the Colville River and Teshekpuk Lake in summer and the effects are hereby incorporated by reference. In the Colville River, the high rate of water flow would rapidly disperse the spill and preclude any effects on dissolved oxygen concentrations. Direct toxicity in the water column would be minimal and limited to the first few reservoir pools downcurrent of where the spill entered the river. Some toxicity might persist in these initial reservoir pools for a few days to weeks, until toxic compounds were washed out of the oil trapped in the sediment or the oiled sediment was buried under cleaner sediment. Where ice is present in the river, the oil would remain on top of the ice until breakup, when it would spread between the ice floes as they separate and move downstream. Spills that occur when the ice cover is growing become encapsulated in the ice until breakup, when the currents would disperse the ice downcurrent and eventually deposit it on shorelines. Similar effects would be expected in the unlikely event that an oil spill were to reach any of the rivers within the planning area.

As noted in Northeast NPR-A IAP/EIS (BLM and MMS 1998), a similar oil spill reaching Teshekpuk Lake also would result in a minimal effect on water quality. Dissolved oxygen levels would not be affected. Direct toxicity would be minimal because of the much greater dilution volume in Teshekpuk Lake than in the small ponds and lakes and because of the relatively unrestricted movement of the slick and underlying water. The spreading of the spill over about 60 acres (0.03% of the lake surface) could be considered an effect on water quality. This effect would exist for a few weeks, until the slick was either cleaned up or the oil stranded on the shoreline. Small waterbodies, such as tundra ponds and small lakes, are more susceptible to oil spills than larger lakes, as they lack sufficient area to generate the wave action or currents to

dissipate the spill. The primary effect of an oil spill in tundra ponds would be long-term direct toxicity. Similar effects would be expected for any of the lakes in the planning area, if an oil spill were to occur.

Spill cleanup in a watershed would involve containing the spill, diverting or isolating it within the waterbody, skimming off the oil, and treating the remaining, oil-contaminated water and sediments. Storage of fuel in lined and bermed areas and the onsite availability of absorbents and removal equipment would help ensure that the size of any area affected by a spill and cleanup efforts is kept to a minimum. Prevention and rapid response with adequate removal equipment would reduce effects; spill-prevention measures are described in Appendix A.

(4) Impacts to Air, Soil, and Water from Locatable Minerals

Impacts would be similar to those discussed under Impacts Common to All Alternatives, but slightly greater in extent. Under Alternative B, three to five new mines could be expected, but these would be small, placer operations. The potential for disturbance to soil and water resources would not exceed an additional fifty acres over that discussed under Impacts Common to All Alternatives. Implementation of ROPs would further reduce the potential for impacts to riparian, floodplain, and wetland habitats, important for maintenance of stream bank stability and water quality. Air quality impacts may result from the emissions of hydrocarbons and byproducts of combustion or wind borne particulates, but would be localized in extent, such that the planning area would still meet regional air quality standards.

(5) Impacts to Air, Soil, and Water from Mineral Materials

Impacts to air quality and soil and water resources from mineral materials disposal would be similar to those projected under Impacts Common to All Alternatives but greater in extent as up to 1,000,000 cubic yards of mineral material would be needed for oil and gas development activities. Impacts relative to oil and gas development are discussed under Leasable Minerals.

(6) Impacts to Air, Soil, and Water from Recreation Management

Impacts to air quality and soil and water resources from recreation management would be similar to those discussed under Impacts Common to All Alternatives.

(7) Impacts to Air, Soil, and Water from Travel Management

Impacts to air quality and soil and water resources from OHV use and travel management would be similar to those discussed under Impacts Common to All Alternatives. Cross-country use of OHVs weighing 2,000 pounds or less GVWR would be allowed throughout and during the winter, the weight limit would be suspended. Under this Alternative, sensitive habitat areas would not receive additional protection from OHV impacts. Impacts would be increased compared to Alternative A. Because the heavier vehicles would be allowed only during the winter, additional impacts would be limited.

(8) Impacts to Air, Soil, and Water from Lands and Realty Actions

Impacts to air quality and soil and water resources would be similar to those discussed under Impacts Common to All Alternatives. Implementation of ROPs would further reduce the potential for impacts compared to Alternative A.

d) Alternative C

(1) Impacts to Air, Soil, and Water from Vegetation Management

Impacts to air quality and soil and water resources would be similar to those discussed under Impacts Common to All Alternatives, but to a lesser extent due to limits on specific ground-disturbing activities in certain areas.

(2) Impacts to Air, Soil, and Water from Livestock Grazing

Impacts to air quality and soil and water resources would be similar to those discussed under Impacts Common to All Alternatives, but to a lesser extent.

(3) Impacts to Air, Soil, and Water from Leasable Minerals

Impacts to air quality and soil and water resources would be similar to, but much less than, those impacts discussed under Alternative B as high potential areas would be closed to leasing. Due to the closure, the probability of seismic exploration occurring in the planning area would also be very low.

(4) Impacts to Air, Soil, and Water from Locatable Minerals

Impacts to air quality and soil and water resources would be similar to, but somewhat less than, those discussed under Impacts Common to All Alternatives. While no mineral development is anticipated under this alternative, exploration may occur under a mining notice in the limited area open to locatable mineral entry.

(5) Impacts to Air, Soil, and Water from Mineral Materials

Impacts to air quality and soil and water resources would be similar to, but somewhat less than, those projected under Impacts Common to All Alternatives. Two sensitive habitat areas, McCarthy's Marsh and the Kigluaik Mountains, would be closed to mineral material disposal, providing additional protection to sensitive wetlands in these areas. Beaches, floodplains, and riparian areas would also be closed, limiting both the availability and need for mineral materials disposal occurring on BLM-managed lands.

(6) Impacts to Air, Soil, and Water from Recreation Management

For most of the planning area, impacts to air quality and soil and water resources would be similar to, but to a lesser extent than, those discussed under Impacts Common to All Alternatives. The limits on commercial use under Alternative C would reduce the potential for disturbance from recreational activities.

(7) Impacts to Air, Soil, and Water from Travel Management

Under Alternative C, the entire planning area would be limited to designated trails. Some areas would be closed to OHV use during the snow free season. The least impacts to air quality and soil and water resources from proliferation of trails would occur under Alternative C.

(8) Impacts to Air, Soil, and Water from Lands and Realty Actions

Impacts to air quality and soil and water resources from lands and realty actions would be similar to those discussed under Impacts Common to All Alternatives, but to a lesser extent. Constraints on realty actions within designated ACECs would provide additional protection to air quality and soil and water resources.

e) Alternative D

(1) Impacts to Air, Soil, and Water from Vegetation Management

Impacts to air quality and soil and water resources would be similar to those discussed under Impacts Common to All Alternatives, but lesser in extent.

(2) Impacts to Air, Soil, and Water from Livestock Grazing

Impacts to air quality and soil and water resources would be similar to those discussed under Impacts Common to All Alternatives, but lesser in extent.

(3) Impacts to Air, Soil, and Water from Leasable Minerals

The impacts to air quality and soil and water resources would be the same as Alternative B.

(4) Impacts to Air, Soil, and Water from Locatable Minerals

Impacts to air quality and soil and water resources would be similar to Alternative B, but slightly lesser in extent. Under Alternative D, ROP SS-4 would apply to lands adjacent to eight lakes supporting Kigluaik Arctic char, slightly reducing the potential for disturbance to soil and water resources. ROP FW-7a would apply along ten rivers, providing additional protection for riparian habitat, which is important for maintenance of stream bank stability and water quality.

(5) Impacts to Air, Soil, and Water from Mineral Materials

Impacts to air quality and soil and water resources would be the same as Alternative B.

(6) Impacts to Air, Soil, and Water from Recreation Management

Impacts to air quality and soil and water resources would be similar to Alternative B, but slightly lesser in extent. Over the short-term, impacts in the Squirrel River Special Recreation Management Area (SRMA) would be similar to those discussed under Alternative A. Over the long-term, limits on both commercial and non-commercial recreational use levels in the Squirrel River would be established through a Recreation Area Management Plan (RAMP). It is

anticipated that improved management of both commercial and non-commercial recreation would result in reduced impacts to soil and water resources by limiting impacts to riparian and wetland habitats.

(7) Impacts to Air, Soil, and Water from Travel Management

Impacts to air quality and soil and water resources from OHV use and travel management would be similar to but somewhat less than under Alternative B because the 2,000 pound weight limit would apply yearlong.

(8) Impacts to Air, Soil, and Water from Lands and Realty Actions

Impacts to air quality and soil and water resources would be similar to those discussed under Alternative B and Impacts Common to All Alternatives. Under Alternative D, several ACECs would be designated including the (WACH) insect relief habitat and core winter habitat in the Nulato Hills. Management applied within these ACECs would provide additional protection of wetland and riparian habitat. Impacts from realty actions would be slightly higher than under Alternative C and somewhat lower than under Alternatives B and A.

2. Vegetation

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to vegetation management: Air Quality, Cultural Resources, Paleontological Resources, Visual Resources, Wilderness Characteristics, Renewable Energy, Lands and Realty Actions, Iditarod National Historic Trail, Public Safety, Social and Economic Conditions, and Subsistence.

a) Impacts Common to All Alternatives

(1) Impacts to Vegetation from Soil, Water, and Special Status Species Plants

Vegetation throughout the planning area would benefit from proper management of soils, water, and special status species plant resources. Implementation of mitigation measures to protect soil, water and Special Status Species (SSS) plants and their habitats on a project specific basis would reduce disturbance to vegetation, and aid in recovery of various habitat types from permitted uses. See impact discussions in this chapter under Special Status Plants on page 4-84 for specific information concerning special status plants within the planning area.

(2) Impacts to Vegetation from Fish and Wildlife Management

Direct benefits to vegetation throughout the planning area would result from protection to important fish and wildlife habitats, such as riparian and tall shrub habitats, and from mitigation of impacts to fish and wildlife habitat through the NEPA and permitting processes.

(3) Impacts to Vegetation from Fire and Fire Management

Fire management programs emphasize protection of human life and site-specific values while recognizing fire as an essential ecological process and natural agent of change to ecosystems. Implementation of various fire management options (Critical, Full, Modified, or Limited) and level of utilization of wildland fire use would directly affect diversity of habitats and successional stages of plant communities throughout the planning area.

(4) Impacts to Vegetation from Forest Products

Forests cover approximately 8% of the land within the planning area. Although this is a relatively small amount, proper management of forest resources would have a positive impact on overall health of vegetation in the planning area. Implementation of mitigation measures to protect forest product resources on a project specific basis would reduce disturbance to vegetation in general, and aid in the recovery of forest habitats from permitted uses. See impact discussions under Forest Products on page 4-127 for specific information concerning forest resources within the planning area.

(5) Impacts to Vegetation from Livestock Grazing

Some form of livestock grazing is permitted under all alternatives, although areas open to grazing and types of livestock authorized differ among alternatives. Incidental grazing by pack animals associated with special recreation use permits would be considered on a case-by-case basis under all alternatives. Livestock grazing has the potential to negatively impact riparian and tundra vegetation in the planning area by creating localized areas of trampled and over-browsed vegetation, cratering to organics or mineral soil, and heavily browsed willow and dwarf birch shrubs. Long-term vegetation disturbance promotes potential spread of noxious and invasive weed species. Annual monitoring of reindeer grazing allotments, consultation with individual reindeer herders, and implementation/development of allotment management plans encourage proper techniques, which prevent or mitigate adverse effects to vegetation.

(6) Impacts to Vegetation from Locatable Minerals

Existing and future locatable mineral activities have the potential to unfavorably impact riparian and tundra vegetation and habitats by stripping away the vegetative mat as part of mine site overburden, re-routing original stream flow into stream bypass areas, trampling or eliminating (under camp buildings, gravel roads, gravel airstrip, etc.) vegetation, and compacting soils throughout the footprint of the mine site. Long-term surface disturbance would increase the potential for introduction and spread of noxious and invasive weed species into placer mine sites. Site-specific mitigation measures would be implemented where necessary and practical.

(7) Impacts to Vegetation from Mineral Materials

Sufficient mineral materials sources exist on private lands to meet the needs of most communities within the planning area. Few mineral materials disposal actions are anticipated on BLM-managed lands, although most lands would be available for such development. The one exception is that mineral materials would be needed to support oil and gas development, if it occurred. Site specific mitigations would be developed to reduce negative impacts to riparian and tundra vegetation. Mineral Material disposal can unfavorably impact vegetation by

destroying any vegetation growing on the site and compacting and removing soils throughout the footprint of the site, hindering regrowth.

(8) Impacts to Vegetation from Recreation Management

There could be minor impacts to riparian and tundra vegetation from both commercial and non-commercial recreation activities. Occasional-to-repeated use of campsites and aircraft landings at remote sites may have direct effects on riparian and tundra vegetation. Plants would be trampled or broken, and soil would be compacted and disturbed. The potential for human-caused wildland fire would increase with backcountry recreation use. Given the low level of recreation use on most BLM-managed lands in the planning area, these impacts are expected to be minimal.

(9) Impacts to Vegetation from Travel Management

There would be direct and indirect impacts on riparian and tundra vegetation from travel management and OHV use. OHV use on and off designated trails has the potential to destroy the vegetation mat, compact soils, accelerate permafrost melt, and lead to soil erosion and ponded water. Plants would be crushed and their habitats degraded. Higher, rockier terrain and remote areas are becoming more accessible over time as OHVs become more sophisticated and powerful, and as the human population in the planning area increases. This increases the total land area accessed and the potential for vegetation damage. Increasing levels of OHV use on and off designated trails bring an increased possibility that noxious and invasive weeds would be introduced to areas of surface disturbance.

b) Alternative A

(1) Impacts to Vegetation from Soil, Water, and Special Status Species Plants

Impacts to vegetation would be the same as discussed under Impacts Common to All Alternatives.

(2) Impacts to Vegetation from Fish and Wildlife Management

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(3) Impacts to Vegetation from Fire and Fire Management

Impacts to vegetation would be the same as discussed under Impacts Common to All Alternatives. Alternative A endorses wildland fire use as a resource management tool. Wildland fire would be used to protect, maintain and enhance vegetative resources. For example, under Alternative A areas containing stands of white spruce-lichen woodland or lichen tussock tundra could be allowed to burn or be considered for protection from wildland fire on a case-by-case basis in order to evaluate specific resource benefits. Important wildlife habitats, such as lichen tussock tundra or spruce-lichen woodland, would be monitored for cumulative effects of wildland fire, suppression activities, and the effects of excluding fire as funding permits.

(4) Impacts to Vegetation from Forest Products

Under continuation of current management, requests for forest product resources (including permits for personal use firewood and house logs, small sales vegetative contracts, and commercial or salvage logging) would be considered on a case-by-case basis. Only a small number of personal or commercial permits would be expected during the life of the plan. Forested lands would be managed for a sustained yield of forest products. Overall impact to vegetation from forest products in the planning area would be minor.

(5) Impacts to Vegetation from Livestock Grazing

Under continuation of current management, livestock grazing would be managed on a case-by-case basis as permits are received. The type of livestock permitted would be limited to reindeer. Under current management (in addition to lands on the Seward Peninsula), other BLM-managed lands throughout the planning area have been open to reindeer grazing. However, no permits have been authorized, mostly due to conflicts with caribou or moose.

(6) Impacts to Vegetation from Leasable Minerals

There would be no impacts from leasable minerals because no leasing would occur.

(7) Impacts to Vegetation from Locatable Minerals

Under current management, many placer mine sites have a long history of occupancy. For the most part, a slow natural revegetation has occurred in mine tailings and disturbed ground of the mine sites. After mining operations cease, early successional native plants with good colonizing ability that are able to spread easily by seed or vegetative propagation gradually rebuild a vegetative mat at these locations. During the last 16 years, approximately 68 acres of surface disturbance have been associated with active placer mines in the planning area (Table 3-17). Permitted or authorized uses that may affect the surrounding riparian and tundra vegetation would be analyzed through the appropriate NEPA document. Based on this analysis, mitigation would be developed to minimize impacts from proposed activities. The resulting mitigation measures would be included in the permit authorizing the use.

(8) Impacts to Vegetation from Mineral Materials

Under current management, mineral material sales would be considered on a case-by-case basis, with specific operating stipulations developed to protect riparian and tundra vegetation. There are no current mineral materials sales on BLM-managed lands in the planning area, and few would be expected to develop within the life of the plan. Impacts would be similar to those discussed under Impacts Common to All Alternatives.

(9) Impacts to Vegetation from Recreation Management

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(10) Impacts to Vegetation from Travel Management

Impacts from travel management and OHV use would be similar to those discussed under Impacts Common to All Alternatives. The planning area would remain undesignated and cross-country use of OHVs weighing 2,000 pounds or less GVWR would be allowed throughout. Sensitive habitat areas would not receive additional protection from OHV impacts.

(11) Impacts to Vegetation from Special Designations

No ACECs or RNAs would be designated under Alternative A. Sensitive habitats would not be afforded additional protection through designation and management.

No Wild and Scenic Rivers have been designated in the planning area under current management. The Squirrel River is a study river under Sec. 5(a) of the WSRA and the BLM would continue to manage it to protect wild river values until fall 2007. At that time, the three-year period for Congress to consider the study recommendation and finding that the river is not suitable for designation will have expired. Over the short-term, protection of wild river values would indirectly benefit riparian vegetation and sensitive habitat by maintaining the free-flowing nature and pristine water quality of the Squirrel River, and prohibit man-made infrastructure along identified river corridors.

c) Alternative B

(1) Impacts to Vegetation from Soil, Water, and Special Status Species Plants

Vegetation throughout the planning area would benefit from proper management of soils, water, and SSS plants resources. Implementation of ROPs (Appendix A) on a project specific basis would reduce disturbance to vegetation and aid in recovery of various habitat types from permitted uses.

(2) Impacts to Vegetation from Fish and Wildlife Management

Indirect benefits to vegetation throughout the planning area would accrue due to inventory and monitoring of fish and wildlife habitats and the application of ROPs as appropriate.

(3) Impacts to Vegetation from Fire and Fire Management

Impacts would be similar to those discussed under Alternative A, except that application of wildland fire use as a management tool would not be allowed. Slightly more lichen-rich plant communities may be allowed to burn under Alternative B.

(4) Impacts to Vegetation from Forest Products

Impacts would be similar to those described under Alternative A, except that forest products permitting would be subject to the ROPs. A baseline forest inventory would be conducted to determine location of both commercial and non-commercial timber, and old growth stands. Coordination with the USDA Forest Service would be initiated to track forest health conditions concerning insect and disease outbreaks. These efforts would enhance overall knowledge

about vegetation status in the planning area. Small commercial logging and firewood sales would be considered in proposed special management areas such as SRMAs.

(5) Impacts to Vegetation from Livestock Grazing

Under Alternative B, all 11.9 million acres of BLM-managed land would be open to livestock grazing, including both reindeer and bison. An additional 9 million acres of BLM-managed lands outside the Seward Peninsula would be available for livestock use. (some of this acreage is State- or Native-selected). Until the WACH population declines significantly, it is unlikely that additional permits for reindeer grazing would be issued by the BLM. However, there has been recent interest in bison grazing on the Seward Peninsula. Overall, there could be a small increase in livestock grazing pressure and trampling effects on riparian and tundra vegetation throughout the planning area under Alternative B. The potential for introduction and spread of noxious and invasive plants could increase somewhat. Livestock grazing would be subject to ROPs, which include restrictions on picketing animals in riparian areas (ROP Veg-2i) and require that any supplemental feed products used on BLM-managed lands be certified weed-free (ROP Veg-2j).

(6) Impacts to Vegetation from Leasable Minerals

(a) Oil and Gas Exploration and Development

It is assumed approximately 710,000 acres of BLM-managed land would be leased in the high occurrence potential region during the life of the plan. Impact to tundra vegetation, including riparian and upland habitats, from leasable minerals would vary from short-term and low impact to long-term destruction of habitat.

Exploratory seismic surveys would be carried out during winter months, involving transport and camp move vehicles. Adequate snow cover and frozen ground offer some protection to underlying vegetation. A 2001 study conducted near the Colville River delta during the summer following seismic work found compression of the vegetation mat, broken shrubs and crushed tussocks as a result of winter seismic work (Jorgenson et al. 2003b). This study documented that during the summer following seismic work little to no impact to tundra vegetation occurred under seismic lines on 30% of the plots studied. Minor impacts to tundra vegetation were found on 66% and moderate impacts were found on 4% of the plots studied. No plots were highly impacted. Camp move trails in this study had little or no impacts to tundra vegetation on 18% of the plots studied, minor impacts on 54%, moderate impacts on 29%, and high impacts on none of the plots (Jorgenson et al. 2003b). If industry showed interest in the area, 43-55 exploration wells could be drilled during winter months involving ice roads, ice pads, and low-impact vehicles. Aside from destruction of vegetation in the immediate vicinity of each exploratory well (approximately 16 square feet), the impacts would be fairly short-term, with recovery from impacts to vegetation expected in a few years. The tundra mat would be compressed under ice roads and ice pads, and plants emerging in the spring would experience a shortened growing season due to delayed melt of ice cover. In localized areas impacts from ice roads may cause plants to die. If an economically viable field were discovered (unlikely during the life of the plan) up to 186 development wells totaling approximately 417 acres of disturbance could be possible. The oil field is assumed to include 1 main and 5 satellite gravel drill pads, an airstrip, and gravel access roads. An oil pipeline would also be necessary for transport to market, and 50-75 miles of a several hundred-mile pipeline could be routed through the planning area, resulting in additional impacts to vegetation.

In recognition of the potential for significant surface disturbing activities inherent in oil and gas exploration, leasing, and production and in accordance with ROP SS-3a, land cover mapping at a 30 meter resolution would be completed before approval of facility construction. Botanical inventory would be included in this effort. Oil and gas operations would comply with ROPs, including ROP Veg-2d for location of winter ice roads, ROP Veg-2e concerning sufficient snow cover, ROP Veg-2g to minimize footprint size, and ROP Soils-1f pertaining to recontour and revegetation guidelines.

(b) Coal Exploration

Under Alternative B, all BLM-managed lands in the planning area would be available for coal exploration. If exploration for coal occurred, it would most likely be within the Kukpowruk River Field or the Cape Beaufort Field, east of Cape Lisburne in the northern quarter of the planning area. Winter exploration for coal would have impacts on vegetation similar to those described above for oil and gas exploration. ROP FW-3a prohibits coal exploration activity within the WACH calving and insect relief areas from May 20 to August 15, reducing the potential for habitat disturbance impacts during the growing season.

(c) Effects of Spills

Vegetation is most vulnerable to a large crude oil spill in June, July, or August, when soils are thawed to seasonal maximum and plants are actively growing. The most vulnerable habitats are those with drier, well-drained soils that would allow oil to penetrate to plant roots and underground rhizomes and buds. Assumptions for both large and small spills are outlined in the Minerals section beginning on page 4-143. Further assumptions specific to the analysis of impacts to vegetation are:

- One occurrence of a large crude oil spill of 500 bbl in a remote stretch of pipeline.
- The spill would occur in June, July, or August and in a drier habitat type.
- Similar to an actual spill at Franklin Bluffs in July 1977 (Walker et al. 1978) the oil is imagined to squirt out vertically, and a strong north wind carries the oil south, creating a fan-shaped impact area. The oil is assumed to spread fairly evenly over the ground for approximately an acre, to form a 2.0 cm thick layer of oil over the ground and vegetation. In addition to oil flooding the ground, the oil is under pressure and backed by wind, thus it coats aerial stems of shrubs, taller grasses and sedges.

During an oil spill on dry tundra habitats the oil rapidly soaks into the soil. The most damaging components of the oil don't evaporate, but filter through the soil profile, killing roots, rhizomes and belowground buds. This causes much more short and long term vegetation damage compared to the same quantity of oil spilled on either water-saturated or frozen soils (McKendrick 1999 and Walker et al. 1978). At typical dry dwarf shrub and mat/cushion communities on the North Slope, most plant species can be expected to die due to oil contact with above and below ground plant parts (McKendrick and Mitchell 1978, Walker et al. 1978). This includes dwarf shrubs such as *Dryas integrifolia* (mountain avens), often a dominant plant community member at dry sites, and *Cassiope tetragona* (four-angled cassiope), a widely distributed evergreen shrub at northern sites, plus assorted forbs, grasses, mosses, and lichens. McKendrick (2000) states that "Dry habitats are the slowest to recolonize and the most susceptible to long-term damages from oil spills. " A dry habitat in the Prudhoe Bay area exposed to an experimental application of 4 cm crude oil (1,000 bbl/acre) supported less than 5% vegetation cover after 24 years (McKendrick 1999). In contrast, wet sedge meadow at

Prudhoe Bay dominated by sedges and willows showed the most complete natural recovery after 24 years from smaller spills (1.0 cm crude oil at 255 bbl/acre or less) with no cleanup measures. Vascular plant species cover had returned to 66% under the 1.0 cm treatment and to 83% under the 0.5 cm treatment (nearby control plots were at 91% cover). Where wet sedge meadow experimental plots at Prudhoe Bay were exposed to a heavy application, 4.0 cm crude oil, encouraging recovery was seen after 24 years with no cleanup treatments. Dominant sedges and willows were able to survive or reestablish to a limited extent, although vascular plant cover was still only 12 percent (nearby control plots were at 91% cover) (McKendrick 1999).

Recovery of vegetation components at the drier sites can take extended periods of time. For example, 24 years after an experimental crude oil spill at Prudhoe Bay at applications of 0.24 cm (64 bbl/acre), 0.5 cm (127 bbl/acre), 1.0 cm (255 bbl/acre), 2.0 cm (500 bbl/acre), and 4.0 cm (1,000 bbl/acre), *Dryas integrifolia* had not recovered at applications above 0.5 cm (McKendrick 1999). Without fertilization, at the site of the first crude oil spill on tundra at Prudhoe Bay, mosses failed to recover in some microhabitats even after 25 years (McKendrick 2000). Forbs (herbaceous annual or perennial plants) seem to be harmed more than other vascular plants (i.e., shrubs, sedges, grasses, and rushes) by exposure to crude oil. This susceptibility may be related to their growth form – low stature and above ground perennating buds – and limited protection of stems (McKendrick 1999). However prostrate and dwarf shrubs in the genus *Salix* (willow) and sedges (*Carex* and *Eriophorum*) have demonstrated more resilience to crude oil at all soil moisture levels, showing some degree of survival and recovery even in dry soils (McKendrick 1999, Walker et al. 1978).

Crude and refined oils react with tundra vegetation in several harmful ways. These oils are similar to contact herbicides, killing vegetation by destroying cellular membranes, and by coating leaf and stem surfaces, preventing critical oxygen and carbon dioxide exchange (McKendrick 2000). Spilled oils damage soils by making water less available, adversely affecting plant survival and development. The additional organic carbon also creates a negative shift in the carbon to nutrient ratios in the soils as microorganism populations increase to decompose the new carbon compounds. This deprives vascular plants of important nutrients such as phosphorus, nitrogen, and potassium (McKendrick 2000). Thus, plant growth is usually enhanced when fertilizer (especially phosphorus) is applied to areas affected by oil spills (McKendrick and Mitchell 1978, McKendrick 2000).

Some portion of the expected 89 small crude oil spills would occur on gravel pads, be cleaned up or contained, and pose no threat to surrounding tundra vegetation. The rest of these spills would stem from problems with pipelines and the product would contact vegetation. Impacts to vegetation would be the same as from large crude oil spills, except at a much smaller scale. Small crude oil spills can be expected to occur in all tundra vegetation habitats – standing water over tundra, as well as wet, moist, and dry tundra. Initial plant die-off would be lightest, and recovery quickest, in the wettest habitats or if the soil is frozen (McKendrick 1999). If spilled crude oil falls onto water-saturated or frozen soil, the light fractions (short chain) and aromatic fractions (ring structure) which are most toxic to plants may have time to evaporate before soaking into the soil (McKendrick 1999, McKendrick 2000).

Some portion of the expected 220 small refined oil spills would occur on gravel pads, be cleaned up or contained, and pose no threat to surrounding tundra vegetation. Since diesel oil spills tend to occur more often than those involving other refined oil products, this portion of the analysis will focus on impacts of diesel oil accidentally released onto tundra vegetation.

Diesel oil is lethal to plants. It was formerly used as an herbicide to selectively control weeds in carrots (McKendrick 1999). Almost no recovery was seen one year after application of 1.2 cm (approximately 300 barrels/acre) of diesel oil to six different common tundra plant communities at Prudhoe Bay (Walker et al. 1978). The six plant communities were selected to illustrate vegetation impacts on a wide range of soil moisture and topographic conditions, from a dry ridge through moist upland to a very wet marsh. The sole surviving species was a submerged aquatic moss (*Scorpidium scorpiodes*). As the diesel oil floated on the water's surface at the wet marsh, contact with emergent leaves of *Carex aquatilis* (water sedge) killed all individuals, even though the oil had not penetrated to their root system. However, the *Scorpipium* did not come in direct contact with the diesel oil, and the soluble components did not seem to affect it. Walker and associates (1978) rated the eventual recovery potential of the six plant communities as "poor" in the dry ridge habitats, "moderate" in the moist upland habitats, and "excellent" at the very wet marsh sites.

Observation of a three-year old diesel oil spill east of Prudhoe Bay, which occurred in winter on an ice pad, showed that all vegetation in moist tundra was initially killed. Despite cleanup efforts, some diesel had penetrated to the frozen vegetation and peat. However after three years several native plants had colonized the site: two forbs – *Melandrium apetalum* (bladder-campion) and *Caltha palustris* (marsh marigold), a sedge (*Carex* spp.), a grass species, and several moss species. The natural recovery of vegetation at this site indicates the toxic effects of the spill had diminished (McKendrick 2000).

(7) Impacts to Vegetation from Locatable Minerals

Alternative B has the highest potential for unfavorable impacts on riparian and tundra vegetation. All ANCSA (d)(1) withdrawals would be revoked and the entire planning area opened to locatable mineral entry, subject to adherence to ROPs. Within the life of the plan, the BLM assumes from 3 to 5 new placer mines might be initiated, each with an approximate 10 acre mining operation footprint, for a total of 30-50 acres of additional surface disturbance. Impacts of new placer mine operations would be the same as discussed under Impacts Common to All Alternatives. Mitigation of vegetation and habitat disturbance would be implemented by adherence to ROPs. Pertinent ROPs include those covering size of development footprint (ROP Veg-2g), wetland disturbance (ROP W-2a and others), stream and ground water handling (ROP W-3e), riparian buffer zones (ROP W-3d), and site reclamation (ROP W-3f).

(8) Impacts to Vegetation from Mineral Materials

The volume of gravel needed to support possible oil and gas development is projected to be approximately 1,000,000 cubic yards of material. Surface disturbance would amount to approximately 50-100 acres in terrain such as floodplains, shoreline deposits, bluffs, and rocky outcrops. Compared to the 710,000 acres estimated for oil and gas leasing, 50-100 acres set aside for gravel extraction is potentially a small impact. However, excavation of material and stockpiling of overburden would destroy all vegetation within each gravel extraction site. The ROPs would be adhered to during all gravel extraction operations in order to minimize adverse impacts to riparian and tundra vegetation.

(9) Impacts to Vegetation from Recreation Management

Impacts would be similar to those discussed under Impacts Common to All Alternatives except the Squirrel River would be designated as a SRMA. Potential restrictions on the number of commercial guiding operators and visitor use days of their clients within the SRMA could have a small beneficial impact on riparian and tundra vegetation as fewer temporary camps would be established each year. Inventory and monitoring of recreation activities and impacts will increase somewhat over current management (Alternative A).

(10) Impacts to Vegetation from Travel Management

Impacts would be similar to that discussed under Impacts Common to All Alternatives. Cross-country use of OHVs weighing 2,000 pounds or less GVWR would be allowed throughout and during the winter, the weight limit would be suspended. Impacts would be slightly increased compared to Alternative A. Because the heavier vehicles will be allowed only during the winter, additional impacts would be limited. Sensitive habitat areas would not receive additional protection from OHV impacts.

(11) Impacts to Vegetation from Special Designations

No ACECs or RNAs would be designated under Alternative B and no rivers would be recommended as suitable for designation under the WSR Act. Sensitive habitats would not be afforded additional protection through special management.

d) Alternative C

(1) Impacts to Vegetation from Soil, Water, and Special Status Species Plants

Impacts would be the same as discussed under Alternative B.

(2) Impacts to Vegetation from Fish and Wildlife Management

Indirect benefits to vegetation under Alternative C would accrue due to inventory and monitoring of wildlife habitats and the application of ROPs. An activity level management plan would be developed for management of caribou habitat in the Nulato Hills ACEC. This would indirectly benefit vegetation by offering additional habitat protection and monitoring. The ACEC proposed for the WACH calving ground and insect relief habitat on the Lisburne Peninsula would provide additional protection for this large, botanically unexplored region north of Kivalina and adjacent to the National Petroleum Reserve-Alaska (NPR-A).

(3) Impacts to Vegetation from Fire and Fire Management

Impacts would be the same as discussed under Alternative A, except more emphasis would be placed on developing activity level plans for important wildlife habitat and outlining site-specific prescriptions for wildland fire use. This would provide positive benefits to vegetation in specific parts of the planning area.

(4) Impacts to Vegetation from Forest Products

Impacts would be similar to those described under Alternative B, with some exceptions. No commercial logging or firewood sales would be permitted in the planning area. No small sales vegetation contracts would be allowed in any proposed SRMA, ACEC, or along rivers determined suitable for WSR status. These limitations could result in a small increase in the amount of live and standing dead timber, and forest understory vegetation left intact in forest stands scattered throughout the planning area.

(5) Impacts to Vegetation from Livestock Grazing

Impacts under Alternative C are similar to Alternative A, except that 2 of the 15 current reindeer grazing allotments, and 2 unalloted areas would be closed. In addition, permits for allotments where reindeer have been absent for 10 or more years due to migration with caribou would not be renewed. Non-renewed allotments would be permanently retired from grazing. Grazing allotment boundaries would be modified to exclude ACECs. These measures would result in slightly less grazing pressure and trampling damage to riparian and tundra vegetation in the near term, and potentially more benefit in the future when the WACH population declines and herders may attempt to build up their reindeer herds again. Livestock grazing would be subject to ROPs, which include restrictions on picketing animals in riparian areas (ROP Veg-2i) and require that any supplemental feed products used on BLM-managed lands be certified weed-free (ROP Veg-2j).

(6) Impacts to Vegetation from Leasable Minerals

The probability of seismic exploration for oil and gas is very low under Alternative C, and no exploratory drilling or development would occur. Under Alternative C, both fluid and solid mineral leasing would be deferred until industry showed interest. Impacts from seismic exploration to tundra and riparian vegetation in the northern quarter of the planning area would be slightly less than discussed under Alternative B. Under Alternative C, the upper portion main stems and tributaries of the Kivalina River, Kukpowruk River, Ipewik River, and Nilik River would have a 300-foot NSO setback, providing additional protection to riparian vegetation in these areas.

(7) Impacts to Vegetation from Locatable Minerals

Impacts to riparian and tundra vegetation from locatable minerals would be the least under Alternative C. Approximately 50% of BLM-managed lands in the planning area would be closed to mineral entry to provide additional protection to sensitive habitats, including 300-foot setbacks along most of the major rivers and tributaries in the planning area. Six proposed special management areas would be closed to mineral entry: WACH calving and insect relief habitat ACEC, Nulato Hills ACEC, Kigluaik Mountains ACEC, McCarthy's Marsh ACEC, Kuzitrin River ACEC, and Squirrel River SRMA.

(8) Impacts to Vegetation from Mineral Materials

Impacts to riparian and tundra vegetation from mineral materials would be similar to those discussed under Impacts Common to All Alternatives, and slightly less severe than those discussed under Alternative B. Under Alternative C, sale of mineral materials from riverbeds,

ocean and lagoon shorelines, and lakeshores will not be permitted. In addition, sales would be prohibited in the proposed Kigluaik Mountains and McCarthy's Marsh ACECs.

(9) Impacts to Vegetation from Recreation Management

Impacts would be similar to those discussed under Impacts Common to All Alternatives and Alternative B, except two SRMAs would be designated: the Squirrel River SRMA and the Salmon Lake/Kigluaik Mountains SRMA. Also under Alternative C, additional management attention may be focused on several areas containing sensitive habitat and important fish and wildlife resources: Koyuk, Inglutalik, Ungalik, Agiapuk, and Buckland rivers, plus the Nulato Hills, Fish River/McCarthy's Marsh, and Bendeleben Mountains. These measures may have small positive benefits to riparian and tundra vegetation by reducing surface disturbance.

(10) Impacts to Vegetation from Travel Management

Impacts from travel management and OHV use would be similar to that discussed under Impacts Common to All Alternatives, but lesser in extent. OHV traffic in the planning area would be limited to designated trails. Additional restrictions such as seasonal restrictions or closures, or weight limits may be implemented within ACECs and SRMAs. Sensitive habitat areas in McCarthy's Marsh, upper Kuzitrin River, Kigluaik Mountains, Nulato Hills, and the De Long Mountains/Brooks Range (WACH calving and insect relief habitat) would receive additional protection from OHV impacts.

(11) Impacts to Vegetation from Special Designations

Management of approximately 5.6 million acres of ACECs in five areas (Kigluaik Mountains, Nulato Hills, WACH calving and insect relief habitat, McCarthy's Marsh, and Kuzitrin River) would provide additional protection to sensitive habitats, as well as to riparian and tundra vegetation in general. Specific measures identified within various ACECs that confer direct benefit to riparian and tundra vegetation include: limitation of OHVs to designated trails from May 15 to October 31; closure to locatable and leasable mineral entry; designation as right-of-way avoidance area; and closure to livestock grazing.

Under Alternative C, 11 river systems are identified as suitable for designation under the WSR Act. Protection of wild river values would indirectly benefit riparian vegetation and sensitive habitat by maintaining the free-flowing nature and pristine water quality of the rivers, and limiting or prohibiting man-made infrastructure along identified river corridors. The number of field patrols by BLM personnel would increase, as would the level of monitoring of commercial operators. These measures would help protect riparian vegetation and sensitive habitats from disturbance and long-term degradation.

e) Alternative D

(1) Impacts to Vegetation from Soil, Water, and Special Status Species Plants

Impacts would be the same as discussed under Alternative B.

(2) Impacts to Vegetation from Fish and Wildlife Management

Impacts would be the same as discussed under Alternative C.

(3) Impacts to Vegetation from Fire and Fire Management

Impacts would be the same as discussed under Alternative C.

(4) Impacts to Vegetation from Forest Products

Impacts would be similar to those described under Alternative B, except no commercial logging or firewood sales would be permitted within the proposed Squirrel River SRMA. This limitation could result in a slight increase in the amount of live and standing dead timber, and forest understory vegetation left intact in the Squirrel River area.

(5) Impacts to Vegetation from Livestock Grazing

Impacts would be similar to those discussed under Alternative A. The difference is that the option to graze livestock on BLM-managed lands outside the current use areas would be eliminated. That option has not been utilized under the current Northwest Management Framework Plan (MFP), so no functional impact to riparian and tundra vegetation would result. Livestock grazing would be subject to ROPs, which includes restrictions on picketing animals in riparian areas (ROP Veg-2i) and require that any supplemental feed products used on BLM-managed lands be certified weed-free (ROP Veg-2j).

(6) Impacts to Vegetation from Leasable Minerals

Impacts would be similar to those discussed under Alternative B. Under Alternative D, additional ROPs would be implemented. ROP FW-7a would limit activities within 300 feet of the banks of active stream channels on the ten rivers shown on Map 2-8, including the Kivalina River. In addition, the Kivalina River would have no surface occupancy restrictions within 300 feet of the bank, slightly lessening the potential surface disturbance to riparian and tundra vegetation in that area, compared to Alternative B which does not impose no surface occupancy restrictions or ROP FW-7a on the Kivalina River.

(7) Impacts to Vegetation from Locatable Minerals

Impacts to and mitigation measures for riparian and tundra vegetation from locatable minerals would be very similar to those discussed under Alternative B, except that additional ROPs would be implemented. ROP FW-7a would limit activities within 300 feet of the banks of active stream channels on the ten rivers shown on Map 2-8. ROP SS-4 would limit mining activities within the watersheds of lakes in the Kigluaik Mountains. These measures would slightly decrease potential surface disturbance to riparian and tundra vegetation in those areas.

(8) Impacts to Vegetation from Mineral Materials

Impacts would be the same as discussed under Impacts Common to All Alternatives and Alternative B.

(9) Impacts to Vegetation from Recreation Management

Impacts would be similar to those discussed under Impacts Common to All Alternatives and Alternative B, except two SRMAs would be designated: Squirrel River SRMA and Salmon Lake/Kigluaik Mountains SRMA. These measures may have small positive benefits to riparian and tundra vegetation by decreasing potential surface disturbance.

(10) Impacts to Vegetation from Travel Management

Impacts to riparian and tundra vegetation would be similar to that discussed under Impacts Common to All Alternatives but lesser in extent than under Alternatives A and B. Although cross-country OHV use would be allowed in much of the planning area, additional restrictions such as limiting OHVs to existing or designated trails, seasonal restrictions or closures, and weight limits may be implemented within ACECs and SRMAs. Sensitive habitat areas in the Kigluaik Mountains, Nulato Hills, and the De Long Mountains/Brooks Range (WACH calving and insect relief habitat) would receive additional protection from OHV impacts.

(11) Impacts to Vegetation from Special Designations

Beneficial impacts to sensitive habitats, as well as riparian and tundra vegetation in general from management of ACECs and RNAs would be somewhat less than under Alternative C. McCarthy's Marsh, Kuzitrin River, and Kigluaik Mountains ACECs would not be designated. The Mount Osborn ACEC (in the Kigluaik Mountains) would be designated in the future, once conveyances are complete, and if sufficient State-selected lands return to the BLM. No rivers would be recognized as suitable for designation under the WSR Act

3. Fish and Wildlife

a) Fish

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to fisheries management: Air Quality, Special Status Species, Cultural Resources, Paleontological Resources, Visual Resources, Forest Products, Livestock Grazing, Wilderness Characteristics, Renewable Energy, Iditarod National Historic Trail, Public Safety, Social and Economic Conditions, and Subsistence.

(1) Impacts Common to All Alternatives

(a) Impacts to Fish from Sedimentation

All alternatives propose some activities, such as mining, oil and gas exploration and development, road construction, and the use of OHV trails and stream crossings, which could contribute to erosion or sedimentation into streams and rivers. Alternative-specific description of impacts will describe to what degree sedimentation may occur.

Erosion can lead to increased turbidity and sedimentation, which in turn can inhibit feeding and spawning success. All members of the biotic community have the potential to be affected.

Potential effects of sedimentation on benthic macroinvertebrates – which are prey species for fish – include interference with respiration, and interruption of filter-feeding insects' capability to secure food. A more important impact to benthic invertebrates would be smothering of physical habitat by increased sediment loads. A loss of interstitial space in the substrate would be highly detrimental to burrowing species. A decrease in abundance could be expected in these situations. In Arctic environments, where fish depend on summer food sources to grow and reproduce, a reduced prey base may preclude fish from directing energy towards spawning.

Direct threats to fish from sediment include changes to physical habitat, subsequent decreased reproductive success, and loss of rearing habitat. Physical habitat changes from sediments are most often attributed to finer size particles. Developing eggs can be smothered and newly hatched fry can be killed by deposited sediment that prevents emergence from spawning gravels and interferes with respiration. Developing fish eggs and larvae need a constant supply of cold, oxygen rich water which flows through the interstitial spaces in stream gravels. Embedded sediments fill these interstitial spaces and also limits essential winter habitat used by juvenile fish for feeding and cover from predators. The filling of pools with sediment further limits overwintering sites for juvenile and adult fish.

(b) Impacts to Fish from Soil, Water, and Vegetation

There would be beneficial impacts to fish from proper management of soils, water, and vegetation resources. Implementation of mitigation measures to protect soil, water, and vegetation on a project specific basis, particularly in riparian zones of watersheds, would reduce disturbance to fish habitats, and aid in the recovery of aquatic habitat from permitted uses. Improper management of soil, water, and vegetation resources can lead to increased sediment loads in affected watersheds. Climate change and the resultant melting permafrost along stream banks may increase localized input of sediments and decrease bank stability.

(c) Impacts to Fish from Fire and Fire Management

Fire effects which directly impact fish populations are: increased siltation, altered water quality (dissolved oxygen, pH, suspended and dissolved solids, total hardness, turbidity), and water temperature changes. Indirectly, any alternation of the nutrient flow that adversely affects aquatic organisms or results in a reduction in emergent insect production would also affect fish populations, at least temporarily.

Fish species and aquatic fauna adapted to the cold water in Interior Alaska streams have been exposed to indirect effects of wildland fire for thousands of years. Fire can indirectly influence fish populations or their prey through increased siltation, increased water temperature, altered water quality (dissolved oxygen, pH, suspended and dissolved solids, total hardness, and turbidity), changes in nutrient input to water system, and changes in permafrost status that can lead to altered hydrology. The extent of surface erosion after a fire largely depends on the topography and soil types of the immediate area, and the amount of ice-rich frozen ground within the active layer. Stream siltation is usually negligible from surface erosion on burned sites in interior Alaska due to its gentle topographical features. Siltation may be a factor where severe burns occur on steep slopes or even shallow slopes with ice-rich active layers, where fire has severely damaged riparian protection of bank soils' integrity, or where heavy equipment is used in suppression activities. Lakes are also vulnerable to fire effects of concentration of nutrients, sedimentation, and erosion of riparian protected shorelines from wave and wind action. Response of deciduous riparian foliage after fire is related to already existing riparian vegetation; the impact of fire is a change in age structure and short-term productivity.

Data on how fires affect stream temperatures and productivity are currently inadequate to accurately assess the effects of fire on anadromous or resident fish habitats. Much of the published work has focused on changes in lake systems (McEachern et al. 2000, St-Onge and Magnan 2000). Analyses of long-term fire effects on stream ecology are currently under way as part of FROSTFIRE8, a landscape-scale prescribed research burn in the boreal forest of Interior Alaska conducted in July 1999. Future research may be able to clarify anecdotal information collected in some systems that seems to suggest higher abundance of juvenile salmonids in systems where land use or fire modifications in canopy cover have led to increased water temperatures.

Fish populations have generally shown a positive response during the initial five-year period after wildland fire where populations exhibit good connectivity with key refugia throughout the watershed (Gresswell 1999; Minshall et al. 1989). Fish will generally reinvade fire-affected areas rapidly where movement is not limited by barriers. These new colonists generally come from areas upstream of the affected area, from surrounding watersheds and from main-stem rivers where migration is not limited. Fish population recovery generally tracks the increase in primary and secondary production that occurs in the early post-fire period. Where sediment is continually delivered into the main-stem, there could be short-term negative effects on fish and macro-invertebrate communities.

Fuels projects are designed and implemented in a “non-emergency” manner that minimizes impacts to aquatic resources. Although wildland fires may still occur in areas where hazardous fuel loads have been reduced, fires which may occur are expected to be predominately ground fires rather than crown fires. Ground fires are easier to control with lower-impact suppression methods (such as hand-built fire line) that are less likely to adversely affect aquatic resources. In contrast, the crown fires associated with heavier fuel loads often require suppression techniques likely to have greater adverse impacts to aquatic habitats and species.

Competent planning and implementation will minimize the effects of fuels treatments. Some projects involve multiple treatments of the same area. Prescribed fires conducted in the spring (when drainage-bottoms are still snow covered) help to protect riparian vegetation and soils. The primary goal of these projects is to reduce the occurrence, risk, and impacts of wildland fires, not restore the natural capacity of aquatic species to withstand the effects of natural fires.

Removal of vegetation to reduce future fuel loading may be accomplished with minimal impacts in some areas, but in others, sensitivity to ground disturbance from loss of vegetation can cause increased erosion, compacted soils, and a loss of nutrients (FS 2000, Beschta et al. 1995). To protect water quality and the diversity of habitats for fish, amphibians and other aquatic organisms, standard operating procedures are in place to protect the proper functioning condition of riparian area and stream characteristics.

Impacts to fisheries from fire and fuels management would be the same under all alternatives. Most of the area within the planning region is in a limited fire suppression category, which means that fires would only be suppressed for the protection of human life and structures. In a worst case scenario, there may be some episodic events related to fire suppression that may affect fish and fish habitat. These effects would be from increased erosion and ground-based control, and alterations of water chemistry from aerial applications of fire retardant. Erosion impacts would likely be small in scale and localized, and could be minimized by rapid rehabilitation after the fire is under control, although improperly located bulldozer line fuelbreaks could greatly increase local stream sediment loads. The use of certain types of fire retardant

in/near fish bearing streams is a serious threat to these aquatic ecosystems. The by-products of the retardant are toxic to fish and would result in fish kills.

(d) Impacts to Fish from Minerals

In general, surface mining activities increase erosion and accelerate sediment production and input into nearby lakes and streams. Surface mining operations may also disrupt subsurface and surface water flow patterns. This could potentially affect seeps and springs that provide thermal refugia in both summer and winter. Bridges, culverts, and low-flow crossings are integral features to road development associated with surface mining. These features can also interfere with migrations to spawning, feeding, rearing, and overwintering sites if improperly designed. Current concerns related to surface mining and road placement include diverting or eliminating flow from small tributaries that connect lakes or connect lakes and rivers. Fish species found in the planning area that move between these habitat types are vulnerable to impact. Potential loss of migratory capacity could stress or kill these fish if they are unable to migrate to food-rich habitat in the summer, reach spawning areas, or move into overwintering habitat. Proper placement of these structures is critical in minimizing impacts to fish.

During placer mining, streams may be diverted into bypass channels while the original channel is mined and then returned to a newly built channel once mining is complete. It has been common practice to construct stream bypasses and new channels with different geometry and physical characteristics (e.g. flood prone and bankfull widths, bankfull depth, sinuosity, slope, entrenchment, and substrate size) than that of the natural channel. This difference is often necessary because of the removal of streamside vegetation and other hard structural elements that help define the natural channel morphology. As a result, new channels are often straighter, have a higher gradient, and consequently have more energy than the natural channel. In addition, new channels often lack the diversity of habitats (pools, glides, riffles) and cover components (undercut bank, overhanging vegetation, and large woody debris) that enhance the quality of habitat in natural channels.

Placer mining operations may lead to a loss of riparian-wetland vegetation. Riparian-wetland vegetation influences the stability of uplands and certain stream types. Changes in the composition, vigor, and density of riparian vegetation can result in changes in sediment input, stream shade, protection from instream erosional processes, terrestrial insect habitat, and the contribution of detritus and structural components to the stream channel. Water quality and esthetic values are also affected by disturbance to riparian-wetlands (Rosgen 1996). The removal of streamside riparian-wetland vegetation during mining would result in loss or degradation of aquatic habitat until proper functioning condition was reestablished. In general, the time required for riparian-wetland areas to attain proper functioning condition would be dictated by natural processes and may require decades to centuries before it approximates the structure and function of the original aquatic habitat (North Carolina State University 1998; BLM and Montana Dept. of Environ. Quality 1996; BLM 1988c).

The altering of surface hydrology may result in stream conditions that are no longer suitable to species or life stages of fish and other aquatic organisms that occurred before disturbance. For example, increased stream flow may result in water velocities that (1) cause involuntary downstream displacement and mortality of juveniles, (2) result in scour-related mortality of eggs and alevins, (3) accelerate streambank erosion, and (4) over the long term, deplete large woody debris and organic material. The enlargement of stream channels may result in a shallow, slow water environment during periods of low flow. This new environment could result in crowding, loss of spawning habitat, reduced primary and secondary productivity, increased vulnerability to

predation, and increased sedimentation (Swanston 1991; Hicks et al. 1991; National Research Council 1992; Strouder et al. 1997).

Mining operations also have the potential to increase pollution that may enter streams through runoff. In addition, major channel and habitat changes could occur if surface mining operations or material sites are allowed in active stream channels.

(e) Impacts to Fish from Recreation Management

Research has shown that the greatest recreational impacts to upland soils and vegetation occur from the initial use, with little additional effect from increased use (Clark and Gibbons 1991). The main impacts on fish would come from additional trails or roads, which may gather runoff and begin to rut, thereby leading to increased erosion and subsequent sedimentation of fish-bearing streams.

Riparian impacts from recreation (such as dispersed campsites) include erosion, loss of shade, loss of food and cover, loss of a “buffer” to upland impacts, and decreased bank stability. Recreation-related changes to the aquatic habitat can occur through alterations to channel morphology and increased pollution. Stream morphology changes would probably only occur as a result of OHV use. Although OHV/stream interactions are sometimes only considered applicable at stream crossings, there are times and places where OHVs users utilize streams as trails. This is not authorized under any alternative, so it is doubtful that it occurs except in isolated, unauthorized and usually undetectable cases. If stream crossings are sited properly, their use would minimize impacts to stream morphology. Crossing of anadromous streams or rivers may require a fish habitat (Title 41) permit from ADNR (http://www.dnr.state.ak.us/habitat/FHpermits.htm).

Increased pollution can occur as more people use the rivers and dump things into the river, either intentionally or unintentionally. As more boaters and OHV users enter and cross streams, the pollutants from petroleum products increase proportionately. Also, as use in general increases, recreational pollutants such as soaps, fuels, and herbicides also increase.

(f) Impacts to Fish from Lands and Realty Actions

Opportunities for acquisitions are considered on a case-by-case basis. Acquisitions, particularly when they occur along riparian areas, can have a positive impact on fish habitat by preventing development of private land and by providing consistent habitat management.

Land conveyance could result in BLM losing management of valuable fisheries habitat (i.e., Nulato Hills, Fish River system, Kigluaik Mountains). However, the State is overselected and some of these areas may be retained by BLM.

(2) Alternative A

(a) Impacts to Fish from Minerals

Alternative A would continue management consistent with the Northwest MFP (BLM 1982). This planning document, through Public Land Order (PLO) 6477 subjects 23,800 acres to No Surface Occupancy (NSO) in the Pah, Shaktoolik, Ungalik, Inglutalik, Tubutulik, Kuzitrin, Fish, and Noatak rivers.

i) Leasable Minerals

There would be no impacts as oil and gas leasing would not occur under Alternative A.

ii) Locatable Minerals

Impacts to fish would be similar in type to those discussed under Impacts Common to All Alternatives. More than half of the BLM-managed land in the planning area is currently closed to locatable mineral entry due to selections or underlying ANCSA (d)(1) withdrawals, reducing the potential for mining related impacts to fish. Of all the alternatives, Alternatives A and C would have the least potential to affect fish and fish habitat due to the small area that would be open for locatable mineral entry.

iii) Mineral Materials

Alternative A anticipates few mineral material sales (less than Alternative B or D, but more than Alternative C). Measures to minimize impacts to fish habitat are considered on a case-by-case basis and impacts to fish would be minimal.

(b) Impacts to Fish from Recreation Management

Impacts would be similar to those discussed under Impacts Common to All Alternatives. There are no SRMAs that would set recreation objectives or develop visitor use limits. Unmanaged trail proliferation would continue, with no guidance for proper construction and placement of new trails. Of all the alternatives, Alternative A would have the most negative impacts to fish and fish habitat from recreation activities.

(c) Impacts to Fish from Travel Management

Under Alternative A, BLM-managed lands would remain undesignated with the exception of permitting required for vehicles over 2,000 pounds GVWR. This will result in some continued localized impacts from erosion due mainly to unauthorized stream crossings. The unauthorized and unmanaged proliferation of trails would increase under this alternative, with a resulting increase in erosion and sediment impacts.

Alternative A would see a slight potential for an increase in road construction associated with mineral exploration and development on State and Native corporation lands. Under this alternative, road construction would be considered on a case-by-case basis. Existing standard stipulations would apply that minimize the effects of erosion, flow augmentation, and runoff; however, these stipulations are not as effective or protective as the ROPs that would be applied under Alternatives B, C, and D.

(d) Impacts to Fish from Lands and Realty Actions

Under this alternative, specific lands use authorizations would be reviewed on a case-by-case basis for potential impacts. Alternative A anticipates more land use authorizations than Alternative C, but fewer than Alternative B or D. Land use authorizations may result in surface disturbance, leading to impacts such as increased sedimentation and other effects described under Impacts Common to All Alternatives.

Under Alternative A, no withdrawal review would take place and all ANCSA (d)(1) withdrawals would remain in place. These withdrawals protect fish habitat by preventing mineral leasing and, in some cases, locatable mineral entry.

(e) Impacts to Fish from Special Designations

Under Alternative A, there are no special management areas such as ACECs, RNAs or suitable rivers. Protective measures for selected values would be implemented on a case-by-case basis and no additional protection of fish habitat would be provided through designation of special management areas. The standard stipulations currently applied do not afford the same protections as do the ROPs that would be applied under Alternatives B, C, and D. Alternative A would have the most negative effects to fish and fish habitat.

(3) Alternative B

(a) Impacts to Fish from Minerals

1. Leasable Minerals

Under Alternative B, oil and gas development is projected to occur in the northern quarter of the planning area, and adverse effects would be limited to that area of potential development. The RFD scenario (BLM 2005j) estimates 1,000,000 cubic yards of gravel may be required to support oil and gas development, resulting in 50-100 acres of disturbance. Adherence to the ROPs and Stips concerning gravel removal will mitigate most adverse affects.

a. Effects from Seismic Surveys

Potential threats to overwintering fish from seismic surveys in the planning area would primarily stem from 1) stress associated with acoustic energy pulses transmitted into the ground directly over overwintering pools, and 2) physical damage to overwintering habitat caused by seismic vehicles. Large overwintering pools might allow fish to flee immediate areas of intense stress, whereas fish occupying small pools might not have that option. Depending on proximity, adult fish could suffer no more than temporary discomfort, whereas intense acoustical pulses could be lethal to juveniles. Given that overwintering habitat represents only a small percent of the planning area, it is unlikely that seismic transmissions would occur directly over overwintering sites with any degree of regularity. Furthermore, seismic crews could avoid known overwintering areas. Overall, any affects to overwintering fish caused by winter seismic surveys would be localized and would not be likely to have any effect on fish populations within the planning area.

The potential level of seismic activity would be greater under Alternatives B and D, than under Alternatives A and C, but it is expected that any impacts would still be localized.

b. Effects from Water Demand

Overwintering areas are limited to deep-water pools and channels in rivers and streams and to lakes deep enough to provide sufficient under-ice free water during winter. In standing waters, 7 feet is considered the minimum depth for supporting overwintering fish (Phillips Alaska, Inc. 2002). Moving waters may deter the thickening of ice, thereby providing overwintering habitat at shallower depths.

Under Alternatives B and D, greater levels of water withdrawal would be expected in conjunction with the increased land available for exploration and development activities as compared to the other alternatives. However, adherence to the ROPs and Stips would offer adequate protection

to fish. Therefore, water withdrawal would not be expected to have an effect on fish populations in or adjacent to the planning area.

c. Effects from Exploratory Drilling

Drilling operations require large amounts of water for blending into drilling muds. Operations also produce large amounts of rock cuttings. If an exploratory well were to be plugged and abandoned, drilling muds and cuttings would be re-injected into the bore hole. If the well were to go into production, muds and cuttings would be removed to an approved disposal site. Any chemical leaching into surrounding waters by cuttings temporarily being stored at the drill site could affect nearby fish habitat. ROP Water-1a requires that all permitted operations be conducted in such a manner to comply with State and Federal water quality standards.

Even though the disturbance under Alternatives B and D would be greater than the amount of disturbance under Alternatives A and C, the prevention of drilling in rivers and streams would provide fish with adequate protection (ROP FW-2g). In general, it is not expected that exploratory drilling would have a measurable affect on fish populations in or adjacent to the planning area.

d. Effects from Pad, Road, and Pipeline Construction

Impacts from pad, road, and pipeline constructions are mainly increased erosion and sedimentation, subsurface and surface flow disruption, and increased pollution in runoff. Under Alternatives B, C, and D, the construction of permanent oil and gas facilities would generally be prohibited within 500 feet of any fish-bearing stream or lake (Leasing Stipulation 2).

Alternative B anticipates the same level of pad, road, and pipeline construction as does Alternative D. Rigorous adherence to ROPs, Oil and Gas Leasing Stips, and existing State environmental regulations would adequately protect fish. For this reason, it is not expected that the construction and placement of drill pads, roadways, pipelines, bridges, or culverts would have a measurable effect on fish populations in or adjacent to the planning area.

e. Effects of Spills

Oil spills can have a range of effects on fish (Malins 1977, Hamilton et al. 1979, Starr et al. 1981). The specific effects depend on the concentration of petroleum present, the length of exposure, and the stage of fish development involved (eggs, larva, and juveniles are most sensitive). If lethal concentrations are encountered (or sub-lethal concentrations over a long enough period), fish mortality is likely to occur. However, mortality caused by a petroleum-related spill is seldom observed outside the laboratory environment. Most acute-toxicity values (96-hour lethal concentration for 50% of test organisms) for fish generally are on the order of 1 to 10 parts per million (ppm). Concentrations measured under the slicks of former oil spills at sea have been less than the acute values for fish and plankton. For example, concentrations of oil 1.6 to 3.3 feet beneath a slick from the Tsesis spill ranged from 50 to 60 parts per billion (Kineman et al. 1980). Extensive sampling following the Exxon Valdez oil spill also found hydrocarbon levels well below those known to be toxic or to cause sub-lethal effects in plankton (Neff 1991). The low concentration of hydrocarbons in the water column following even a large oil spill at sea appears to be the primary reason for the lack of lethal effects on fish and plankton.

The ROPs (Appendix A) associated with Alternatives B, C, and D are designed to prevent or otherwise mitigate oil spills in the planning area. ROP Water-5b prohibits refueling within 500 feet of the active floodplain of fish-bearing waterbodies and within 100 feet from non-fish-bearing waterbodies. Also, ROPs for Hazmat deal specifically with spill prevention and cleanup.

Under Alternatives B and D, the number of spills could increase proportionately with the increase in exploration and development. Given the small volume of oil typically involved in leads and spills, as well as the safety requirements for operations in the oil field and stringent clean-up protocols, oil spills associated with Alternative B would not be expected to have a measurable long-term impact on fish populations in or adjacent to the planning area.

2. Locatable Minerals

Dependent on gold prices, Alternatives B and D anticipate a moderate increase (3-5) in the number small placer operations on BLM-managed lands. Large operations are possible in this planning period, but would occur on State or private lands, though roads or infrastructure could cross BLM-managed lands. Impacts to fisheries from mining activities would be similar to those discussed under Impacts Common to All Alternatives and may include increased erosion, impacts associated with infrastructure (roads), and toxic pollution. If mining occurs in riparian zones, the most likely result would be the loss of fish habitat.

The ROPs common to Alternatives B, C, and D are designed to minimize or prevent impacts from erosion, altered stream flow, stream crossings, and riparian impacts. However, ROP FW-7a would not apply under this alternative, increasing the potential for impacts compared to Alternative D. Strict adherence to the ROPs would minimize any effects to fish and fish habitat within the planning area, but there may be some short-term impacts on water quality and sedimentation based on the location of the actions. These impacts are expected to be short-term and small, and are not expected to have a significant impact to fish or fish habitat in the long-term.

3. Mineral Materials

Alternatives B and D anticipate increased gravel extraction in support of oil and gas development. In general, gravel extraction would not likely have a harmful effect on fish spawning grounds as ROP MM-1a prohibits gravel extraction in known fish spawning or rearing areas. However, if gravel mining activities were conducted in fish-bearing streams or in tributaries to fish-bearing streams, other detrimental effects could occur. These include the blocking and rerouting of stream channels and increased silt concentrations resulting in reduced primary production, loss of invertebrate prey species, and disruption of feeding patterns for sight dependent feeders (Branson and Batch 1971, Cooper 1965).

Under Alternatives B, C, and D, ROPs MM-1a and MM-1b would minimize the effects of gravel extraction on fish by avoiding spawning and rearing habitats and other habitats that may limit populations. The protection provided to fish and fish habitat under Alternative B would be superior to that provided under Alternative A, despite the fact that there would be increased activity under Alternative B.

(b) Impacts to Fish from Recreation Management

Under Alternative B, recreation management would continue to be custodial in nature, but more facilities would be developed to handle increased recreation use. The Squirrel River SRMA

would be designated and receive additional management emphasis. The proliferation of trails would continue in some areas, with no guidance for proper construction and placement of new trails. Alternative B would provide more protection to fish than would Alternative A as a result of the stronger ROPs that would be applied; however, there would be more impacts than under Alternative C or D.

(c) Impacts to Fish from Travel Management

Although a limited OHV designation would apply under Alternative B, it would allow for similar types of OHV use as those occurring under Alternative A. Therefore, impacts would be the same as for Alternative A.

Alternative B assumes there would be no increase in road construction associated with mineral exploration and development on BLM-managed lands. Equipment necessary for the potential 3-5 placer mines would be hauled in overland in the winter, and summer access would be by air or existing trails. Under Alternative B, any road construction would be considered on a case-by-case basis, although any new roads would come from the State or private development, not from BLM's proposed management. Application of the ROPs would minimize the effects of erosion, flow augmentation, and runoff.

(d) Impacts to Fish from Lands and Realty Actions

Alternative B anticipates the highest level of land use authorizations associated with increased resource development. This alternative adopts the ROPs listed in Appendix A, which identify measures for permitted activities that minimize impacts to fish habitat.

Alternative B would revoke all ANCSA (d)(1) withdrawals to allow for increased mineral exploration and development. Effects of mineral development on fish habitat under this alternative are described under Impacts to Fish from Mineral Exploration and Development on page 4-59. No new withdrawals from locatable mineral entry would be implemented under this alternative, leading to potential for greater impacts from locatable mineral development than under Alternative C, where some important streams would be withdrawn.

(e) Impacts to Fish from Special Designations

Under Alternative B, no ACECs or RNAs would be designated and no rivers would be determined suitable. Protective measures for selected values would be implemented on a case-by-case basis. The ROPs would be the only measures to protect fish and fish habitat. ACECs can provide additional protection if subsequent RMP decisions establish activity plans specifically designed to protect natural resource values contained within ACECs. This alternative provides the least amount of fish habitat protection.

(4) Alternative C

(a) Impacts to Fish from Minerals

1. Leasable Minerals

Under Alternative C, both fluid and solid mineral leasing would be deferred until industry showed interest. Impacts are the same discussed under Alternative A.

2. Locatable Minerals

The anticipated level of locatable mineral development under Alternative C is similar to that identified under Alternative A, but the application of ROPs under this alternative would further minimize impacts to fish from what limited mining activity would occur. Also, 5.6 million acres in ACECs would be withdrawn from mineral entry.

3. Mineral Materials

The anticipated level of mineral material sales under Alternative C would be similar to that identified under Alternative A, but the application of ROPs under this alternative would further minimize impacts to fish from what limited mining activity would occur. Also, sale of mineral materials from riverbed, ocean beach/lagoon, and lakeshore will not be permitted, providing additional protection to valuable spawning, rearing, and migratory habitat for fish.

(b) Impacts to Fish from Recreation Management

Proposed OHV management would focus on halting the unmanaged proliferation of trails. In general, as OHV use becomes more restrictive, the impact or potential for impact to fisheries habitat decreases. Recreation management under Alternative C would have a positive benefit for fisheries habitat within the planning area, mainly due to the management of increased use in specific areas. The Squirrel River, the Fish River system, and the Kigluaik Mountains are areas with important fisheries resources that would benefit from visitor use limits.

Commercial recreation use can have a direct effect on fish populations in that fishermen who use guides are generally more successful than fishermen who do not. Therefore, if commercial recreation is authorized there would be more fish harvested and proportionately more incidental mortality related to handling and stress. Of all the alternatives, this is least likely to happen under Alternatives C and D due to the proposal to determine commercial use limits in some watersheds. However, under all alternatives, any negative changes in the health of the fish populations would likely evoke a response in management regulations by ADF&G.

(c) Impacts to Fish from Travel Management

Travel management under Alternative C would be the most restrictive of all the alternatives, resulting in the fewest potential impacts to fish and fish habitat from unauthorized stream crossings or sedimentation into streams or rivers. In the short-term, there would continue to be some localized impacts from erosion as unmanaged trails continue to proliferate at a slower rate. These impacts would be expected to decrease during the planning period as education and enforcement efforts are implemented.

Under Alternative C, the potential for new road construction would be less than under any of the other alternatives. In addition, application of ROPs would minimize the effects of erosion, flow augmentation, and runoff from authorized roads.

(d) Impacts to Fish from Lands and Realty Actions

This alternative limits land use authorizations in ACECs and RNAs to protect specific resource values. Where authorizations occur, they would be subject to the ROPs, which contain measures to protect fisheries. Overall, Alternative C would be the most beneficial to fish and fish habitat of all the alternatives relative to land use authorizations.

Within ACECs, withdrawals are maintained to provide maximum protection of resources under Alternative C. Impacts to fish from mineral activities are described in the Impacts to Fish from Minerals section beginning on page 4-59.

(e) Impacts to Fish from Special Designations

Under Alternative C, five ACECs totaling 5.6 million acres (WACH calving grounds and critical insect relief areas, Nulato Hills, McCarthy's Marsh, Upper Kuzitrin River, and Kigluaik Mountains) would be designated. Fish and fish habitat would benefit from the designations because special management is identified in this RMP to provide protection for important resources in the ACECs. Along with these special designations come restrictions on OHV use and surface disturbing activities, all of which are discussed above under Impacts Common to All Alternatives beginning on page 4-57. The designations would provide another level of prevention of impacts to fish and fish habitat above and beyond the ROPs that would still apply. Habitat for the Kigluaik char would receive additional protection through land use decisions in this RMP in support of designation of the Kigluaik ACEC.

Interim management of 12 suitable rivers would further protection of fish habitat by discouraging development within these drainages. The protection of fish and fish habitat based on these designations would be greater under Alternative C than under Alternative D, and would be much greater than under Alternative A or B.

(5) Alternative D

(a) Impacts to Fish from Mineral Exploration and Development

1. Leasable Minerals

Impacts from leasable minerals would be the same as those described under Alternative B.

2. Locatable Minerals

Impacts to fish and fish habitat would be similar to but somewhat less than Alternative B and greater than under Alternative C. Removal of the originally proposed mineral withdrawals on the Ungalik and Kivalina River through the 300-foot setback from the mean high water mark would result in less protection of fish habitat in these areas. If mining occurs in riparian zones, the most likely result would be the loss of fish habitat as discussed under Impacts Common to All Alternatives. If that loss is deemed to be an adverse effect on Essential Fish Habitat, an official consultation with the National Marine Fisheries Service (NMFS) will be required to mitigate these effects. However under this alternative, ROP FW-7a would be implemented on the Kivalina, Ungalik, Shaktoolik, Inglutalik, Koyuk including the East Fork, Tubutulik, Kuzitrin, Agiapuk, Pah, and Noatak rivers (Appendix H). Implementation of this ROP would reduce the potential for loss or degradation of riparian and wetland habitat, and the resulting impacts on aquatic habitats. ROP SS-4 would also apply under this alternative. This ROP places restrictions on activities within the watersheds of eight lakes that support Kigluaik Arctic char. In the unlikely event that locatable mineral development was proposed within these watersheds, this ROP would reduce the potential for impacts to aquatic habitats.

3. Mineral Materials

Impacts to fish and fish habitat would be the same as Alternative B.

(b) Impacts to Fish from Recreation Management

Similar to Alternative C, recreation management under Alternative D is expected to have a positive benefit for fisheries habitat within the planning area due to the management of increased use in specific areas. Impacts to fish would be the same as Alternative C.

(c) Impacts to Fish from Travel Management and OHV Use

Under Alternative D, proposed OHV management would focus on halting the proliferation of trails in specific management areas such as ACECs and SRMAs. In general, as OHV use becomes more restrictive, the impact or potential for impact to fisheries habitat would decrease. OHV trails have the potential to cause sedimentation in site-specific areas. There would continue to be some localized impacts from erosion, due mainly to stream crossings. Under this alternative, OHV trails would be managed with the objective of minimizing the unmanaged proliferation of trails within six million acres in ACECs and SRMAs.

Impacts to fish from roads would be the same as discussed under Alternative B.

(d) Impacts to Fish from Lands and Realty Actions

Under Alternative D, land use authorizations would be limited in ACECs to protect resource values. Outside of these areas, land use authorizations would be covered by the ROPs, which would minimize impacts to fish and fish habitat from permitted activities.

Under Alternative D, withdrawals would be revoked on 99% of the planning area. Where withdrawals are revoked, all proposed activities would be subject to ROPs, Stips, and site-specific mitigation measures for the conservation of fish habitat. New withdrawals would be established with 300-foot setbacks on the Ungalik River, Kivalina River, and Boston Creek. Impacts to fish from mineral activities are described in the Impacts to Fish from Mineral Exploration and Development section beginning on page 4-59.

(e) Impacts to Fish from Special Designations

Under Alternative D, six ACECs totaling 3,655,000 acres (WACH winter habitat in northern Nulato Hills and calving/insect relief habitat, Mount Osborn, and the Shaktoolik, Ungalik, and Inglutalik watersheds) would be designated. The additional protective measures to be applied through land use decisions in this RMP in support of the ACEC designation would benefit fish and fish habitat in the area, including additional protection of Kigluaik char habitat in the Mount Osborn ACEC.

(6) Essential Fish Habitat

Although there are no Federally-managed fisheries on BLM-managed land in the planning area, the ranges of the five species of Pacific salmon found within the land use plan boundaries are under the jurisdiction of the North Pacific Fisheries Management Council. The Magnuson-Stevens Act calls for direct action to stop or reverse the continued loss of fish habitats for species that are under this jurisdiction. Therefore, Essential Fish Habitat (EFH) is a specific classification term that only applies to the habitat of Pacific salmon and not to any other species in the planning area. EFH is defined as those waters and substrate necessary to salmon for spawning, breeding, feeding, or growth to maturity. For the purpose of interpreting the definition of EFH, “waters” include aquatic areas that are used by fish and their associated physical, chemical, and biological properties and may include areas historically used by fish where

appropriate; “substrate” includes sediment, hard bottom, structures underlying the waters, and associated biological communities; “necessary” means the habitat required to support a sustainable fishery and a healthy ecosystem; and “spawning, breeding, feeding, or growth to maturity” covers a species’ entire life cycle (National Marine Fisheries Service 2005).

For Alaska, freshwater EFH includes all streams, lakes, ponds, wetlands, and other waterbodies that have been historically accessible to salmon. A significant body of information exists on the life histories and general distribution of salmon in Alaska. The locations of many freshwater waterbodies used by salmon are described in documents organized and maintained by the ADF&G. Alaska Statute 16.05.870 requires ADF&G to specify the various streams that are important for spawning, rearing, or migration of anadromous fishes. This is accomplished through the Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes (ADF&G 1998a) and the Atlas to the Catalog of Waters Important for Spawning, Returning or Migration of Anadromous Fishes (ADF&G 1998b). The catalog lists waterbodies documented to be used by anadromous fish. The atlas shows locations of these waters and the species and life stages that use them. Map 3-9 shows the locations of these streams in the planning area.

Potential impacts to the salmon that inhabit the planning area would be the same as described for other fish. Consequently, impacts to salmon as part of EFH, have been evaluated in the general fish analysis above. For the reasons described under Alternatives B and D and through adherence to protective ROPs and Leasing Stips, EFH is likely to be largely unaffected under the proposed development activities probable during the course of this land use plan.

b) Wildlife

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to wildlife management: Air Quality, Fisheries Management, Special Status Species, Cultural Resources, Paleontological Resources, Visual Resources, Wilderness Characteristics, Iditarod National Historic Trail, Public Safety, Forest Products, Social and Economic Conditions, and Subsistence.

(1) Impacts Common to All Alternatives

(a) Impacts to Wildlife from Soil, Water, and Vegetation

There would be beneficial impacts to wildlife from proper management of soils, vegetation, and water resources. Implementation of mitigation measures to protect soil, water, and vegetation on a project specific basis would reduce disturbance to wildlife habitats and aid in the recovery of habitat from permitted uses. Changes in soil and vegetation due to global climate change may also affect wildlife. The effects of such changes may be slightly reduced through changes in management and application of the ROPs (Appendix A). Potential impacts of climate change are discussed further under Chapter IV, section (G)(2)(b) “Climate Change.”

Changes in vegetation due to climate change may result in increased stress on some wildlife species. Other species may benefit. One of the projected changes in the arctic is increased shrub cover. Such a change would reduce the amount of lichen available for caribou to some extent. Changes in vegetation could be gradual if due to climate change alone, and very rapid in areas affected by a combination of warmer temperatures, longer growing times and fires or

increased recreation and travel. It is difficult to predict what changes would occur during the life of the plan.

(b) Impacts to Wildlife from Fire and Fire Management

Approximately 93% of the planning areas is comprised of herbaceous or shrub habitats. Fire is less prevalent in these vegetation types compared to boreal forests, thus effects of fire on wildlife and habitats would be lower in the planning area than in Interior Alaska. The following effects would occur on both BLM-managed and land owned by others as wildland fire is not constrained by administrative boundaries.

Fire has both direct and indirect effects on wildlife and their habitats. These effects are described in detail in the Land Use Plan Amendment for Wildland Fire and Fuels Management for Alaska (BLM 2004b) which is incorporated by reference. Generally, the effects on habitat are much greater than the effects on resident animals. Short-term negative impacts from fire on resident wildlife include displacement, disruption of reproductive activities, and occasional mortalities. However, populations of certain species can recover quickly if suitable habitat is available. Adverse effects to individuals are generally offset by the benefits of habitat changes for future generations.

Fire helps maintain a mixture of vegetation types and age classes that provide habitat for a variety of wildlife. Fire alters habitats and may improve habitat components for some species while degrading habitat for others. Over time, as vegetation recovers from fire disturbance, various species of wildlife would benefit from various successional stages of vegetation. Herbivores are directly affected by the changes in vegetative cover and forage associated with fire, whereas predators respond to both changes in cover and abundance of prey.

Wildlife has evolved in the presence of fire and have adapted to it. Overall, a natural fire regime has a beneficial effect on maintaining a diversity of wildlife and their habitats. Grasses, sedges and herbaceous plants that quickly resprout after fire provide forage and cover for small mammals, grassland birds, and grazing species such as muskoxen. Browsers such as moose, hares, and ptarmigan benefit from fire when trees and shrubs begin to reestablish themselves. If fires are not too severe, sprouting of shrubs will occur soon after burning.

Moose generally benefit from fire due to increased production of high quality browse for 23-30 years after fire (McCracken and Viereck 1990). Prescribed fires are a management tool used to increase moose habitat. Moose populations generally react in a strongly positive manner to areas with increased browse. The level of effect is variable, depending upon the health of the moose population pre-fire and the amount of browse available. If browse is not a limiting factor on moose populations, then fire would have little impact on populations over the short-term (BLM 2004b).

Fire is relatively rare in muskoxen habitat; this is especially true for preferred winter habitat which is generally more windswept, barren, and montane. Over the long-term, fire would likely be beneficial to muskoxen summer range because it maintains herbaceous forage and willows, reduces encroachment of spruce forest into tundra, increases habitat heterogeneity, and rejuvenates decadent or over-browsed riparian communities (BLM 2004b).

The short-term effects of fire on caribou winter range are negative, and vary depending upon the severity of the burn. Lichens, primary winter forage for caribou, are highly susceptible to wildfire. Impacts to habitat include reduced availability of forage lichens for up to 80 years after

fire (Klein 1982, Joly et al. 2003). On caribou summer ranges, forage quality of vascular plants is improved by fire. Fire also affects caribou movement patterns. Research has shown that caribou actively avoid burned areas for 35--50 years after a fire (Joly et al. 2003). Over the long-term, fire would likely be beneficial to caribou as it helps maintain the ecological diversity of the habitat and may prevent mosses from out-competing forage lichens. Light fires may rejuvenate stands of lichen and replace old forest stands where lichen has been replaced by moss. Periodic fires create a mosaic of fuel types and fire conditions that naturally preclude large, extensive fires (BLM 2004b).

Fire is very rare in subalpine habitats used by Dall sheep. Fire may enhance sheep habitat by reducing encroachment of shrubs and spruce into subalpine habitats. Fire can also increase the amount or quality of herbaceous and graminoid forage available and reduce cover used by bears and wolves when hunting sheep.

Fire has both beneficial and negative effects on bears. Beneficial effects include increasing the availability of forage plants such as berries, grasses and forbs. On the negative side, some forage species may be reduced or temporarily eliminated by fire. Moose calves are an important prey item for both black and grizzly bears. Early stages of plant succession due to fire tend to increase moose production, resulting in more calves available for prey (BLM 2004b). Fire has little direct effect on grizzly bears as it is infrequent in tundra habitats and tundra fires tend to be small.

The effects of fire on furbearers are variable depending on the species. Carnivorous furbearers (e.g., lynx) respond to fire in a manner similar to their prey species, though there tends to be a lag period. If prey species benefit from fire, predators do as well. Snowshoe hares, voles, and other small mammals tend to respond positively to vigorous re-growth triggered by wild fires. Species such as marten and lynx tend to increase as well, tracking these prey species (Johnson et al. 1990). Fire is not common in the coastal habitats favored by Arctic foxes thus they are minimally affected. Herbivorous furbearers tend to benefit from fire due to rejuvenation of forage plants and maintenance of open water. Beavers may be negatively affected by severe fires until forage species recolonize the area.

Fire near wetlands can consume dead grass and sedges, opening up dense marsh vegetation to maintain habitat for waterfowl. Burning also stimulates new shoots that have greater forage value. Under the right conditions, fire may create new ponds or prevent old ponds from filling in with vegetation. Fire can have short-term negative effects on waterfowl when it occurs during nesting or molting periods, or when it eliminates woody vegetative cover (BLM 2004b).

It is difficult to generalize impacts of fire on passerine birds due to the great variety of habitat requirements. Shrub communities often support the greatest number and diversity of passerine birds (Spindler and Kessel 1980, Kessel 1989). Shrub communities are maintained by periodic fires. Within forested areas, fire creates openings in the forest, and snags used for nesting, perching, and foraging. Fire may cause direct impacts to birds when it occurs during the nesting season, killing nestlings and destroying nests. Raptors may benefit from fire due to increased populations of small mammals and birds in response to vegetative changes after fire. The timing of the benefit varies depending upon the type of prey favored by the raptor. Over the short-term, fires reduce cover available for prey species, making them more visible to raptors.

Fire suppression activities also cause both direct and indirect impacts to wildlife. Wildlife habitat may be destroyed, fragmented, or degraded due to construction of fire breaks or use of OHVs. Small mammals may be killed by the use of mechanized equipment. Mitigation measures

designed to reduce the impacts of suppression activities include limitations on the use of tracked, or off-road vehicles; measures to prevent the introduction of invasive or noxious plant species; establishment of riparian buffer zones; and rehabilitation of fire and dozer lines. These types of impacts would be small as most BLM-managed lands are far from the road system, minimizing the use of mechanized equipment.

(c) Impacts to Wildlife from Livestock Grazing

Grazing by reindeer can indirectly impact wildlife by degrading habitat or reducing the availability of preferred forage species. Because reindeer are the same species as caribou, a native ungulate, impacts to other herbivorous wildlife are minimal. The greatest potential for impact would be on caribou as they have the same forage requirements. Because reindeer remain in the same area yearlong, they may overuse lichen in localized areas. This has been a problem in recent years due to incursions by caribou into reindeer ranges. Reindeer herders have been forced to keep their animals in the same area, year after year in order to keep them separate from caribou. This has resulted in reduction of lichen biomass in some areas.

Herding activities may result in disturbance impacts to wildlife. These impacts would be negative, especially during stressful times such as winter or reproductive periods. Reindeer herders may attempt to separate their reindeer from caribou, resulting in disturbance impacts to caribou. Disturbance to wintering moose by reindeer herding activities may result in increased stress on these animals.

Authorization of grazing may negatively impact brown bear and wolf populations due to the increased number of these animals harvested by reindeer herders in defense of life and property. Harvest of predators by reindeer herders in some parts of the Seward Peninsula has been substantial in the past (ADF&G 2002). From 1996-98, nine bears were reported harvested in defense of life and property (DLP) in GMU 22. This reported total does not accurately represent the actual number of non-hunting kills due to low compliance with reporting requirements. Nelson (1993) estimated that an additional 10-30 bears were killed annually and not reported in GMU 22. However, reindeer may also act as an alternative prey base to migratory caribou and keep predator numbers inflated.

Approval of grazing permits may result in conflicts between wildlife management and reindeer grazing. ADF&G spends a large amount of time managing caribou hunts in areas that overlap with reindeer ranges in an attempt to reduce accidental harvest of reindeer by hunters.

Disease transmission is potentially a key issue. Under current levels of grazing, potential for impacts would be limited due to the small numbers of reindeer remaining. However, since reindeer and caribou are the same species, if disease transmission did occur, it could have serious, negative impacts on the WACH.

Under current levels of grazing, impacts to wildlife would be limited to the western Seward Peninsula and would be minimal due to the small numbers of reindeer remaining. The impacts discussed above would not be limited to BLM-managed land. BLM issues joint grazing permits with the National Park Service and the State. Reindeer are not closely herded and move freely between State, BLM, and Park Service land.

Grazing associated with Special Recreation Permits (SRPs) could be authorized under all alternatives on a case-by-case basis. Potential impacts include transmission of disease to wildlife from domestic animals; reduction of forage availability; and introduction of noxious or

invasive plants from feed carried in for pack animals. As with disease transmission from reindeer, the probability of impacts is low but there is potential for serious, negative consequences.

(d) Impacts to Wildlife from Locatable Minerals

Although mineral development is not anticipated under every alternative, some exploration may occur under any alternative. Potential impacts to wildlife would include temporary disturbance in very localized areas, temporary loss of habitat, long-term degradation of habitat, and possible direct mortality of small rodents or nestling birds. These impacts would be minimal due to the very low level of activity anticipated (less than four notices per year), the very minimal amount of acres disturbed (20 acres per year), and the seasonal and temporary nature of the activity.

(e) Impacts to Wildlife from Mineral Materials

Mineral material disposal has both direct and indirect impacts on wildlife and their habitat. Habitat is degraded or destroyed, depending upon the location of the material site. Some sites may recover to the original vegetation cover within a relatively short time frame. Other sites may take decades to recover. In some cases, disturbance to the site by mining of mineral materials may result in improved habitat for species which depend upon habitats in a low seral stage. Temporary disturbance impacts would occur to larger and more mobile animals. Direct mortality may result to smaller and less mobile animals such as lemmings, voles, or nestling birds. Impacts would be reduced under all alternatives due to implementation of mitigation measures developed during NEPA analysis of specific disposal actions.

Impacts to wildlife from mineral material disposal would be minimal under most alternatives. Sufficient material sources exist on private lands to meet the needs of most communities within the planning area and few mineral material disposal actions are anticipated on BLM land, unless a new road or other infra-structure are constructed. Under Alternatives B and D, mineral material disposal would occur in association with oil and gas development and would impact wildlife. These impacts are discussed under Alternative B, Impacts to Wildlife from Minerals beginning on page 4-74.

(f) Impacts to Wildlife from Recreation Management

There would be minor impacts to wildlife from recreational activities. The primary impacts would be temporary stress and displacement of wildlife due to recreational activities, or to recreation associated access (aircraft overflight and landing in remote areas). In areas that are repeatedly used for camping sites, there may be minor, site-specific degradation of habitat. Given the low level of recreational use on most BLM-managed lands within the planning area, these impacts would be minimal and would not have population level effects.

(g) Impacts to Wildlife from Travel Management

The noise and activity associated with OHV use (including snowmachines) can adversely affect wildlife both directly and indirectly. Direct effects include stress and displacement of animals, possibly to less suitable habitats. Both stress and displacement may result in reduced productivity (ADF&G 1990). Changes to traditional movement patterns, distribution and behavior of wildlife can result from exposure to OHVs. Wildlife are particularly vulnerable to disturbance at areas of concentration such as caribou calving grounds, or during stressful periods during life history. High levels of OHV use may result in changes in density or species composition in the vicinity of the trail.

Indirect effects include habitat degradation and alternation, and increased access into habitats due to proliferation of trails. Refugia areas will become more accessible over time as OHVs become more powerful and as the human population in the planning area increases. Snowmachine use compacts snow and may inhibit movement under the snow by small rodents. At current use levels, OHV impacts to wildlife habitat within the planning area are minor.

(h) Impacts to Wildlife from Renewable Energy

If renewable energy sources such as wind are developed on within the planning area, there would be both direct and indirect impacts on wildlife. Direct impacts would include disturbance during construction and maintenance activities, mortality due to bird strikes on wind towers, and mortality of small, less mobile animals such as small mammals or nestling birds during construction. Indirect impacts would include minor loss of habitat due to facility construction. To be most useful, these types of development need to be located near population centers. However, most land near villages is private. Therefore, little renewable energy development is anticipated on BLM-managed lands, actual impacts would be minimal, and would not have population level effects.

There is a potential for bird mortality due to collisions with wind turbines. On the basis of mortality estimates at existing wind energy projects in the western United States, the mid-range expected for passerine mortality would be approximately 1.2 to 1.8 birds per turbine per year (BLM 2005e). These data are based upon wind energy projects in the western United States, exclusive of Alaska. Wind energy projects in Alaska are much smaller with fewer turbines, and would have even less impact on birds. In 2003 the Kotzebue Electric Association wind farm was monitored for bird strikes. At the time of the study, there were 12 towers. No bird strikes were documented on wind towers, although one dead sparrow was found near a radio tower (Moran 2005). Wind energy facilities would also be sited to minimize bird strikes.

(i) Impacts to Wildlife from Lands and Realty Actions

There would be both direct and indirect impacts to wildlife from lands and realty actions under all alternatives. Wildlife may be temporarily displaced or disturbed during activities authorized under this program. There may be direct mortality to small or immobile wildlife species. Wildlife habitat may be destroyed, fragmented, or degraded. However, BLM-managed lands are generally far from settled areas and the demand for realty actions is low. These types of impacts would affect a very small percentage of the BLM-managed land in the planning area.

(2) Alternative A

(a) Impacts to Wildlife from Soil, Water, and Vegetation

Impacts would be the same as under Impacts Common to All Alternatives.

(b) Impacts to Wildlife from Livestock Grazing

Impacts would be the same as those discussed under Impacts Common to All Alternatives. Under this alternative, applications for grazing permits would be considered throughout the planning area but would likely not be approved outside of the Seward Peninsula due to the presence of caribou and the difficulty of managing reindeer within occupied caribou habitat. Impacts from grazing would be slightly higher than under Alternatives C and D as a larger area would be open to grazing, but less than under Alternative B because alternative forms of livestock would not be considered.

(c) Impacts to Wildlife from Leasable Minerals

There would be no impacts as no leasing or exploration would occur.

(d) Impacts to Wildlife from Locatable Minerals

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(e) Impacts to Wildlife from Mineral Materials

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(f) Impacts to Wildlife from Recreation Management

Levels of recreational use would be dependent upon social and economic factors, current hunting regulations, and health of the wildlife populations. Under this alternative, no limits would be set on commercial recreational use levels. Impacts would be similar to those discussed under Impacts Common to All Alternatives. High levels of both commercial and non-commercial recreational use would continue in the Squirrel River, particularly during the moose hunting season in September. Wildlife may be temporarily stressed or displaced due to the large number of camps and numerous aircraft overflights and landings. Use of four-wheelers by guides may result in the creation of new trails into areas that were previously not easily accessible at this time of year – such as prime rutting habitat for moose. Local residents have expressed concern that migrating caribou may be diverted if they encounter high levels of activity along their migration route, resulting in animals not passing through traditional subsistence hunting areas. While individual groups of caribou may be delayed by a day or two, or diverted slightly to the east or west, the current level of recreational use is not expected to significantly affect caribou migration routes.

(g) Impacts to Wildlife from Travel Management

Impacts to wildlife from OHV use and travel management would be similar to that discussed under Impacts Common to All Alternatives. The planning area would remain undesignated and cross-country use of OHVs weighing 2,000 pounds or less GVWR would be allowed throughout. Sensitive habitat areas would not receive additional protection from OHV impacts.

(h) Impacts to Wildlife from Lands and Realty Actions

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(i) Impacts to Wildlife from Special Designations

Under Alternative B, no ACECs or RNAs would be designated. Therefore, there would be no impacts on wildlife from such designations.

(2) Alternative B

(a) Impacts to Wildlife from Soil, Water, and Vegetation

There would be beneficial impacts to wildlife from proper management of soils, water and vegetation resources. Implementation of ROPs on a project specific basis would reduce disturbance to wildlife habitats and aid in the recovery of habitat from permitted uses.

Proactive management of vegetative resources would benefit most wildlife species. Vegetation would be managed to maintain a diversity of wildlife habitats. The BLM would manage lichen-rich plant communities (lichen tussock tundra, white spruce-lichen woodland, etc.) as priority, unique habitats due to the slow growth potential of lichen and its importance to caribou. Fire would be managed to maintain or increase old growth lichen stands in important caribou winter ranges. Proactive management to prevent introduction and spread of invasive and noxious plant species would help maintain wildlife habitats in good condition.

(b) Impacts to Wildlife from Livestock Grazing

This alternative has the potential for the greatest impacts to wildlife from grazing. Impacts to wildlife from reindeer grazing would be similar to those discussed under Impacts Common to All Alternatives, but possibly more extensive as the entire planning area would be open to reindeer grazing. It is unlikely that new reindeer grazing operations would be established outside of the Seward Peninsula during the life of the plan due to the presence of caribou throughout most of the planning area and the difficultly of managing reindeer in occupied caribou habitat.

In addition, grazing by domestic bison could be authorized on the Seward Peninsula under this alternative. Potential impacts to wildlife from authorization of bison grazing include competition with other herbivores including moose, caribou and muskox; potential for disease transmission to wildlife; possible increased DLP killing of predators; and stress/disturbance to wildlife from bison herding activities.

Two areas on the Seward Peninsula that are currently ungrazed (McCarthy's Marsh and Death Valley) were evaluated by BLM specialists in 2004 to determine the feasibility of authorizing bison grazing. Their recommendation was not to authorize this type of use based on: 1) low biomass of bison forage species, 2) lack of State support, 3) wet summer conditions, 4) potential conflict with moose, caribou, muskox, reindeer, fish, wetland and riparian species, 5) potential of emigration and founding of new, feral populations of bison, 6) potential spread of diseases, 7) threat to introduced individual bison, 8) threat to fragile, diverse, productive and unusual habitat, 9) lack of benefit to majority of local people, and 10) potential local opposition (Joly and Meyers 2004).

Moose populations on the Seward Peninsula are currently low. Competition between moose and bison could negatively affect moose recovery efforts. Competition may also exist between bison and caribou and muskox.

There are disease concerns related to introduction of bison to the Seward Peninsula. Because of susceptibility to many of the same diseases, crossover of diseases from bison to muskox would be of particular concern. Diseases likely to have the most serious impacts on wildlife health if infected, captive-raised bison were ranched on the Seward Peninsula would be tuberculosis, bovine viral diarrhea, infectious bovine rhinotracheitis, parainfluenza 3, Johne's disease, and various nematode parasites (Joly and Meyers 2004).

Grazing associated with SRPs could be authorized under this alternative and potential impacts are similar to those discussed under Impacts Common to All Alternatives. Negative impacts would be reduced by implementation of ROP FW-6a which would prohibit the use of goats, llamas, alpacas, and other similar animals for packing, and require the use of certified seed-free feeds.

(c) Impacts to Wildlife from Leasable Minerals

1. Seismic Exploration

Seismic exploration would have direct impacts on wildlife, including temporary disturbance or stress of wildlife. In one study, seismic activities within 1.15 miles (1.8 km) of a grizzly bear den caused changes in heart rate and movement of the female bear and cubs (Reynolds et al. 1986). The investigators suggest that seismic-testing activities within about 600 feet of the den may cause abandonment of the den. In studies on the effects of seismic exploration on muskoxen, some muskoxen reacted to seismic activities at distances up to 2.5 miles (4 km) from the operations; however, reactions by muskoxen were highly variable among individuals, with some individuals not reacting at very close distances (0.12 miles [0.2 km]) (Reynolds and LaPlant 1985). Responses varied from no response, to becoming alert, forming defense formations, or running away (Winters and Shideler 1990). The movements of muskoxen away from the seismic operations did not exceed 3.1 miles (5 km) (Reynolds and LaPlant 1986).

Helicopter support traffic seemed to have a cumulative effect on muskoxen responses to seismic activities (Jingfors and Lassen, 1984). Muskoxen reacted to helicopters flown at 325 and 1,300 feet (100 and 400 m) with durations of responses lasting from 2 to 12 minutes (Miller and Gunn, 1984). Muskoxen cows and calves appear to be more sensitive (responsive) to helicopter traffic than other age/sex classes, and muskoxen in general are more sensitive to overflights by helicopter than by fixed-wing aircraft (Miller and Gunn, 1979).

Seismic activity could potentially occur within habitat for the Cape Lisburne muskox population. Unlike caribou, muskox are not able to travel and dig through snow easily. In the winter, they search out sites with shallow snow, and greatly reduce movements and activity to conserve energy. Muskox survive the winter by using stored body fat and reducing movement to compensate for low forage intake (Dau 2001). Because of this strategy, muskox may be more susceptible to disturbances during the winter. Repeated disturbances of the same animals during winter could result in increased energetic costs that could increase mortality rates.

Seismic exploration would have minimal effects on caribou as exploration would occur during the winter when most of the WACH has migrated south of the Brooks Range. However, some portion of the WACH winters on the North Slope or Cape Lisburne area every year. These animals could be temporarily disturbed due to seismic activity. Caribou have been shown to exhibit panic or violent flight reactions to aircraft flying at elevations of approximately 160 feet and to exhibit strong escape responses (animals trotting or running from aircraft) to aircraft flying at 150 to 1,000 feet (Calef et al. 1976). These documented reactions were responses to aircraft that circled and repeatedly flew over caribou groups. Aircraft associated with support of seismic exploration would pass over caribou only once on any given flight to or from a camp.

Seismic camps may provide additional food sources for foxes at dumpster sites near the galley and dining halls and at dump sites (Eberhardt et al. 1982, Rodrigues et al. 1994). However, seismic crews are required by stipulation to incinerate and remove waste materials from BLM lands; hence this activity is not expected to enhance the survival of arctic foxes. Grizzly Bears would generally be hibernating during seismic exploration so they would not be affected.

In general, large mammal responses to seismic activities in the planning area are expected to be a temporary avoidance of the local area, with reoccupation of the area after the exploration activities are complete. Small rodents (such as lemmings and voles) and their predators (such as short-tailed weasels) are expected to be affected locally (direct mortality and loss of habitat

for individuals or small groups of lemmings and voles) along seismic lines. However, these losses would be insignificant to populations in the planning area.

Seismic surveys occur during winter months (December-April) when nearly all birds are absent from the region. Species present during the winter such as ravens, ptarmigan, gyrfalcons, and snowy owls could be temporarily displaced by seismic activities. In the unlikely event that a seismic operation extended into May, disturbance of early breeding season activities of some species could occur. Because the campsites and survey areas are occupied for relatively brief periods, and most of the birds are dispersed in relatively low numbers over a large area, the duration of disturbance incidents is likely to be brief and infrequent.

Indirect impacts to wildlife from seismic operation may include degradation of habitat (impacts to soil and vegetation) due to seismic exploration. These types of impacts would be reduced by implementation of ROP Veg-2e, which limits seismic surveys to the winter when the ground is frozen and covered with snow.

2. Exploratory Drilling

Impacts to wildlife from exploratory drilling for oil and gas or coal would be similar to those discussed under seismic exploration. As exploratory drilling will occur during winter, potential disturbance would come primarily from aircraft and surface traffic, and activities associated with ice road and drill pad construction. Numerous studies show that wildlife such as caribou and muskoxen react to low flying aircraft by exhibiting various behaviors from panic to strong escape responses (animals trotting or running from aircraft). Disturbance reactions to aircraft would be brief, lasting only minutes to less than one hour. Wildlife may be temporarily disturbed from ground traffic and activities associated with ice road construction. Wildlife may temporarily avoid the local area but would reoccupy the area after the exploration activities are complete. Small and less mobile animals such as lemmings and voles may suffer direct morality during ice road or pad construction. These losses would not result in population level effects.

3. Development

Although initial construction would occur primarily during winter, development of oil and gas resources will bring year-round facilities and activities to wildlife habitat in the northern part of the planning area. Potential effects of development activities include direct habitat loss from gravel mining and oil field facilities, and indirect habitat loss through reduced access caused by physical or behavioral barriers created by roads, pipelines, and other facilities. Depending on location and season, oil and gas activities in areas where waterfowl, caribou, muskoxen, and other species occur would result in increased disturbance to individual animals from routine aircraft operations, gravel-mining operations, presence of gravel pads and facilities, and associated vehicle and foot traffic.

Disturbance and stress impacts would be similar to those discussed under Seismic Exploration but more extensive due to the yearlong exposure. Various species could be affected to some extent by disturbance events (e.g., passage of aircraft), although most incidents are expected to result in negligible effects from which individuals would recover within hours to one day. However, the cumulative effect of repeated disturbance could extend for longer periods and potentially may adversely affect physiological condition, reproductive success, and productivity.

The presence of facilities, gravel mining, and construction of gravel structures would result in displacement from favored habitats and associated energy costs which could result in short-term, negative effects to wildlife during breeding, brood-rearing, or migration. Gravel mining

would occur in 2-3 areas and result in the loss of 50-100 acres of wildlife habitat. The footprint of structures and gravel mines is quite small relative to the distribution of wildlife, so effects would not be evident at the population level for most species. Species such as arctic ground squirrels may benefit from gravel deposition due the creation of suitable burrowing habitat.

The response of caribou to potential disturbance is highly variable from no reaction to violent escape reactions depending on their distance from human activity; speed of approaching disturbance source; frequency of disturbance; sex, age, and physiological condition of the animals; size of the caribou group; and season, terrain, and weather. Caribou cow and calf groups are the most sensitive to disturbance, especially in early summer during and immediately after calving. If development occurred within the calving grounds for the WACH, which is unlikely, impacts could be significant.

The distribution of calving caribou could shift away from development facilities into less suitable habitat. Displacement of caribou of the Central Arctic herd from a portion of the calving range near the Prudhoe Bay and Kaparuk-Milne Point facilities has been documented (Cameron et al. 1981, 1983, 1992; Lawhead et al. 1997; Wolf 2000). This shift in calving distribution occurred even though the Kuparuk-Milne Point area included improvements in field design and layout, such as elevated pipelines and reduced road density indicating that parturient female caribou (those about to give birth or accompanied by very young calves) are very sensitive to disturbance. Parturient caribou were less likely to cross roads and pipelines during the calving season (Cameron et al. 1992). Forage during peak lactation declined as the concentrated calving area shifted south-southwest of the developed area,1980-1995 (Wolfe 2000). Calving grounds are likely selected by some combination of factors including forage quality, forage quantity, and reduced predation on calves. Reduced access to annual and concentrated calving areas could reduce herd productivity unless compensated for by other factors.

Development within the calving range of the WACH would likely have similar impacts. However, development in the portion of the calving grounds within the planning area is highly unlikely. More than 43% of this area is under State or Native corporation ownership. Of the BLM-managed land in this area, 94% is Native-selected, or is high-priority State-selection. Most of the Native-selected lands are top-filed by the State, indicating that BLM is unlikely to retain these lands. It is estimated expected that only a small area along the southern boundary of the calving grounds could potentially remain under BLM-management for the long-term. Over the short-term, selected lands are segregated against the mineral leasing laws, therefore no leasing could occur until selections are relinquished.

Depending upon the location of oil development infrastructure, movement of caribou between calving grounds, insect relief habitat and summer range could be disrupted by oil development. The level of effect would depend upon the location and level of development. An aboveground pipeline with no associated road, as proposed under this alternative, would have little effect on movement, except perhaps by parturient females. Roads and associated traffic would have a greater impact.

Another issue arising from oil field development is the ability of caribou to move freely past oil fields to insect-relief habitats. Caribou under extreme insect harassment initially move rapidly to insect-relief habitat. When insect harassment abates, caribou move to better foraging areas, at which time, they are more sensitive to disturbance. Infrastructure and activities in oil fields could delay or alter movements of caribou from insect-relief areas to foraging habitat, potentially reducing food intake and slowing rates of weight gain (Smith 1996). The probability of producing a calf is directly related to body weight and fat content of females during the previous autumn

(Cameron et al. 2000). Since reproductive success of caribou is highly correlated with nutritional status (Cameron et al. 2002), there could be reproductive consequences from extensive disruption of caribou during the insect-relief season.

Under this alternative, the reasonably foreseeable scenario is that at most, only one oil field would be developed in the northern quarter of the planning area. It would most likely be within the defined WACH insect relief habitat. The field would consist of several well pads connected to a central processing facility and airstrip, the anticipated extent of the area encompassed by development would be approximately three miles in diameter. If located along the migration route of parturient females to the calving grounds, it could slightly delay caribou arrival at the calving grounds. Based upon available data from satellite collared caribou, the majority of the caribou appear to approach the calving grounds from National Park Service lands to the south, rather than through the planning area. The field could interfere with movements of caribou seeking insect relief habitat. However, since the field will be small, it is anticipated that caribou could move through or around the oil field with relative ease, making population level effects unlikely. Potential impacts to caribou from oil and gas development are discussed in greater detail in the Northeast National Petroleum Reserve-Alaska Final Amended IAP/EIS (BLM 2005h).

If the oil field is located in habitat for muskoxen, there would be displacement, and disturbance impacts to muskoxen similar to those discussed under seismic impacts. In addition, there would be direct habitat loss due to gravel mining and at oil field facilities, and indirect habitat loss through reduced access caused by physical or behavioral barriers created by roads, pipelines, and other facilities (Garner and Reynolds 1986, Clough et al. 1987). Muskoxen may be more exposed to oil exploration and development than caribou, because they tend to remain year-round in the same habitat area. Repeated disturbance of the same group during the winter, by air traffic, for example could negatively affect the energy balance of individual animals and potentially contribute to winter mortality.

Disturbance impacts to grizzly bears would be similar to those discussed under seismic impacts. A similar effect could occur from construction activities near maternal dens. The increase in human presence resulting from the establishment of permanent settlements (oil fields, mines, etc.), usually leads to human-bear encounters on a regular basis and to conflict, particularly if bears learn to associate humans with food (Harding and Nagy 1980, Schallenberger 1980, Miller and Chihuly 1987, McLellan 1990). Grizzly bears initially avoid human settlements because of the noise and disturbance (Harding and Nagy 1980), but if the area includes an important food source, some bears are likely to habituate to the noise and human presence, leading to an increase in encounters. Individual bears, especially females with cubs, vary in the degree of habituation-tolerance to human presence, and some would continue to avoid areas when humans are present (Olson and Gilbert 1994). Although, studies show that cub survival is higher in bears using anthropogenic food sources in the oil field region (Prudhoe and Kuparuk), this effect is countered by the fact that these bears have a lower than normal survival rate after becoming sub-adults (Shideler and Hechtel 2000).

4. Effects of Spills

Oil spills could negatively affect wildlife in several ways. Animals may be coated with oil and suffer from loss of thermal insulation, ingest oil during grooming, or absorb toxic hydrocarbons through the skin. Oil may be ingested through contamination of forage or prey. Clean up response may result in temporary disturbance and displacement of wildlife.

Oil may adhere to birds' feathers, causing the feathers to lose their insulating capabilities and result in hypothermia (Patten et al. 1991). This effect would be particularly severe for birds that come in contact with water where feather integrity is necessary to maintain water repellency and buoyancy. Birds could also suffer toxic effects from ingestion of oil by consumption of food contaminated by an oil spill or from oil ingestion resulting from preening of oiled feathers (Hansen 1981). Oil contacting bird eggs could cause toxic effects to embryos (Patten and Patten 1979, Stickel and Dieter 1979). Oil could come in contact with eggs directly as a result of a spill, or indirectly from oiled feathers of incubating adults.

A spill occurring during the summer breeding season would have a greater impact on birds than a spill occurring during the winter, when most birds are on wintering grounds. Cleanup of spilled oil during ice-covered periods or periods of broken ice may be difficult, and lingering oil may be present and may be hazardous to spring migrating birds. Lingering effects from a winter spill could impact returning birds during the following breeding season if clean-up activities did not adequately remove contaminants from bird habitats. In addition, oiled carcasses of dead birds washing up on beaches or shorelines could also be hazardous to scavenging birds such as gulls, golden eagle, gyrfalcon, and peregrine falcon, and to mammals such as Arctic fox and grizzly or polar bear, that feed on these carcasses.

Adult caribou and muskox that were oiled would not likely suffer from a loss of thermal insulation, although toxic hydrocarbons could be absorbed through the skin or inhaled. However, the oiling of young calves could reduce thermal insulation, leading to their death (BLM and MMS 1998). Toxicity studies of crude-oil ingestion in cattle indicate that anorexia (substantial weight loss) and aspiration pneumonia leading to death are possible effects (Rowe et al. 1973). Exposure of livestock (horses and cattle) utilizing grazing lands with oil development has resulted in mortality and morbidity (Edwards 1985). In cattle, this exposure has been shown to result in a wide variety of symptoms including effects on the central nervous system, cardiopulmonary abnormalities, gastrointestinal disorders, inhalation pneumonia, and sudden death. Caribou or muskox that become oiled by contact with a spill in contaminated lakes, ponds, or rivers could die from toxic hydrocarbon inhalation and absorption through the skin. No documented caribou deaths have been attributed to spills associated with the Trans-Alaska Pipeline (TAPS) (BLM and MMS 1998).

In the case of a large spill, some tundra vegetation would become contaminated. Caribou and muskox probably would not ingest oiled vegetation, as they tend to be selective grazers and are particular about the plants they consume (Kuropat and Bryant 1980). Control and clean-up operations (ground traffic, air traffic, and personnel) at the spill site would frighten animals away from the spill and limit the likelihood that these animals would ingest oiled vegetation. In most cases, onshore oil spills would not be expected to affect caribou and muskox through ingestion of oiled vegetation.

Grizzly bears depend on coastal streams, beaches, mudflats, and river mouths during the summer and fall for catching fish and finding carrion. If an oil spill were to contaminate these habitats, some grizzly bears would be likely to ingest contaminated food, such as oiled birds, seals, or other carrion. Such ingestion could result in the loss of a few bears. An oiling experiment on captive polar bears indicated that if a bear's fur becomes oiled and the bear ingests a considerable amount of oil while grooming, kidney failure and other complications could lead to the bear's death (Oritsland et al. 1981). Grizzly bears may have a similar reaction. Brown bears on the Shelikof Strait Coast of Katmai National Park (an area contacted by the *Exxon Valdez* oil spill) were observed with oil on their fur and were consuming oiled carcasses; one young bear that died had high concentrations of aromatic hydrocarbons in its bile and might

have died from oil ingestion (Lewis and Sellers 1991). Anecdotal accounts of polar bears deliberately ingesting hydraulic and motor oil, and foreign objects from human garbage sites suggest that bears are vulnerable to ingesting oil directly, especially from oiled carrion and other contaminated food sources (Derocher and Stirling 1991). Skin damage and temporary loss of hair can result from oiling, with effects on thermal insulation.

Spill response would disturb wildlife; some oiled animals could be captured for treatment, while others could potentially be hazed from the area under agency guidance. Aircraft or overland vehicles would temporarily disturb wildlife present in the vicinity of the spill. Response to disturbance could last from a few minutes to a few hours. Larger and more mobile animals would be temporarily displaced by human activity around the clean-up site; displacement could last for a few days to a few weeks.

Under Alternative B, impacts to wildlife from oil spills would be minimal. For the most part, oil spills would be localized in their effects and would not be expected to substantially contaminate or alter wildlife habitat. Most small spills would be contained on the gravel pads and would have virtually no impact on wildlife. Flat, coastal tundra may retain 300 to 1,500 bbl of oil per acre (Miller et al. 1980). Thus, a large spill (500-900 bbl) from a gravel pad that escaped to tundra could affect up to 3 acres. In the event of a pressurized discharge from a pipeline, a much larger area may be affected. In an incident in December 1993, 1-4 bbl of crude oil misted over an estimated 100-145 acres (Ott 1997). Given the millions of acres of tundra habitat within the planning area, contamination of 145 acres of habitat would be minor. Most spills would occur at facilities with human activity - areas that wildlife would tend to avoid, reducing the potential for animals to come in contact with oil.

(d) Impacts to Wildlife from Locatable Minerals

Impacts would be similar to that discussed under Impacts Common to All Alternatives but slightly greater in extent. Under this alternative, mineral development would occur. The development of 3-5 placer mines would have negligible impacts on wildlife. Impacts would be localized in the immediate vicinity of the mines. In these specific areas, wildlife would be displaced and an estimated 10 acres of habitat would be unavailable during the life of the operation. There may be mortality of small mammals, and eggs or nestling birds during initial clearing of land. These losses would be localized and would not have population level impacts. Implementation of the ROPs would further reduce impacts.

(e) Impacts to Wildlife from Mineral Materials

Under this alternative, up to 1,000,000 cubic yards of mineral materials would be required to support oil and gas development. Impacts to wildlife from mineral material disposal would be similar to those discussed under Impacts Common to All Alternatives but much greater in extent. A more detailed discussion of gravel mining impacts is included under Leasable Minerals above.

(f) Impacts to Wildlife from Recreation Management

For most of the planning area, impacts would be similar to those discussed under Impacts Common to All Alternatives.

Impacts in the Squirrel River would be similar to those discussed under Alternative A but potentially lower. The Squirrel River would be designated as SRMA. Allowable levels of recreational use would be dependant upon many factors but would likely be lower than under

Alternative A. Non-commercial recreational use would continue at a level similar to Alternative A. Recreational use associated with commercial operators would be limited by capping the number of guides allowed to operate within the area during high use periods.

(g) Impacts to Wildlife from Travel Management

Impacts to wildlife would be similar to those under Alternative A. However, disturbance of habitat may be slightly greater as the 2,000 pound GVWR limitation would not be applied during the winter. Use of heavier OHVs, during the winter months could result in some additional damage to vegetation and soils, impacting wildlife habitat, cover, and forage. In most areas, these additional impacts would be minor.

(h) Impacts to Wildlife from Lands and Realty Actions

Impacts would be similar to those discussed under Impacts Common to All Alternatives. Implementation of ROPs would further reduce impacts compared to Alternative A.

Large blocks of BLM-managed lands would be retained in Federal ownership, reducing the potential for habitat fragmentation. Alternatively, lands not identified for retention would be available for disposal. Privatization of BLM-managed lands would increase levels of human activity in wildlife habitat. Depending upon the location of the parcels, access into wildlife habitats may also increase. Wildlife may be displaced from preferred habitats, and habitat may be destroyed or degraded. Disposal of BLM-managed lands are expected to be minimal over the life of the plan. Lands would likely not be disposed of until conveyance to State and Native corporations is complete, demand for disposal of BLM lands is low, various parcels of State land within the planning area have been identified for sale, and land would have to meet the criteria for disposal in Federal Land Policy Management Act (FLPMA). The WACH calving and insect relief area, as well as core winter range in the Nulato Hills is identified for retention, as are the larger blocks of muskox habitat on BLM-managed lands. There would not be population level effects on wildlife.

(i) Impacts to Wildlife from Special Designations

No ACECs would be designated under this alternative. Nor would any rivers be found suitable for designation under the WSR Act. Therefore, there would be no impacts on wildlife from such designations.

(3) Alternative C

(a) Impacts to Wildlife from Soil, Water, and Vegetation

Impacts would be the same as Alternative B.

(b) Impacts to Wildlife from Livestock Grazing

Impacts to wildlife from livestock grazing would be similar to those discussed under common to all alternatives but lesser in extent. Reindeer would be the only type of livestock authorized, and grazing would be limited to the Seward Peninsula. In addition, 2,531,00 acres in four grazing areas would be closed. Areas where reindeer have been absent for more than 10 years would also be closed. The potential for conflicts between wildlife management and grazing would be reduced slightly by the closure of McCarthy's Marsh, upper Kuzitrin River, the Baldwin

Peninsula, and the Buckland River allotments. These areas include winter caribou range and important winter habitat for moose.

(c) Impacts to Wildlife from Leasable Minerals

Impacts from leasable minerals would be very limited as no oil and gas development is forecast under this alternative. Most high potential areas would be closed to leasing. There may be some impacts from seismic exploration, as discussed under Alternative B, but the probability of seismic exploration is very low.

(d) Impacts to Wildlife from Locatable Minerals

Impacts to wildlife would be similar to and somewhat less than those discussed under Impacts Common to All Alternatives. No mineral development is anticipated under this alternative. Although exploration may occur, additional areas would be closed to locatable mineral entry, further reducing the potential for exploration.

(e) Impacts to Wildlife from Mineral Materials

Impacts to wildlife from mineral material disposal would be similar to but less than impacts projected under Impacts Common to all Alternatives. Two sensitive habitat areas, McCarthy's Marsh and the Kigluaik Mountain ACEC would be closed to mineral material disposal, providing additional protection to habitats in these areas. River beds, beaches, and lakeshores would also be closed. These additional benefits would be minor due to the low probability of requests for mineral material disposal on BLM-managed lands in the planning area.

(f) Impacts to Wildlife from Recreation Management

Outside of special recreation management areas, impacts would be similar to and lesser in extent than those discussed under Impacts Common to all Alternatives. Under this alternative, limits on commercial use would be established in several areas including the Koyuk, Inglutalik, Ungalik, Shaktoolik, Buckland, and Agiaupuk rivers, the Nulato Hills, Bendeleben Mountains, and McCarthy's Marsh. This would reduce the potential for disturbance impacts to wildlife from recreational activities.

Impacts in the Squirrel River would be similar to those discussed under Alternative A, but would be lesser in extent. The Squirrel River would be designated as SRMA and limits would be set on both commercial and non-commercial recreational use levels. Commercial use would be limited by capping the number of guides allowed to operate within the area during the high use season. Non-commercial use would be limited during the high use season by requiring all visitors to obtain a permit. The number of visitor use days would be capped at 2,000. These limitations would reduce the potential for disturbance impacts to wildlife. Guides and outfitters would not be permitted to use four-wheelers during the snow-free period so impacts associated with proliferation of trails would be reduced.

The Salmon Lake-Kigluaik Mountain SRMA would be established and managed as a semi-primitive motorized area. Management would focus on enhancing the recreational experience while protecting natural resources. Over the long-term, management of this area for recreation may result in increased visitor use and a greater potential for disturbance impacts to wildlife. If over-use became an issue, limits on visitor use levels would be established. Facilities would be designed to minimize impacts to wildlife and their habitat. Overall, recreation management in the Salmon Lake-Kigluiak SRMA would have minimal impacts on wildlife and wildlife habitat.

(g) Impacts to Wildlife from Travel Management

Under this alternative, the entire planning area would be limited to designated trails. Guides and outfitters would not be permitted to use four-wheelers during the snow-free period. Both disturbance impacts, and impacts to wildlife from proliferation of trails would be reduced compared to Alternatives A, B and D.

(h) Impacts to Wildlife from Lands and Realty Actions

Impacts would be similar to those discussed under Alternative B and Impacts Common to All Alternatives. In addition under this alternative, several ACECs would be designated: including the WACH calving and insect relief habitat, and core winter habitat in the Nulato Hills; and moose, caribou and waterfowl habitat in McCarthy's Marsh and upper Kuzitrin River. Constraints on realty actions within these ACECs would provide additional protection of wildlife habitats, reducing the potential for habitat degradation, fragmentation, and reducing the potential for disturbance impacts to wildlife. The level of impact reduction compared to other alternatives would be dependant upon socio-economic conditions which would drive the demand for realty actions. It is anticipated that the level of impact to wildlife would be the lowest under this alternative.

(i) Impacts to Wildlife from Special Designations

Under this alternative, 5.6 million acres in five areas would be designated as ACECs, including the WACH calving and insect relief habitat and core winter habitat; and moose, caribou and waterfowl habitat in McCarthy's Marsh and upper Kuzitrin River. Constraints on or exclusion of other activities such as mining within these ACECs (Appendix B) would provide additional protection of wildlife habitats, reducing the potential for habitat degradation and fragmentation, and also reducing the potential for disturbance impacts to wildlife. All ACECs would be closed to mineral entry and leasing, thus no oil and gas development would occur within core caribou habitats under this alternative. OHVs would be limited to designated trails during the snow-free season. There is currently very limited OHV use in these areas during the summer. Therefore, beneficial impacts of reduced disturbance from OHVs would be minimal. Designation would also result in additional management attention for these areas.

In addition, 11 river systems would be considered suitable for designation as wild under the WSR Act. Protection of wild river values would indirectly benefit wildlife by protecting riparian vegetation and sensitive habitats from disturbance and long-term degradation.

(4) Alternative D

(a) Impacts to Wildlife from Soil, Water, and Vegetation

Impacts would be the same as Alternative B.

(b) Impacts to Wildlife from Livestock Grazing

Impacts from livestock grazing would be similar to Alternative C, but to a slightly greater extent. Under this alternative, the Baldwin Peninsula and Buckland River allotments would remain open to grazing by reindeer.

(c) Impacts to Wildlife from Leasable Minerals

Impacts would be similar to those in Alternative B. Impacts to caribou would be slightly less than under Alternative B, as oil and gas leasing stipulations 6 and 7 and ROP FW 3-c would apply. Stipulation 6 prohibits exploration activities between May 20 and June 20 in the WACH calving area. This stipulation would have little effect since the identified calving area is all Native-selected or high priority State-selected lands. No exploration is likely to occur in this area as selected lands are segregated against mineral entry. If the WACH calving area changed in the future, this stipulation would slightly reduce the potential for stress related impacts to calving caribou. The effect would be minimal as most exploration would be expected to occur during the winter, rather than during the calving period. Stipulation 7 prohibits exploration activities between May 20 and August 15 within WACH crucial insect relief habitat. ROP FW 3-c prohibits leases or permits longer than 14 days, surface disturbing activity, and mining exploration the peak calving period (May 20-June 20). Again, the protective effect of the stipulation would be minimal as not much exploration is likely to occur during the summer. Under Alternative D, a 300 foot setback on the Kivalina River would be designated as no surface occupancy for fluid leasable minerals. If mineral development was proposed in this area, there would be a slight reduction in long-term habitat disturbance of riparian habitats along the Kivalina River compared to the other alternatives, benefiting wildlife dependant upon these habitats. Given the low probability of leasable mineral exploration or development along the Kivalina River and the limited amount of habitat involved, these benefits would be minor.

ROP FW-3e would place seasonal restrictions on mineral exploration in caribou winter range in the Nulato Hills. If such exploration occurred in this area, the potential for disturbance and stress related impacts to wintering caribou would be reduced. However, the potential for solid leasable mineral exploration is very low and thus the effect of this ROP is expected to be minor.

(d) Impacts to Wildlife from Locatable Minerals

Impacts to wildlife would be similar to Alternative B, but to a slightly lesser extent. Under this alternative, strict required operating procedures (SS-4) would apply to locatable mineral development in the Kigluaik Mountains, reducing the potential for disturbance to ground nesting birds and small mammals. Areas within 300 feet of active channels of ten rivers would be subject to ROP FW-7 which would limit surface disturbance within riparian habitat, providing additional protection for riparian habitat in these areas. Riparian habitat is important to many species of wildlife including moose, migratory birds, bears, and wolverines.

(e) Impacts to Wildlife from Mineral Materials

Impacts would be the same as Alternative B.

(f) Impacts to Wildlife from Recreation Management

Outside of special recreation management areas, impacts would be similar to those discussed under Impacts Common to All Alternatives. Impacts to wildlife in the Salmon Lake-Kigluaik Mountain SRMA would be the same as discussed under Alternative C.

Until a recreation area management area plan (RAMP) is developed, impacts in the Squirrel River SRMA would be similar to those discussed under Alternative A. Over the long-term, limits on both commercial and non-commercial recreational use levels in the Squirrel River would be established through a RAMP. How this plan would affect wildlife is somewhat uncertain but it is

anticipated that improved management of both casual and commercial recreation would result in reduced impacts to wildlife and their habitat.

(g) Impacts to Wildlife from Travel Management

Impacts would be less than under Alternative B and greater than under Alternative C. Application of a 2,000 pound maximum GVWR yearlong and the institution of additional OHV limitations in ACECs and SRMAs would reduce the potential for habitat impacts compared to Alternative B. Application of the State's generally accepted uses (existing trails) on State- and Native-selected lands would also reduce habitat impacts and proliferation of trails on selected lands. Disturbance impacts would potentially be lower than under Alternative B as OHV use would be more confined within ACECs, SRMAs, and on State- and Native-selected lands.

(h) Impacts to Wildlife from Lands and Realty Action

Impacts would be essentially the same as those discussed under Alternative B and Impacts Common to All Alternatives. Under this alternative, several ACECs would be designated: including the WACH insect relief habitat, and core winter habitat in the Nulato Hills. Realty actions within these ACECs may be scrutinized more closely and subject to additional mitigation measures if approved, slightly reducing the potential for habitat degradation, and fragmentation, and reducing the potential for disturbance impacts to wildlife. The level of impact reduction compared to other alternatives would be dependant upon socio-economic conditions which would drive the demand for realty actions. Impacts from realty actions would be slightly higher than under Alternative C and somewhat lower than under Alternatives B and A.

(i) Impacts to Wildlife from Special Designations

Under this alternative, 3.7 million acres would be designated as ACECs: including the WACH insect relief habitat, and core winter habitat in the Nulato Hills. Constraints on other activities within these ACECs (Appendix B) would provide some additional protection of wildlife habitats, slightly reducing the potential for habitat degradation, fragmentation, and reducing the potential for disturbance of wildlife. These areas would be open to mineral entry subject to the required operating procedures, therefore, oil and gas development could occur in core caribou habitats under this alternative. OHVs would be allowed to travel cross-country year round, increasing the potential for disturbance impacts to wildlife compared to Alternative C. The primary benefit of designation would be the additional management attention given to the area and consideration of the identified values in the area during approval of future projects.

4. Special Status Species

a) Special Status Plants

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to Special Status Plants: Air Quality, Cultural Resources, Paleontological Resources, Visual Resources, Wilderness Characteristics, Forest Products, Renewable Energy, Lands and Realty Actions, Fisheries Management, Iditarod National Historic Trail, Wild and Scenic Rivers, Public Safety, Social and Economic Conditions, and Subsistence.

(1) Impacts Common to All Alternatives

There are no Threatened or Endangered plant species within the planning area, and none that are being considered for listing with the U.S. Fish and Wildlife Service. Discussed below are impacts to the eight sensitive status plants which occur in the planning area, with mention where appropriate of impacts to plants classified as rare by the Alaska Natural Heritage Program.

(a) Impacts to Special Status Plants from Soil, Water, and Vegetation

Sensitive status plants would benefit from proper management of soils, water, and vegetation resources. Implementation of mitigation measures to protect soil, water, and vegetation on a project specific basis would reduce disturbance to habitat of sensitive status plants and aid in the recovery of habitat from permitted uses.

(b) Impacts to Special Status Plants from Wildlife Management

Indirect benefits to sensitive status plants would result from protection of wildlife habitats and mitigation of impacts to wildlife habitat through the NEPA and permitting processes.

(c) Impacts to Special Status Plants from Fire and Fire Management

Some sensitive status plants would benefit from fire suppression that minimizes loss of individuals, populations, or habitats. On the other hand, fire suppression activities can also affect sensitive plant species through mortality, disturbance, and damage or alteration of key habitat components (BLM 2004b). Impacts to sensitive plant species would vary depending upon range and distribution, life history, and preferred habitats.

(d) Impacts to Special Status Plants from Livestock Grazing

Some form of livestock grazing is permitted under all alternatives, although areas open to grazing and types of livestock authorized differ among alternatives. Incidental grazing by pack animals associated with special recreation use permits would be considered on a case-by-case basis under all alternatives. Livestock grazing has the potential to negatively impact sensitive status plants through partial or complete removal of individual plants, and through damage by trampling. The degree of impact would depend upon number of animals involved, and seasonal frequency of presence in sensitive plant habitat.

(e) Impacts to Special Status Plants from Leasable Minerals

Coalbed natural gas exploration is not expected to occur on BLM-managed lands in the planning area during the life of the plan and thus there would be no impacts on special status plants. There are no other sensitive status plants impacts common to all alternatives because under Alternative A no mineral leasing would occur, and under Alternatives B, C, and D varying amounts of leasing are possible.

(f) Impacts to Special Status Plants from Locatable Minerals

Existing and future locatable mineral activities have the potential to unfavorably impact sensitive status plants and their habitat by stripping away the vegetative mat as part of mine site overburden, trampling or eliminating (under camp buildings, gravel roads, gravel airstrip, etc.) vegetation and compacting soils throughout the footprint of the mine site. Site-specific mitigation measures would be implemented where necessary and practical.

(g) Impacts to Special Status Plants from Mineral Materials

Sufficient material sources (mainly sand and gravel) exist on private lands to meet the needs of most communities within the planning area. Few mineral material disposal actions are anticipated on BLM land, although most BLM lands would be available for salable mineral exploration and development. The one exception is that mineral materials would be needed to support oil and gas development (if it occurred) on BLM land, most likely in the northern quarter of the planning area. Site specific mitigations would be developed to protect sensitive status plants and their habitats from negative impacts.

(h) Impacts to Special Status Plants from Recreation Management

There could be minor to moderate impacts to sensitive status plants from both commercial and non-commercial recreation activities. Hiking, aircraft landings at remote sites, or occasional to repeated use of remote camp sites may have direct effects on sensitive plant species. Plants could be trampled or crushed, and soil could be compacted or disturbed. Special Recreation Permit holders are specifically directed via permit stipulation to avoid camping at locations where the BLM has identified populations of sensitive plants. Given the low level of recreation use on most BLM-managed lands within the planning area, and the scattered, infrequent placement of sensitive plant populations, these impacts would mostly be minimal, and would not have population level effects.

(i) Impacts to Special Status Plants from Travel Management

There would be direct and indirect impacts on sensitive status plants from travel management and OHV use. OHV use on and off designated trails has the potential to destroy the vegetation mat, compact soils, accelerate permafrost melt, and lead to soil erosion and ponded water. Sensitive status plants could be crushed and their habitats degraded. Higher, rockier terrain and remote areas are becoming more accessible over time as OHVs become more sophisticated and powerful, and as the human population in the planning area increases.

(2) Alternative A

(a) Impacts to Special Status Plants from Soil, Water, and Vegetation

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(b) Impacts to Special Status Plants from Livestock Grazing

Under continuation of current management, there have been no known instances of reindeer grazing which negatively affected any populations of sensitive status plants. Annual visits to specific locations in grazing allotments directly monitored by the BLM have shown no evidence of harm to sensitive status plants. However, because reindeer are herded on a free-range basis over approximately 12.6 million acres of land on the Seward Peninsula (and under management by various Federal, State and Native entities), it is difficult to adequately track this situation. Under current management and on a case-by-case basis, other BLM-managed lands throughout the planning area have been open to reindeer grazing, but no permits have been authorized, mostly due to conflicts with caribou or moose. McCarthy’s Marsh and the upper Kuzitrin River area on the Seward Peninsula have been closed to reindeer grazing.

(c) Impacts to Special Status Plants from Locatable Minerals

Under current management, impacts to sensitive status plants on BLM-managed lands are not well known. Many placer mine sites have a long history of occupancy and most were not inventoried for presence of sensitive plant species prior to authorization. During the last 16 years approximately 68 acres of surface disturbance have been associated with active placer mines in the planning area. Impacts are assumed to be minimal. Proposed permitted or authorized uses that may affect sensitive status plants would be analyzed through the appropriate NEPA document. Based on this analysis, mitigation would be developed to minimize impacts from proposed activities. The resulting mitigation measures would be included in the permit authorizing the use.

(d) Impacts to Special Status Plants from Mineral Materials

Under current management, mineral material sales would be considered on a case-by-case basis, with specific operating stipulations developed to protect sensitive status plants and their habitats through the NEPA process. There are no current mineral material sales on BLM-managed lands in the planning area, and few would be expected within the life of the plan.

(e) Impacts to Special Status Plants from Recreation Management

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(f) Impacts to Special Status Plants from Travel Management

Impacts to sensitive status plants would be similar to that discussed under Impacts Common to All Alternatives. The planning area would remain undesignated and cross-country use of OHVs weighing 2,000 pounds or less GVWR would be allowed throughout. Sensitive habitat areas would not receive additional protection from OHV impacts.

(g) Impacts to Special Status Plants from Special Designations

No ACECs or RNAs or suitable rivers have been designated under this alternative. Sensitive habitats would not be afforded additional protection through designation and management.

(3) Alternative B

(a) Impacts to Special Status Plants from Soil, Water, and Vegetation

Sensitive status plants would benefit from proper management of soils and water resources. Implementation of ROPs on a project specific basis would reduce disturbance to sensitive status plant habitats and aid in the recovery of habitat from permitted uses.

Proactive management of vegetative resources would provide positive benefit to sensitive status plant species. Vegetation would be managed to maintain a diversity of habitats for sensitive species plants. Active management to prevent introduction and spread of invasive and noxious plant species would help maintain habitats in good condition.

(b) Impacts to Special Status Plants from Wildlife Management

Indirect benefits to sensitive status plants under this alternative would accrue due to inventory and monitoring of wildlife habitats and the application of ROPs as appropriate. An indirect negative impact could be sustained to sensitive plant species and their habitats under this

alternative because no seasonal restrictions (generally from mid-May to mid-August) would be applied if oil and gas development were to occur in caribou habitat.

(c) Impacts to Special Status Plants from Livestock Grazing

Under this alternative, all 11.9 million acres of BLM-managed land would be open to livestock grazing, including both reindeer and bison. Therefore, an additional 9 million acres of BLM-managed lands outside the Seward Peninsula would be available for livestock use (some of this acreage is selected). Until the large WACH population declines significantly, it is unlikely that additional permits for reindeer grazing would be issued by the BLM. However, there has been recent interest in bison grazing on the Seward Peninsula. Overall, there could be an increase in livestock grazing pressure and trampling effects on sensitive status plants throughout the planning area under this alternative.

(d) Impacts to Special Status Plants from Leasable Minerals

Under the RFD scenario for oil and gas development, approximately 710,000 acres of BLM-managed land would be leased in the high occurrence potential region during the life of the plan. Impact to tundra vegetation and populations of sensitive status plants would vary from short-term and low impact, to long-term destruction of habitat.

Seismic surveys would be carried out during winter months, involving transport and camp move vehicles. Adequate snow cover and frozen ground offer some protection to underlying vegetation, but studies near the Colville River delta have shown compression of the vegetation mat, broken shrubs and crushed tussocks, usually ranging from little to no impact, to minor impact, to moderate impact during seismic work (Jorgenson et al. 2003b). Development is not likely within the life of the plan. However, if industry showed interest in the area, 43-55 exploration wells could be drilled during winter months involving ice roads, ice pads, and low-impact vehicles. Aside from destruction of vegetation in the immediate vicinity of each exploratory well (approximately 16 square feet), the impacts would be fairly short-term, with recovery from impacts to vegetation expected in a few years. The tundra mat would be compressed under ice roads and ice pads, and plants emerging in the spring would experience a shortened growing season due to delayed melt of ice cover. In localized area impact from ice roads may cause plants to die. If an economically viable field were discovered and developed (unlikely over the life of the plan) 467-517 acres of disturbance would be possible. The 417 acre oilfield would include one main and 5 satellite gravel drill pads, an airstrip, and gravel access roads. An additional 50-100 acres of disturbance would result from 3 gravel sources. An oil pipeline would also be necessary for transport to market, and 50-75 miles of a several hundred mile pipeline could be routed through the planning area.

Only a small coastal area in the vicinity of Cape Thompson and Ogotoruk Creek has been studied botanically, from 1959-1962 (Wilimovsky 1965). The Lisburne Hills and interior portion of the Lisburne Peninsula have received little to no botanical exploration. The sensitive status species *Erigeron muirii* (Muir's fleabane) has been documented at Cape Thompson and much farther east in the Arctic National Wildlife Refuge. The sensitive status species *Mertensia drummondii* (Drummond's bluebell), *Potentilla stipularis* (stipulated cinquefoil) and *Poa hartzii* ssp. *alaskana* (Alaskan bluegrass) have been found farther east on the North Slope in the northcentral and/or northeastern National Petroleum Reserve-Alaska (NPR-A), and with further botanical inventory may be discovered in the northern quarter of the planning area. Three additional species categorized as rare occur in the northern quarter of the planning area: *Smelowskia johnsonii* (Johnson's smelowskia) in the northern Lisburne Hills, *Rumex krausei* (Cape Krause sorrel) at Cape Thompson and Cape Dyer, and *Trisetum sibiricum* (Siberian

oatgrass) at Cape Thompson and Ogotoruk Creek. In recognition of the potential for significant surface disturbing activities inherent in oil and gas exploration, leasing, and production under this alternative and in accordance with ROP SS-3a, an ecological land classification map would be developed before approval of facility construction. Botanical inventory would be part of this effort. In accordance with ROP SS-1e, measures would be taken to protect populations or individual sensitive status plants using site-specific buffers or management prescriptions.

Special status plant species are most vulnerable to a large crude oil spill in June, July, or August, when soils are thawed to seasonal maximum and plants are actively growing. The most vulnerable habitats are those with drier, well-drained soils that would allow oil to penetrate to plant roots and underground rhizomes and buds. General assumptions for a both large and small oil spills are outlined in the Minerals section beginning on page 4-143. Additional assumptions specific to analysis of impacts to sensitive plants are:

- One large crude oil spill (500 bbl) from a damaged valve in a remote stretch of pipeline.
- The spill would occur in June, July, or August and in a drier habitat type.
- Similar to an actual spill at Franklin Bluffs in July 1977 (Walker et al. 1978) the oil is imagined to squirt out vertically, and a strong north wind carries the oil south, creating a fan-shaped impact area. The oil is assumed to spread fairly evenly over the ground for approximately an acre, forming a 2.0 cm thick layer of oil over the ground and vegetation. In addition, the oil coats the aerial stems of shrubs and the taller grasses and sedges.

Some portion of the expected 89 small crude oil spills and 220 small refined oil spills would occur on gravel pads, be cleaned up or contained, and pose no threat to surrounding tundra vegetation. The remaining portion of these spills would stem from problems with pipelines and the product would come into contact with vegetation. Impacts to plants from small spills would be the same as from large spills, except at a much smaller scale. Small oil spills can be expected to occur in all tundra vegetation habitats – standing water over tundra, as well as wet, moist, and dry tundra. Initial plant die-off will be lightest, and recovery quickest, in the wettest habitats or if the soil is frozen (McKendrick 1999). If spilled crude oil falls onto water-saturated or frozen soil, the light fractions (short chain) and aromatic fractions (ring structure) which are most toxic to plants may have time to evaporate before soaking into the soil (McKendrick 1999, McKendrick 2000). Impacts from refined products would be the same as discussed under Vegetation, Effects of Spills beginning on page 4-46.

Of the species discussed above, only *Rumex krausei,* is found in wet habitats. The rest occur in various types of dry habitats. Any oil spill can be expected to have severe impacts on any special status or rare plant populations growing in dry habitats. As explained in detail under Vegetation, Effects of Spills beginning on page 4-46, the most vulnerable habitats are those with drier, well-drained soils that would allow oil to penetrate to plant roots and underground rhizomes and buds. Dry habitats are the slowest to recolonize and the most susceptible to long-term damages from oil spills (McKendrick 2000). As forbs, *Erigeron muirii* and *Smelowskia johnsonii* may be at greater risk from exposure to crude oil than other vascular plants (shrubs, sedges, grasses, and rushes). This susceptibility may be related to their growth form – low stature and above ground buds – and limited protection of stems (McKendrick 1999). Initial studies by Walker et al. (1978) indicated that grasses have a poorer recovery potential than sedges and shrubs at moderate to heavy applications of crude oil. One of the three rare plants known to occur in the northern one-quarter of the planning area is the grass *Trisetum sibiricum*. *Rumex krausei*, growing in moist to saturated soil habitats, would be expected to have at least a moderate chance to recover or recolonize after an oil spill.

If exploration for coal occurred, it would most likely be within the Kukpowruk River Field or the Cape Beaufort Field, east of Cape Lisburne. Winter exploration for coal would have impacts on vegetation and sensitive status plants similar to those described above for oil and gas exploration. ROP FW-3a prohibits coal exploration activity within the WACH calving and insect relief areas from May 20 to August 15. This stipulation would reduce the potential for habitat disturbance impacts during the growing season for any sensitive status or other rare plants possibly occurring in these areas.

(e) Impacts to Special Status Plants from Locatable Minerals

This alternative has the highest potential for unfavorable impact on sensitive status plant species. All ANCSA (d)(1) withdrawals would be revoked and the entire planning area opened to locatable mineral entry, subject to adherence to ROPs. Within the life of the plan, the BLM assumes that 3-5 new placer mines might be initiated, each with an approximate 10 acre mining operation footprint, for a total of 30-50 acres of additional surface disturbance. Impacts of new placer mine operations would be the same as discussed under Impacts Common to All Alternatives. Any new placer mine site would be inventoried for presence of sensitive plant species. Use would be redirected to maintain public land health through avoidance of sensitive habitat (ROP SS-1d). If populations or individual sensitive plants are located, measures would be taken to protect these populations or individuals through site-specific buffers or management prescriptions (ROP SS-1e).

(f) Impacts to Special Status Plants from Mineral Materials

The volume of gravel extraction needed to support possible oil and gas development in the northern quarter of the planning area is projected in the reasonable foreseeable development scenario to be approximately 1 million cubic yards of material. Surface disturbance would amount to approximately 50-100 acres in terrain such as floodplains, shoreline deposits, bluffs, and rocky outcrops. Compared to the 710,000 acres estimated as possible for oil and gas leasing in the high occurrence potential region in the northern portion of the planning area, 50-100 acres set aside for gravel extraction is potentially a small impact. However, to possible sensitive status plants occurring in this northern region it may have a proportionally larger impact, since this particular group of species tends to occur in drier habitats. At least four sensitive status plants occur or have potential to occur at drier, or more well-drained, or rocky sites in the northern one-quarter of the planning area. *Potentilla stipularis* (stipulated cinquefoil) found farther east near Umiat in the NPR-A, often grows on low vegetated river banks, in grassy riparian terraces, or in moist Dryas-heath tundra adjacent to lakeshores or alpine creeks. *Erigeron muirii* (Muir's fleabane) has been documented at Cape Thompson (within the planning area) and the Arctic National Wildlife Refuge. Both *Mertensia drummondii* (Drummond's bluebell) and *Poa hartzii* ssp. *alaskana* (Alaskan bluegrass) have been found in north-central NPR-A. These last three species occur in dry habitats associated with bluffs, floodplains, river terraces, sand dunes, rocky outcrops or fellfields. These habitats are often primary sources of gravel fill used during oil and gas-related construction and development on the North Slope (National Research Council 2003). In addition, *Smelowskia johnsonii* (Johnson's smelowskia), a rare plant documented from the Lisburne Hills and Cape Thompson, is known to occur on limestone talus slopes and Dryas fellfields. Possible impacts to sensitive and rare plant populations and habitats could be severe. In accordance with ROP SS-1e, measures would be taken to protect populations or individual sensitive status plants using site-specific buffers or management prescriptions.

(g) Impacts to Special Status Plants from Recreation Management

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(h) Impacts to Special Status Plants from Travel Management

Impacts to sensitive status plants from travel management and OHV use would be similar to that discussed under Impacts Common to All Alternatives. The planning area would be designated as limited and across-country use of OHVs would be allowed throughout. Sensitive habitat areas would not receive additional protection from OHV impacts.

(i) Impacts to Special Status Plants from Special Designations

Impacts would be the same as Alternative A.

(4) Alternative C

(a) Impacts to Special Status Plants from Soil, Water, and Vegetation

Impacts would be the same as Alternative B.

(b) Impacts to Special Status Plants from Wildlife Management

Indirect benefits to sensitive status plants under this alternative would accrue due to inventory and monitoring of wildlife habitats and the application of ROPs. Seasonal restrictions (generally from mid-May to mid-August) would be applied if oil and gas development were to occur in caribou habitat. An activity level management plan would be developed for management of caribou habitat in the Nulato Hills ACEC. This would indirectly benefit sensitive plant species by offering additional habitat protection and monitoring, especially for *Douglasia beringensis* (Bering dwarf primrose) and *Potentilla stipularis* (stipulated cinquefoil), both of which occur in the Nulato Hills. The ACEC proposed under this Alternative for the WACH calving ground and insect relief terrain on the Lisburne Peninsula would provide additional habitat protection for this large, botanically unexplored region north of Kivalina and adjacent to the NPR-A.

(c) Impacts to Special Status Plants from Livestock Grazing

This alternative is similar to Alternative A, except that 2 of the 15 current reindeer grazing allotments would be closed. In addition, permits for allotments where reindeer have been absent for 10 or more years due to emigration with caribou would not be renewed. Non-renewed allotments would be permanently retired from grazing. Grazing allotment boundaries would be modified to exclude ACECs. These measures would result in slightly less grazing pressure and trampling damage to sensitive status plants in the near term, and potentially more benefit in the future when the WACH population declines, and herders may attempt to build up their reindeer herds again.

(d) Impacts to Special Status Plants from Leasable Minerals

The probability of seismic exploration for oil and gas is very low under this alternative, and no exploratory drilling or development would occur. Under this alternative, areas with high potential for fluid mineral leasing are closed and solid mineral leasing would be deferred until industry showed interest. If exploration occurred, impacts for seismic exploration to sensitive status plants would be the same as discussed under Alternative B.

(e) Impacts to Special Status Plants from Locatable Minerals

Impacts to sensitive status plants would be lightest under this alternative. Approximately 50% of BLM-managed lands in the planning area would be closed to mineral entry to provide additional protection to sensitive areas, including the 300-foot riverbank setbacks along many major rivers and tributaries. Impacts would be similar to those discussed under Impacts Common to All Alternatives. Mitigation measures would be the same under Alternative B.

(f) Impacts to Special Status Plants from Mineral Materials

Impacts would be similar to those discussed under Impacts Common to All Alternatives, and less severe than those discussed under Alternative B. Under Alternative C, sale of mineral materials from riverbeds, ocean and lagoon shorelines, and lakeshores will not be permitted. The Kigluaik and McCarthy's Marsh ACECs, which contain habitat for two sensitive plant species, would be closed to mineral material disposal.

(g) Impacts to Special Status Plants from Recreation Management

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(h) Impacts to Special Status Plants from Travel Management

Impacts to sensitive status plants from travel management and OHV use would be similar to that discussed under Impacts Common to All Alternatives but lesser in extent. OHV traffic in the planning area would be designated as limited to designated roads and trails. Additional restrictions such as seasonal restrictions or closures, or weight limits may be implemented within ACECs and SRMAs. Sensitive habitat areas in McCarthy's Marsh, upper Kuzitrin River, Kigluaik Mountains, Nulato Hills, and the De Long Mountains/Brooks Range (WACH calving and insect relief habitat) would receive additional protection from OHV impacts.

(i) Impacts to Special Status Plants from Special Designations

Designation of approximately 5.6 million acres of ACECs in five areas would provide additional protection to sensitive habitats, as well as to known and undiscovered populations of sensitive status plant species.

Three of eight species of sensitive status plants in the planning area occur in the proposed Kigluaik Mountains ACEC. *Artemisia globularia* var. *lutea* (purple wormwood) has been documented in only four locations in Alaska, and the western flank of the Kigluaik Mountains is one of them. *Artemisia senjavinensis* (yellow-ball wormwood) is endemic to the Seward Peninsula and southeastern Chukota Peninsula in Russia. It is found at a range of elevations scattered throughout the Seward Peninsula, including the Kigluaik Mountains. *Beckwithia glacialis* ssp. *alaskensis* (Alaskan glacier buttercup) is known from only two areas in North America – Greenland and the Kigluaik Mountains. Two other plant species considered rare in Alaska by the Alaska Natural Heritage Program occur in the Kigluaik Mountains: *Primula tschuktschorum* (Chukchi primrose) and *Ranunculus auricomus* (goldilocks buttercup). Measures identified for the proposed ACEC would directly benefit sensitive plant species: 1) Limiting OHVs to designated trails May 15 to October 31; 2) closing the area to locatable and leasable mineral entry; 3) limiting commercial recreation use; 4) designating the area as a right-of-way avoidance area; 5) limiting communication site rights-of-way (ROW) to the existing sites; 6) retaining lands in Federal ownership once conveyances are completed; and 7) closing the area to livestock grazing.

Two of eight species of sensitive status plants known to occur in the planning area are found in the Nulato Hills. Several *Potentilla stipularis* (stipulated cinquefoil) populations have been documented along the upper reaches of the Buckland River, in the northwestern portion of the proposed Nulato Hills ACEC. *Douglasia beringensis* (Bering dwarf primrose) has been collected several places in the Nulato Hills, just south of the proposed ACEC southern boundary, and is expected to occur within ACEC boundaries. Measures identified for the proposed ACEC to protect caribou habitat would directly benefit sensitive plant species: 1) Limiting OHVs to designated trails May 15 to October 31; 2) closing the area to locatable and leasable mineral entry; 3) designating the area as a ROW avoidance area; 4) retaining lands in Federal ownership once conveyances are completed; and 5) closing the area to livestock grazing.

The proposed WACH Calving Grounds and Critical Insect Relief ACEC sits on the Lisburne Peninsula, in the far northeastern portion of the planning area. Multi-disciplinary studies conducted in the Cape Thompson and Ogotoruk Creek region in support of Project Chariot from 1959-1962 (Wilimovsky 1965) are probably the most thorough and most recent botanical records for this area. Cape Thompson and Ogotoruk Creek are State-selected coastal lands just outside the southwestern edge of the proposed ACEC. The Lisburne Hills and interior portion of the Lisburne Peninsula have received little to no botanical exploration. The Sensitive Status Species *Erigeron muirii* (Muir's fleabane) has been documented at Cape Thompson and much farther east in the Arctic National Wildlife Refuge. The Sensitive Status Species *Mertensia drummondii* (Drummond's bluebell), *Potentilla stipularis* (stipulated cinquefoil), and *Poa hartzii* ssp. *alaskana* (Alaskan bluegrass) have been found on the North Slope in north-central and northeastern NPR-A. One or more of these three species may turn up within the proposed caribou calving and insect relief ACEC. Three additional species categorized as rare by the Alaska Natural Heritage Program occur within the proposed ACEC – *Smelowskia johnsonii* (northern Lisburne Hills), or closely adjacent – *Rumex krausei* (Cape Thompson and Cape Dyer) and *Trisetum sibiricum* (Cape Thompson and Ogotoruk Creek). Measures identified within the proposed ACEC to protect caribou habitat would directly benefit sensitive and rare plant species: 1) Limiting OHVs to designated trails May 15 to October 31; 2) closing the area to locatable and leasable mineral entry; 3) designating the area as a ROW avoidance area; 4) retaining lands in Federal ownership once conveyances are completed; and 5) closing the area to livestock grazing.

McCarthy's Marsh proposed ACEC is bounded to the north by the crest of the Bendeleben Mountains. The sensitive status plants *Pedicularis hirsuta* (hairy lousewort) occurs in alpine tundra just inside the ACEC northern boundary. This is the only known location for Alaska. Three other rare plant species (tracked by the Alaska Natural Heritage Program) occur just outside the northern ACEC boundary, on closely adjacent slopes and foothills of the Bendeleben Mountains. These species are: *Carex holostoma* (arctic marsh sedge), *Pleuropogon sabinei* (Sabine grass), and *Primula tschuktschorum* (Chukchi primrose). Their close proximity and shared habitats indicate the possibility of occurrence within the ACEC. Measures identified to protect wildlife habitats and botanical values in the proposed McCarthy's Marsh ACEC include: 1) limiting OHVs to designated trails May 15 to October 31; 2) closing the area to locatable and leasable mineral entry; 3) closing the area to mineral material sales; 4) limiting commercial recreation use; 5) designating the area a ROW avoidance area; 6) retaining the lands in Federal ownership, once conveyances are completed; 7) closing the area to livestock grazing; 8) developing a fire management plan protect lichen habitats for caribou winter range; and 9) prohibiting FLPMA and Recreation and Public Purposes (R&PP) leases.

No sensitive status or rare plant species are currently known to occur in the proposed Kuzitrin River ACEC.

(5) Alternative D

(a) Impacts to Special Status Plants from Soil, Water, and Vegetation

Impacts would be the same as discussed under Alternative B.

(b) Impacts to Special Status Plants from Wildlife Management

Impacts would be the same as discussed under Alternative C.

(c) Impacts to Special Status Plants from Livestock Grazing

Impacts would be similar to those discussed under Alternative A. The difference is that the option to graze livestock on BLM-managed lands outside the current use areas would be eliminated. That option has not been utilized under the current Northwest MFP, so no functional impact to sensitive status plants would result.

(d) Impacts to Special Status Plants from Leasable Minerals

Impacts would be similar to those discussed under Alternative B. Under Alternative D, a 300 foot setback on ten key rivers would be designated as no surface occupancy. The Kivalina River, located in the northern quarter of the planning area where leasable mineral development is possible, is one of these rivers. This could confer some benefit to species such as *Potentialla stipularis* which grows on moist, vegetated floodplains or river banks.

(e) Impacts to Special Status Plants from Locatable Minerals

Impacts would be very similar to those discussed under Impacts Common to All Alternatives and Alternative B. Under Alternative D, two additional ROPs, SS-4 and FW-7 would apply to locatable mineral activity. These two measures, designed to protect riparian and aquatic habitat from disturbance, would potentially reduce disturbance impacts to special status plant species occurring in the Kigluaik Mountains and floodplains of ten rivers.

(f) Impacts to Special Status Plants from Mineral Materials

Impacts would be the same as discussed under Impacts Common to All Alternatives and Alternative B.

(g) Impacts to Special Status Plants from Recreation Management

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(h) Impacts to Special Status Plants from Travel Management

Impacts to sensitive status plants from travel management and OHV use would be similar to that discussed under Impacts Common to All Alternatives, but to a lesser extent. Although cross-country OHV use would be allowed in much of the planning area, additional restrictions such as limiting OHVs to existing or designated trails, seasonal restrictions or closures, and weight limits may be implemented within ACECs and SRMAs. Sensitive habitat areas in the Kigluaik Mountains, Nulato Hills, and the De Long Mountains/Brooks Range (WACH calving and insect relief habitat) would receive additional protection from OHV impacts.

(i) Impacts to Special Status Plants from Special Designations

Beneficial impacts to sensitive status plants would be somewhat less than under Alternative C, because the McCarthy's Marsh, Kuzitrin River, and Kigluaik Mountains ACECs would not be designated. The single known population in Alaska of *Pedicularis hirsuta* (hairy lousewort) in the proposed McCarthy's Marsh ACEC and the one known population of *Artemisia glomerata* var. *lutea* (purple wormwood) in the planning area, in the proposed Kigluaik Mountains ACEC, would not come under protective ACEC management. The Mount Osborn ACEC (in the Kigluaik Mountains) would be designated in the future, once conveyances are complete. Designation of the Mount Osborn ACEC would offer direct protection to *Beckwithia glacialis* ssp. *alaskensis* (Alaska glacier buttercup) and *Artemisia senjavinensis* (yellow-ball wormwood), but does not include known populations of *Artemisia globularia* var. *lutea* (purple wormwood). Measures outlined in the proposed Mt. Osborn ACEC to protect scenic, cultural, botanical, and geological values would directly benefit sensitive plant species and habitats: 1) the area would be designated as "limited" to OHV use. Until conveyances are complete, OHVs would be managed consistent with the State's generally allowed uses. Once conveyances are complete or the selections are relinquished, an OHV management plan would be developed to outline limitations on OHV use; 2) the area would be open to locatable mineral entry subject to strict required operating procedures; 3) remaining lands would be retained in Federal ownership.

b) Special Status Fish

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to special status fish management: Air Quality, Cultural Resources, Paleontological Resources, Visual Resources, Forest Products, Livestock Grazing, Wilderness Characteristics, Iditarod National Historic Trail, Public Safety, Renewable Energy, Social and Economic Conditions, and Subsistence. Impacts to special status fish from Fire and Fire Management would also have no anticipated impacts since the habitat utilized by the Kigluaik Char is high alpine country with little or no fuel to burn.

Impacts to special status fish from all other resources/resource uses/programs except recreation management would be the same as discussed under the Fish section beginning on page 4-53.

(1) Impacts Common to All Alternatives

(a) Impacts to Special Status Fish from Recreation Management

Increased recreational use usually leads to increased fishing pressure. Unchecked recreational access to the Kigluaik Mountains may increase fishing pressure on the sensitive species arctic char inhabiting Fall Creek Lake and Crater Lake, as well as those char populations inhabiting other Kigluaik Mountain lakes. Regardless of the alternative, population assessments and monitoring must be done on the fish populations in Fall Creek Lake and Crater Lake to determine if increased fishing pressure is adversely affecting these susceptible BLM sensitive species populations.

c) Special Status Wildlife

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to special status wildlife: Air Quality, Fisheries Management, Cultural Resources, Paleontological Resources, Visual Resources, Forest Products, Wilderness Characteristics, Iditarod National Historic Trail, Public Safety, Social and Economic Conditions, and Subsistence.

(1) Impacts Common to All Alternatives

(a) Impacts to Special Status Wildlife from Soil, Water, and Vegetation

There would be beneficial impacts to special status wildlife from proper management of soil, water, and vegetation. Implementation of mitigation measures to protect soil, water, and vegetation on a project specific basis would reduce disturbance to habitat for these species and aid in the recovery of habitat from permitted uses.

(b) Impacts to Special Status Wildlife from Fire and Fire Management

In general, impacts to special status wildlife from fire would be similar to those described in the wildlife section above. More specific effects are described below.

Effects on Steller's and spectacled eider are described in more detail in the Land Use Plan Amendment for Wildland Fire and Fuels Management for Alaska Environmental Assessment (BLM 2004b). Both of these species are Federally listed as threatened.

Fire within the breeding habitat of either eider species could have negative effects on the breeding population. However, fire frequency in the northern wet tundra habitat used for breeding is very low (Map 3-18) and the threat of wildland fires to the breeding population of Steller's and spectacled eider, and polar bears and their habitat is negligible. Since fire frequency is so low in these habitats, no fire suppression activity would be likely to occur and there would be no impacts from suppression activities to eiders, polar bears, or their habitat. Outside of breeding, eiders spend most of their time in marine habitats and thus would not be affected by fire or fire management activities. Polar bears spend most of their time on the pack ice and thus would not be affected. There would be no affect on designated critical habitat for eiders.

Fire within the breeding habitat of Kittlitz's murrelet could have negative effects on the breeding population. However, fire is rare in the montane habitats used by murrelets for nesting. Since 1950, only one fire has occurred in the Kigluaik Mountains and only two small fires have occurred in the Cape Lisburne area (Map 3-18). The threat of wildland fire to breeding Kittlitz's murrelet is negligible. Since fire frequency is so low in these habitats, no fire suppression activity would be likely to occur and there would be no impacts from suppression activities.

Some sensitive species would benefit from fire suppression that minimizes loss of individuals, populations, or habitats. On the other hand, fire suppression activities can also affect sensitive species through mortality, disturbance, displacement, and damage or alteration of key habitat components (BLM 2004b). Impacts to sensitive species would vary depending upon range and distribution, life history, and preferred habitats.

Fire near wetlands can consume dead grass and sedges, opening up dense marsh vegetation to maintain habitat for waterfowl such as black brant and long-tailed duck. Burning also stimulates new shoots that have greater forage value. Under the right conditions, fire may create new ponds or prevent old ponds from filling in with vegetation. Fire can have short-term negative effects on waterfowl when it occurs during nesting or molting periods, or when it eliminates woody vegetative cover (BLM 2004b).

It is difficult to generalize impacts of fire on passerine birds due to the great variety of habitat requirements. Shrub communities often support the greatest number and diversity of passerine birds (Kessel 1989). Shrub communities are maintained by periodic fires. Within forested areas, fire creates openings in the forest, and snags used for nesting, perching, and foraging. Fire may cause direct impacts to birds when it occurs during the nesting season, destroying nests and killing nestlings.

Potential direct and indirect effects from fire management include:

- Mortality or injury of adults, young, or eggs from smoke inhalation, or crushing by vehicles or equipment used during fire management activities.
- Disturbance or displacement of individuals from smoke, noise, and other human activities associated with fire management operations. This disturbance or displacement may affect foraging, roosting, or reproductive behavior.
- Nest abandonment or mortality of young, resulting in the loss of one year's recruitment.
- Loss or conversion of key habitat components needed for nesting, foraging, roosting, or cover.
- Creation of key habitat components.
- Increased risk of predation associated with removal of cover.
- Changes in the quantity or quality of available forage and prey species.
- Long-term changes in habitat quality or quantity for nesting, roosting, foraging, or cover that affects the ability of a species continuing to occupy an area or facilitating the return of a species to it historic range.

(c) Impacts to Special Status Wildlife from Livestock Grazing

The majority of the special status wildlife are birds, many of which are migratory, only spending a portion of their time in the planning area. There may be minor impacts to habitat due to cratering and exposure of mineral soils by grazing reindeer. In rare cases, there could potentially be direct mortality of nestling birds or eggs of ground nesting species due to trampling by reindeer or OHV use associated with herding. Impacts would vary depending upon range and distribution, life history, and preferred habitats of specific species but are expected to be minor to negligible. Under most alternatives, grazing would not be authorized within the known distribution of olive-sided flycatcher, Steller's eider, spectacled eider, king eider, black guillemot, or trumpeter swans. Grazing would have no impact on polar bears. Most alternatives would not authorize grazing in areas likely to be used by polar bears.

(d) Impacts to Special Status Wildlife from Locatable Minerals

Some mining exploration may occur under any alternative. Potential impacts to special status wildlife would include temporary disturbance or displacement in very localized areas, temporary loss of habitat, long-term degradation of habitat, and possible direct mortality of nestling birds or eggs. These impacts would be minimal due to the very low level of activity anticipated (less than 4 notices per year), the very minimal amount of acres disturbed (20 acres/year), and the temporary nature of the activity.

(e) Impacts to Special Status Wildlife from Mineral Materials

Impacts from mineral material disposal would be negligible under most alternatives. Sufficient material sources exist on private lands to meet the needs of most communities within the planning area and few requests for mineral material sales are anticipated on BLM managed land. One exception is mineral materials needed for oil and gas development. These impacts are discussed under fluid leasable minerals, Alternatives B and D.

(f) Impacts to Special Status Wildlife from Recreation Management

There would be minor impacts to special status wildlife from both commercial and non-commercial recreation activities. The primary impacts would be temporary stress and displacement of individual animals due to recreational activities, or to recreation associated access (aircraft overflight and landing in remote areas). In areas that are repeatedly used for camping sites, there may be minor, site-specific degradation of habitat. OHV use associated with commercial recreational activities could occasionally result in mortality of nestlings and eggs of ground nesting birds. Given the low level of recreational use on most BLM-managed lands within the planning area, these impacts would be minimal and would not have population level effects.

(g) Impacts to Special Status Wildlife from Travel Management

There would be both direct and indirect impacts on special status wildlife from Travel Management and OHV. Direct effects include stress and displacement of animals, possibly to less suitable habitats. Changes to traditional movement patterns, distribution and behavior of wildlife can result from exposure to OHVs (ADF&G 1990). Wildlife are particularly vulnerable to disturbance during stressful periods during life history such as nesting, molting, or denning. Refugia areas will become more accessible over time as OHVs become more powerful and as the human population in the planning area increases. Indirect effects may include habitat degradation and alternation, and increased access into habitats due to proliferation of trails.

(h) Impacts to Special Status Wildlife from Renewable Energy

Impacts to special status wildlife would be the same as those described under wildlife, common to all alternatives. There is a potential for bird mortality due to collisions with wind turbines. Some of the avian mortality could involve special status species, particularly if wind-generating facilities were located within breeding habitats for these species. Based upon the low numbers of bird strikes on wind turbines in other parts of the United States (BLM 2005e) and the small-scale of wind energy projects anticipated, impacts are expected to be minimal.

(i) Impacts to Special Status Wildlife from Lands and Realty Actions

There would be both direct and indirect impacts to special status wildlife from lands and realty actions under all alternatives. Special status wildlife may be temporarily displaced or disturbed during activities authorized under this program. There may be direct mortality to small or immobile species such as nestling birds. Habitat may be destroyed, fragmented, or degraded. However, BLM-managed lands are generally far from settled areas and the demand for realty actions is expected to be low. These types of impacts would affect a very small percentage of the BLM-managed land in the planning area. Impacts would vary between species depending on their range, life history, and habitat preferences.

(2) Alternative A

(a) Impacts to Special Status Wildlife from Soil, Water, and Vegetation

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(b) Impacts to Special Status Wildlife from Livestock Grazing

Impacts to special status wildlife would be similar to those discussed under Impacts Common to all Alternatives and would vary depending upon the range, life history and preferred habitats of individual species. Although the entire planning area is open to grazing by reindeer under this alternative, it would be unlikely for grazing to be authorized within the breeding range of Steller's eider, spectacled eider, king eider, trumpeter swans, or black guillemot due to the presence of caribou in these areas. There would be no impacts to these species or their breeding habitat.

(c) Impacts to Special Status Wildlife from Leasable Minerals

There would be no impacts to special status wildlife under this alternative as no leasing would occur. No exploration is anticipated.

(d) Impacts to Special Status Wildlife from Locatable Minerals

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(e) Impacts to Special Status Wildlife from Mineral Materials

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(f) Impacts to Special Status Wildlife from Recreation Management

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(g) Impacts to Special Status Wildlife from Travel Management

Impacts to special status wildlife from OHV use and travel management would be similar to that discussed under Impacts Common to All Alternatives. The planning area would remain undesignated and cross-country use of OHVs weighing 2,000 pounds or less GVWR would be allowed throughout. Wildlife habitat areas would not receive additional protection from OHV impacts.

(h) Impacts to Special Status Wildlife from Special Designations

There would be no ACECs, RNAs, or suitable rivers under this alternative. Thus there would be no impacts from these designations to special status wildlife.

(3) Alternative B

(a) Impacts to Special Status Wildlife from Soil, Water, and Vegetation

There would be beneficial impacts to special status wildlife from proper management of soils, and water resources. Implementation of ROPs on a project specific basis would reduce disturbance to special status wildlife habitats and aid in the recovery of habitat from permitted uses. In addition, proactive management of vegetative resources would benefit special status

wildlife. Vegetation would be managed to maintain a diversity of habitats. The BLM would manage lichen-rich plant communities (lichen tussock tundra, white spruce-lichen woodland, etc.) as unique habitats. Proactive management to prevent introduction and spread of invasive and noxious plants would help maintain habitats in good condition.

(b) Impacts to Special Status Wildlife from Livestock Grazing

Impacts to special status wildlife from reindeer grazing would be similar to those discussed under Impacts Common to All Alternatives but possibly more extensive as the entire planning area would be open to reindeer grazing. It is unlikely that new reindeer grazing operations would be established outside of the Seward Peninsula due to the presence of caribou throughout most of the planning area. Therefore, impacts would be limited to special status wildlife occurring on the Seward Peninsula, including: blackpoll warbler, MacKay's bunting, gray-cheeked thrush, Kittlitz's murrelet, yellow-billed loon, black brant, red knot, red-throated loon, bristle-thighed curlew, surf scoter, long-tailed duck, and harlequin duck.

In addition, grazing by bison could be authorized on the Seward Peninsula under this alternative. Potential impacts to special status wildlife from authorization of bison grazing include trampling of nests or nestlings, minor disturbance to habitats, and stress/disturbance to special status wildlife from bison herding activities.

(c) Impacts to Special Status Wildlife from Leasable Minerals

1. Fluid Leasable Minerals

a. Seismic Exploration

Seismic exploration would only occur in the northern quarter of the planning area which includes habitat for Steller's eider, spectacled eider, king eider, black guillemot, red knot, Kittlitz's murrelet, and black brant. There would be no effect on these species from seismic exploration occurring during the winter months as they are not present in the planning area at this time. Polar bears also occur in this region and are present during the winter when seismic exploration would be expected to occur.

Summer geophysical work, including field sampling would involve helicopter support and could have negative effects on these species depending on the location of the work in relation to their habitat. Summer seismic work, including aircraft overflights would have temporary and non-lethal effects on special status wildlife, probably lasting less than an hour. Elevated activity and air traffic in the vicinity of large summer camps may result in minor impacts on both local and regional populations of these species.

As discussed above, disturbance effects from oil and gas seismic exploration on spectacled and Steller's eiders are likely to be short-term and localized. Summer seismic work could have temporary and non-lethal effects on eiders, probably lasting less than an hour (BLM 2003b). However, given the extremely low eider density and the land ownership patterns in the portion of the planning area where seismic exploration would be most likely to occur, few disturbance effects to eiders are anticipated.

Lynx may be temporarily disturbed or displaced by seismic activities, with reoccupation of the area after the exploration activities are complete. These impacts would be rare as lynx are not common in the areas were seismic exploration is most likely to occur.

Seismic surveys located near the coast could potentially expose a few denning polar bears to noise and disturbance. This activity could result in the displacement of a few maternal polar bears and their cubs, leading to the abandonment of the den site and possible loss of a small number of cubs (USDOI, BLM 2003b). Few polar bears are expected to be affected, however, because of the low number maternal den sites expected on BLM-managed land and the limited amount of coastal land under BLM management.

If the seismic camp was located near the coast, polar bears could be attracted to the camps by food odors and curiosity. Some polar bears could be harassed or killed to protect workers. These types of encounters are unlikely given the very limited coastal areas managed by BLM, the low level of seismic activity projected, and the low probability of encountering polar bears on BLM-managed land. The number of bears harassed as a result of such encounters is expected to be very low.

To limit and avoid excessive harassment or taking of non-endangered marine mammals, the Marine Mammal Protection Act requires lessees to have a permit or letter of authorization to conduct activities that may harass or take marine mammals. This requirement is expected to further limit disturbance of polar bears associated with leasable mineral activities within the planning area. Documented impacts on polar bears by the oil and gas industry during the past 30 years are minimal (Federal Register 2007). Polar bears spend a limited amount of time on land, coming ashore to feed, den, or move to other areas. During those periods, the likelihood of interactions between polar bears and industry activities increases. In Prudhoe Bay, the FWS found that polar bear interaction planning and training requirements have increased polar bear awareness and minimized these encounters. Since 1968, there have been two documented cases of lethal take of polar bears associated with oil and gas activities (Federal Register 2007). Both were in defense of human life.

Indirect impacts to special status wildlife from seismic operation may include degradation of habitat (impacts to soil and vegetation). These types of impacts would be minimized by implementation of the ROPs, including limiting seismic exploration to the winter when the ground is frozen and covered with snow.

b. Exploratory Drilling for Oil and Gas

Exploratory drilling for oil and gas would only occur in the northern quarter of the planning area which includes habitat for Steller's eider, spectacled eider, king eider, black guillemot, red knot, Kittlitz's murrelet, and black brant. Exploratory drilling would only occur during the winter. Therefore, there would be no effect on these species as they are not present in the planning area at this time. Polar bears and lynx may be temporarily disturbed or displaced by exploratory drilling, with reoccupation of the area after the exploration activities are complete. Impacts to polar bears would be similar to impacts from seismic exploration and to impacts to grizzly bears discussed in section (B)(3)(b) "Wildlife."

c. Oil and Gas Development

Although construction will occur primarily during winter, development will bring year-round facilities and activities to the northern quarter of the planning area which includes habitat for Steller's eider, spectacled eider, king eider, black guillemot, red knot, Kittlitz's murrelet, black brant, and polar bear. Those species present in the area may be disturbed by ground vehicles, humans on foot, and low-flying aircraft associated with oil development. Potential effects of oil-development activities include both direct and indirect habitat loss. Direct loss of habitat would result from gravel mining and gravel deposition on the tundra for roads, pads, and airstrips.

There may be indirect habitat loss through reduced access caused by physical or behavioral barriers created by roads, pipelines, and other facilities.

The oil and gas development activities with the greatest potential for causing loss of habitat are gravel mining and placement (BLM 2005h). Roads and pads are constructed using gravel, and tundra covered by gravel would no longer be available for eider nesting, brood-rearing, or foraging. This loss of habitat would continue for as long as the proposed development was in operation. If abandonment plans call for allowing gravel pads and roads to “bed” naturally, loss of habitat may extend considerably longer than the end of the operational life of the field. Under this alternative, up to 417 acres may be disturbed over the long-term, due to development of one oil field (development wells, airstrip, connecting roads, and other facilities). An additional 50-100 acres would be disturbed due to gravel mining. This potential loss of breeding habitat for most species would likely result in negligible population effects.

Although specific studies have not been conducted to investigate the population effects of eider displacement as a result of infrastructure construction, spectacled and Steller’s eiders displaced from nesting or brood-rearing sites may move to adjacent habitats (BLM 2005h). Anderson et al. (2003) and Troy, D. (1996) reported spectacled eider nests within several hundred feet of roads and pads in the Kuparuk and Prudhoe Bay oil fields. Since nest site fidelity has been demonstrated by spectacled eiders (Troy, D. 1997), it is possible that spectacled or Steller’s eiders displaced from traditional nesting sites by gravel placement would return to the same general area and utilize similar habitats. If spectacled or Steller’s eiders were present within the proposed development area, BLM and the permittee would consult with FWS about the design and placement of roads and facilities.

Under this alternative, the reasonable foreseeable development scenario identifies the possibility of the development of one oil field with a footprint of 417 acres. Spectacled eider breeds and molts on the Arctic Coastal Plain from Cape Simpson east to the Sagavanirktok River (BLM 2005h) and may nest within the planning area (FWS 2004a). 467-517 acres of spectacled eider breeding habitat may be lost due to gravel mining and gravel deposition for facility construction (see Analysis Assumptions: Minerals beginning on page 4-11). Steller’s eider breeds outside of the planning area (FWS 2004a), but likely migrates through the area. Therefore, no impacts to Steller’s eider breeding habitat are anticipated.

Disturbance impacts to polar bears would be similar to those discussed under seismic impacts. A similar effect could occur from construction activities near maternal dens. The increase in human presence resulting from the establishment of permanent settlements (oil fields, mines, etc.), may lead to human-bear encounters and to conflict, particularly if bears learn to associate humans with food.

d. Effects of Spills

Impacts to special status species would be similar to those discussed under Wildlife, Effects of Spills beginning on page 4-77. Most of the BLM sensitive species occurring in the planning area are migratory birds which are only found in the area during the breeding season. The area where a spill might occur includes habitat for Steller’s eider, spectacled eider, king eider, black guillemot, red knot, Kittlitz’s murrelet, and black brant. Oil spills onto tundra, freshwater, or marine habitats could negatively impact these species. Birds may be oiled, causing feathers to lose their insulating ability, resulting in hypothermia. This effect would be more severe in marine and fresh water habitats than tundra habitats. Birds could also suffer toxic effects from ingestion oil contaminated food or oil ingestion resulting from preening of oiled feathers (Hansen

1981). Oil contacting bird eggs could cause toxic effects to embryos (Patten and Patten 1979, Stickel and Dieter 1979).

A spill occurring during the summer breeding season would have a greater impact than a spill occurring during the winter, when these species are on wintering grounds. However, lingering effects from a winter spill could impact birds during the following breeding season.

Spectacled eider breeds and molts on the Arctic Coastal Plain and may nest within the planning area in low densities. McDonald et al. (2002) conducted an oil spill risk assessment for spectacled eiders in the Prudhoe Bay area, using scenarios constructed to mimic spills that had occurred on lake and tundra habitats in the Prudhoe Bay oil field. Based on the assumptions of these scenarios, a maximum of 2.5 spectacled eiders would be exposed to oil from an aquatic spill covering 1,134 acres, and 0.34 spectacled eiders would be exposed to oil from a tundra spill covering 146 acres. Given that the planning area is much lower density eider habitat than that used in the scenario by McDonald et al. (2002) even fewer individual eiders would be potentially exposed to oil. In addition, projected spills in the planning area (Table 4-3, 4-4 and 4-5) would likely affect less acreage than in the scenario used by McDonald et al.

Steller's eider breeds outside of the planning area (FWS 2004a), but likely migrates through the area. There would be no impacts to Steller's eider breeding habitat. In the event of a large spill during the migratory season, a few individual eiders could potentially be affected.

Polar bears occur on coastal streams, beaches, mudflats, and river mouths during certain times of the year. If an oil spill were to contaminate these habitats, some bears could ingest contaminated food, such as oiled birds, seals, or other carrion. Such ingestion could result in the loss of a few bears. An oiling experiment on captive polar bears indicated that if a bear's fur becomes oiled and the bear ingests a considerable amount of oil while grooming, kidney failure and other complications could lead to the bear's death (Oritsland et al. 1981). Anecdotal accounts of polar bears deliberately ingesting hydraulic and motor oil, and foreign objects from human garbage sites suggest that bears are vulnerable to ingesting oil directly, especially from oiled carrion and other contaminated food sources (Derocher and Stirling 1991). Skin damage and temporary loss of hair can result from oiling, with effects on thermal insulation.

2. Solid Leasable Minerals

If exploration for coal occurred, it would be most likely within the Kukpowruk River Field or the Cape Beaufort Field, east of Cape Lisburne. These fields potentially include habitat for Steller's eider, spectacled eider, Kittlitz's murrelet, king eider, black brant, red knot, harlequin duck, long-tailed duck, black scoter, yellow-billed loon, and grey-cheeked thrush. There would be no effect on these species from exploration occurring during the winter months as they are not present in the planning area at this time. This is also within the normal range of the polar bear. Bears could be present in the area during the winter. Impacts to polar bears would be similar to those discussed under Fluid Leasable Minerals above.

Summer geophysical work, including field sampling would involve helicopter support and could have negative effects on special status wildlife depending on the location of the work in relation to their habitat. Summer exploration, including aircraft overflights would have temporary and non-lethal effects on special status wildlife, probably lasting less than an hour. Elevated activity and air traffic in the vicinity of large summer camps may result in minor impacts on both local and regional populations of these species. The potential for impacts to nesting birds would be further reduced by ROP FW-3a which prohibits coal exploration activity within the WACH

calving and insect relief areas, May 20-August 15. This stipulation would reduce the potential for disturbance impacts to special status birds that nest within these areas.

(d) Impacts to Special Status Wildlife from Locatable Minerals

Impacts would be similar to that discussed under Impacts Common to All Alternatives but slightly greater in extent. The development of 3-5 placer mines would have minor impacts on special status wildlife. The distribution of special status wildlife and the amount of habitat available within the state is such that the loss of up to 50 acres of habitat over the life of the plan would result in only minor impacts to any given species. Impacts would be localized in the immediate vicinity of the mines. In these specific areas, animals would be displaced and an estimated 10 acres of habitat would be unavailable during the life of the operation. There may be mortality of eggs or nestling birds during initial clearing of land to be mined. These losses would be localized and there would not be population level impacts. Implementation of the ROPs would further reduce the impacts to special status wildlife and their habitat under this alternative.

(e) Impacts to Special Status Wildlife from Mineral Materials

Impacts would be similar to those discussed under Impacts Common to All Alternatives but greater as up to 1,000,000 cubic yards of material would be needed for oil and gas development activities. Impacts to special status species are discussed under Fluid Leasable Minerals above.

(f) Impacts to Special Status Wildlife from Recreation Management

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(g) Impacts to Special Status Wildlife from Travel Management

Impacts to special status wildlife from OHV use and travel management would be similar to that discussed under Impacts Common to All Alternatives. The planning area would be designated as limited and cross-country use of OHVs would be allowed throughout. Special habitat areas would not receive additional protection from OHV impacts.

(h) Impacts to Special Status Wildlife from Lands and Realty Actions

Impacts to special status wildlife from lands and realty actions would be the similar to those discussed under Impacts Common to All Alternatives. Under this alternative, large, contiguous blocks of BLM lands are identified for retention and thus would not be available for disposal, providing additional protection for special habitats.

(i) Impacts to Special Status Wildlife from Special Designations

There would be no ACECs, RNAs, or suitable rivers under this alternative.

(4) Alternative C

(a) Impacts to Special Status Wildlife from Soil, Water, and Vegetation

Impacts would be the same as discussed under Alternative B.

(b) Impacts to Special Status Wildlife from Livestock Grazing

Impacts to special status wildlife would be similar to those discussed under Impacts Common to All Alternatives but even lesser in extent. Grazing would be limited to the Seward Peninsula and 2.5 million acres in four areas would be closed to grazing. This would include McCarthy's Marsh and the upper Kuzitrin River, both areas with extensive waterfowl habitat.

(c) Impacts to Special Status Wildlife from Leasable Minerals

Under this alternative, areas with high potential for fluid mineral leasing are closed and solid mineral leasing would be deferred until industry showed interest. If exploration were to occur, impacts would be similar to those discussed under Alternative B. The probability of seismic exploration occurring under this alternative is very low, and no exploratory drilling or development would occur. If coal exploration occurred under this alternative, impacts would be the same as those discussed under Alternative B.

(d) Impacts to Special Status Wildlife from Locatable Minerals

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(e) Impacts to Special Status Wildlife from Mineral Materials

Impacts to special status wildlife from mineral material disposal would be similar to but less than impacts projected under Impacts Common to All Alternatives. Two special habitat areas, McCarthy's Marsh and the Kigluaik Mountains, both area used by special status wildlife, would be closed to mineral material disposal, providing additional protection to habitats in these areas. Sale of mineral materials from riverbed, ocean beach/lagoon and lakeshore would not be permitted. Oil and gas development would not occur so there would be no material sales associated with oil and gas activity. These additional benefits would be minor due to the low probability of mineral material disposal occurring on BLM-managed lands in the first place.

(f) Impacts to Special Status Wildlife from Recreation Management

Impacts to special status wildlife from recreation would be similar to those discussed under Impacts Common to All Alternatives but possibly lesser in extent. The Squirrel River and Kigluaik Mountains would be designated as SRMAs and additional management attention would be focused in these areas. Activity level plans would be developed, providing an opportunity to develop more specific management objectives and to design recreation facilities to minimize impacts to special status wildlife.

(g) Impacts to Special Status Wildlife from Travel Management

Impacts to special status wildlife from OHV use and travel management would be similar to that discussed under Impacts Common to All Alternatives but lesser in extent. The planning area would be designated as limited to designated roads and trails. Additional restrictions such as seasonal closures may be implemented within ACECs and SRMAs. Special habitat areas in McCarthy's Marsh, upper Kuzitrin River, Kigluaik Mountains, Nulato Hills, and the De Long Mountains/Brooks Range (WACH calving and insect relief habitat) would receive additional protection from OHV impacts.

(h) Impacts to Special Status Wildlife from Lands and Realty Actions

Impacts would be the same as under Alternative B.

(i) Impacts to Special Status Wildlife from Special Designations

Designation of 5.6 million acres of ACECs and the area-wide restrictions implemented in five areas would provide additional protection of special habitats. Designation of the WACH calving and insect relief habitat would benefit Kittlitz's murrelet, king eider, yellow-billed loon, harlequin duck, long-tailed duck, surf scoter and black scoter by providing additional protection for habitat and reducing the potential for disturbance or displacement of birds from human activity in the area. Designation of the McCarthy's Marsh and Kuzitrin River ACECs would provide additional protection to habitats for bristle-thighed curlew, harlequin duck, long-tailed duck, surf scoter, red knot, yellow-billed loon, black-poll warbler, McKay's bunting, and black scoter. Designation of the Kigluaik ACEC would provide additional protection to habitat for Kittlitz's murrelet. Designation of the Nulato Hills ACEC would provide additional protection to habitat for harlequin duck, long-tailed duck, black-poll warbler, olive-sided flycatcher, and lynx.

Determination of 11 river systems as suitable for designation as wild under the WSR Act would provide some additional protection of habitats for Special Status Species using these habitats, such as harlequin duck.

(5) Alternative D

(a) Impacts to Special Status Wildlife from Soil, Water, and Vegetation

Impacts would be the same as Alternative B.

(b) Impacts to Special Status Wildlife from Livestock Grazing

Impacts to special status wildlife from livestock grazing would be similar to those discussed under Alternative C but slightly greater in extent. Grazing would be limited to the Seward Peninsula and approximately 1,060,000 acres in McCarthy's Marsh and the upper Kuzitrin River would be closed to grazing providing additional protection to habitats for bristle-thighed curlew, harlequin duck, long-tailed duck, surf scoter, red knot, yellow-billed loon, black-poll warbler, McKay's bunting, and black scoter.

(c) Impacts to Special Status Wildlife from Leasable Minerals

Impacts would be almost the same as Alternative B. Under Alternative D, a 300 foot setback on the Kivalina River would be designated as no surface occupancy for fluid leasable minerals. If mineral development was proposed in this area, there would be a reduction in long-term habitat disturbance of riparian habitats along the Kivalina River, benefiting special status species dependant upon these habitats. Given the low probability of leasable mineral exploration or development along the Kivalina River and the limited amount of habitat involved, these benefits would be minor.

(d) Impacts to Special Status Wildlife from Locatable Minerals

Impacts would be almost same as Alternative B. Under Alternative D, ROP SS-4 and FW-7 would apply to locatable mineral development within the floodplains of ten rivers and near the lakes in the Kigluaik Mountains. If mineral development was proposed in these areas, there would be a slight reduction in the potential for long-term disturbance of riparian habitats supporting special status species.

(e) Impacts to Special Status Wildlife from Mineral Materials

Impacts would be the same as Alternative B.

(f) Impacts to Special Status Wildlife from Recreation Management

Impacts would be the same as Alternative C.

(g) Impacts to Special Status Wildlife from Travel Management

Impacts to special status wildlife from OHV use and travel management would be similar to that discussed under Impacts Common to All Alternatives but lesser in extent. Although cross-country OHV use would be allowed in much of the planning area, additional restrictions such as limiting OHVs to existing or designated trails, and seasonal closures may be implemented within ACECs and SRMAs. Sensitive habitat areas in the Kigluaik Mountains, Nulato Hills, and the De Long Mountains/Brooks Range (WACH calving and insect relief habitat) would receive additional protection from OHV impacts.

(h) Impacts to Special Status Wildlife from Lands and Realty Actions

Impacts would be the same as Alternative B.

(i) Impacts to Special Status Wildlife from Special Designations

Impacts to special status wildlife would be similar to those discussed under Alternative C except that no rivers would be determined suitable. There would be less protection of waterfowl habitat in McCarthy's Marsh and the upper Kuzitrin River as these areas would not be designated as ACECs under this alternative. Kittlitz's murrelet habitat in the Kigluaik Mountains would receive less protection as a smaller area, the Mount Osborn ACEC, would be designated.

5. Fire Management and Ecology

a) Impacts Common to All Alternatives

(1) Wildland Fire

The impacts of other resources or uses on wildland fire are minimal. The exception to this is if one or more resources or uses wants fire excluded in a given area.

The biggest potential impact to Fire Management is in areas where fire exclusion is being attempted. Long-term fire suppression in the boreal forest does not create a fuel loading problem in the classic sense. Although the overall fuel load on any particular site may increase with time and fire exclusion, it usually does so with additional biomass being added to the organic layer. It also creates large homogeneous stand of flammable fuels, usually black spruce. Species diversity is decreased. The end result is larger more severe fires that may be outside the range of natural variability. This attempt at fire exclusion then impacts other resources over the long-term and with potentially high impact effects. For example, attempts at fire exclusion in the range of the western artic caribou's herds wintering range could result in significant portions of their range burning in one fire event limiting the carrying capacity of their range.

(2) Fuels Management

There are no planned fuels management projects at this time. If projects are proposed in the future, their impact on the fire program will be in the form of time commitment for preparation and budgetary for implementation.

6. Cultural Resources

a) Impacts Common to All Alternatives

Federal undertakings and unauthorized uses have the potential to cause irreversible disturbance and damage to non-renewable cultural resources. BLM would continue to avoid impacts to cultural resources from authorized uses through project redesign. If necessary, impacts would be mitigated through data recovery investigations in accordance with the National Cultural Programmatic Agreement and the Alaska Protocol for Managing Cultural Resources.

Without a 100% inventory of public lands within the planning area, the exact number, kind, and variability of cultural resources will be unknown. New cultural resources will continue to be found and evaluated for eligibility to the National Register of Historic Places as additional inventories are completed.

b) Alternative A

Under Alternative A, existing management practices would continue. Few impacts to cultural resources are anticipated from authorized activities due to the remoteness of most BLM-managed lands and the nature of most permitted activities. Currently the primary permitted activity in the planning area is Special Recreation Permits for big game guides, and these involve little potential for impacts. Other activities that have been authorized under current management include plans of operation for placer mining, rights-of-way for crossing public lands, leases for improvements associated with reindeer grazing, communication sites and research uses. These activities happen infrequently, and to date significant conflicts with cultural resources have not occurred. There is some potential for impacts from unauthorized activities, but it is difficult to estimate the extent of this, as the cost of monitoring known sites is prohibitive and there has been no consistent attempt to track the condition of the resource.

c) Alternative B

Under Alternative B, there could be a significant increase in the potential for impacts to cultural resources.

Exploration for leasable minerals involves little potential for impacts, with the application of the Required Operating Procedures and Oil and Gas Stipulations (Appendix A). Exploration and development of oil and gas is considered unlikely for the life of the plan, however, if it occurs, such development would probably result in surface disturbance that could pose a threat to cultural resources. Based on the Reasonable Foreseeable Development scenario, 417 acres

would be disturbed by construction of well pads and associated airstrip and roads. An additional 50 to 100 acres would be disturbed through extraction of gravel for these developments.

In the absence of specific information concerning design and location, it is difficult to estimate the extent to which cultural resources might be affected by other construction associated with oil and gas development. Gathering lines, delineation wells, and distribution pipeline are estimated to entail short-term disturbance of up to 4,979 acres. Most, if not all, of these features would be built during the winter, minimizing the amount of surface disturbance, but drilling for Vertical Support Members and any sections of buried pipeline would clearly have potential for disturbance or destruction of cultural resources. Given that this development would probably occur in the northern portion of the planning area, where numerous prehistoric sites are known to be located, there is clear potential for conflicts with cultural resources.

An additional 53.5 acres of non-BLM-managed land in the plan area might be disturbed as a result of development related to coal bed natural gas extraction.

Some impacts to cultural resources can be anticipated from locatable mineral development under this alternative. Three to five placer mines are expected to occur under this alternative, which would entail surface disturbance of 30-50 acres. Based on current experience with placer mining operations, this level of activity is unlikely to impact more than one or two sites.

Little or no impact to cultural resources is anticipated from all other resource uses. Increased OHV use would probably result in some increase in impacts to cultural resources from activities such as looting and vandalism, but it is impossible to develop a reliable estimate of the probable extent of this impact.

d) Alternative C

Impacts to cultural resources would be the same as for Alternative A.

e) Alternative D

Impacts to cultural resources would be the same as for Alternative B.

7. Paleontological Resources

a) Impacts Common to All Alternatives

Federal undertakings and unauthorized uses have the potential to cause irreversible disturbance and damage to non-renewable paleontological resources. The BLM would mitigate impacts to significant paleontological resources from authorized uses through project redesign and specimen recovery. Geologic formations with exposures containing vertebrate and non-vertebrate fossils would be impacted from natural agents, unauthorized public collection, and vandalism. Given the little information we have about paleontological resources in most of the planning area, it is difficult to estimate the extent and nature of anticipated impacts.

b) Alternative A

Under Alternative A expected impacts to paleontological resources would stem almost exclusively from unauthorized uses and natural causes.

c) Alternative B

Under Alternative B, anticipated development associated with leasable and locatable minerals, especially in the northern part of the planning area, could have adverse impacts on paleontological resources.

Exploration and development of oil and gas is considered unlikely for the life of the plan, however, if it occurs, such development would result in surface disturbance that could pose a threat to paleontological resources. Based on the RFD scenario, 417 acres would be disturbed by construction of well pads and associated airstrip and roads (BLM 2005j). An additional 50-100 acres would be disturbed through extraction of gravel for these developments. This development is considered most likely in the northern part of the planning area, where almost all of the known paleontological occurrences on BLM-managed lands are located. Winter construction of gathering lines, delineation wells, and distribution pipeline are estimated to entail short-term disturbance of up to 4,979 acres. The potential for this type of construction to impact paleontological resources is probably slight.

An additional 53.5 acres of non-BLM-managed land in the plan area might be disturbed as a result of development related to coal bed natural gas extraction.

Some impacts to paleontological resources can be anticipated from locatable mineral development under this alternative. Three to five placer mines are expected to occur, which would entail surface disturbance of 30-50 acres. Depending on the location of these mines and the methods utilized for stripping overburden, these operations could result in disturbance and destruction of paleontological materials.

Little or no impact to paleontological resources is anticipated from all other resource uses. Impacts from natural agents and unauthorized uses would also occur.

d) Alternative C

Impacts to paleontological resources would be essentially the same as for Alternative A.

e) Alternative D

Impacts to paleontological resources would be essentially the same as for Alternative B.

8. Visual Resources

Proposed management of the following resources/resource uses/programs would have minor anticipated impacts to visual resources: Cultural Resources, Paleontological Resources, Fish and Wildlife Management, Special Status Plants, Water Resources, and Livestock Grazing. Minor impacts would be from the result of research studies, inventory etc. that are temporary, lasting two to three seasons. These may require camps with temporary structures such as tents, outhouses, aircraft support and human presence and associated activity would create minimal short-term impact on visual resources (Table 4-1).

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to visual resources: Air Quality, Soil Management, Wilderness Characteristics, Special Designations, Public Safety, Social and Economic Conditions, and Subsistence.

a) Impacts Common to All Alternatives

(1) Impacts to Visual Resources from Fire and Fire Management

Both wildland and prescribed fires affect the visual resource by changing line, color, and texture of burned areas in contrast to the surrounding unburned areas. Line would change from a more regular, smooth line to a irregular, jagged line along the adjacent burned and unburned area within the foreground-middleground zones. Short-term color impacts would be expected in burned areas until revegetation occurs. Fire can enhance color over time by creating more diversity in the hues and colors associated with a more diverse vegetation composition. Vegetation texture can change from a medium to fine dense texture in natural areas to a coarse, sparse texture in burned areas as a result of fire. Burned areas, if viewed in the foreground-middleground and background zones, would attract the attention of the casual observer. Because wildland fire does not stop at administrative boundaries, impacts to visual resources would occur on both BLM land and non-BLM land.

Fire suppression activities cause impacts to visual resources by introducing changes in color, texture, and line to a natural landscape. Colors change from the various hues of green vegetation and predominately brown soils and organic materials. Texture changes from a natural medium, subtle texture of vegetation to a coarse, rough contrast of disrupted soils and organic materials. Changes in line from the irregular, weak line of the natural landscape to a regular, strong line between natural vegetation and human-constructed fireline could occur. Even with revegetation of the fireline, which decreases the color contrast, a line contrast may be long-term depending on the vegetation composition between the undisturbed natural area and the disturbed fireline. These impacts may attract the attention of the casual observer in both the foreground-middleground and background zones.

(2) Impacts to Visual Resources from Forest Products

Timber and firewood harvest activities would have impacts similar to those described above for Fire Management in that timber activities can primarily impact line, form, color, and texture. The removal of trees changes the density of vegetation, a characteristic of texture. Changes in line from the irregular, weak line of the natural landscape to a regular, strong line between natural vegetation and the harvest area is dependent on the harvest technique used. Form changes

from the irregular shape of the vegetation to a regular geometric shape from removal of vegetation. Changes in color would occur from the deeper hue of trees to the more diverse colors of lower growing vegetation. Clear-cutting would have the greatest impact to visual resources, while select cutting would have the least impact. Depending on size, timber harvest activities may attract the attention of the casual observer in the foreground-middleground zone, background zone, and even the seldom seen zone. These impacts would be limited to the 8% of the planning area that is forested, so would be minor.

(3) Impacts to Visual Resources from Minerals

(a) Leasable Minerals

Impacts associated with the seismic exploration for oil and gas, and coal would primarily be connected with the temporary support facilities, survey work and overland moves. Temporary structures (e.g. weatherports, housing mounted on sleds), vehicles (e.g. rolligons, track rigs), aircraft, and human presence and associated activity would create minimal short-term impacts on visual resources.

A longer lasting impact would be “green trails” resulting from overland moves. These trails are not always visible for the entire route. These “green trails” are quite visible from the air to the casual observer verses on the ground it becomes more difficult to recognize them. Seismic surveys (2D) are projected to occur every four years over the life of the plan covering between 150 and 800 miles. The RFD scenario also projects 130 miles of 3D seismic being acquired following a discovery. Coal exploration activities would be minimal on most BLM-managed lands, with increased potential for exploration on lands within the Kukpowruk River Field and Cape Beaufort Field. Lands available to exploration would vary between alternatives depending on discretionary and non-discretionary closures. Alternative C has the largest area closed to exploration, while under Alternatives B and D, most of the planning area is open to exploration. Exploration activities may attract the attention of the casual observer in the foreground-middleground zone, but would be undistinguishable in the background and seldom seen zones.

(b) Locatable Minerals

The impacts from the extraction of locatable minerals would vary depending on the methods used and size of operation. Large placer mining would have the greatest impact to visual resources impacting line, form, color, and texture of mined areas, with the removal of vegetative cover and stockpiled materials creating form contrast between the mined areas and the stockpiled materials and the background landforms. Mining and material stockpiles would also create color contrast between the greens of vegetation and the browns of soils. Texture would change from a natural medium, subtle texture of vegetation to a course, rough contrast of disrupted soils and organic materials. Changes in line from the irregular, weak line of the natural landscape to a regular, strong line between natural vegetation and disturbed landscape could occur. Shaft mining techniques would have the least impact but would still impact visual resources through the development of above ground support structures. Support structures from any support facilities would also impact line, form, color, and texture by introducing vertical lines from buildings into a predominately horizontal landscape. Colors would contrast between the greens of vegetation and the building colors. Buildings introduce a smooth texture into a more coarse texture of the vegetation, as well as a more geometric square or rectangular form into the more random and irregular form of the landscape. Depending on size, mining activities

may attract the attention of the casual observer in the foreground-middleground zone, background zone, and even in the seldom seen zone.

(c) Mineral Materials

The impacts on visual resources from extraction activities for mineral material sources are similar to those described for placer mining techniques in the previous paragraph for Locatable Minerals.

(4) Impacts to Visual Resources from Recreation Management

Recreation activities such as development of recreational facilities would impact visual resources by introducing straight vertical lines and smooth textures into a predominately horizontal, random landscape. Increased use of existing and new facilities would impact visual resources by introducing different colors into a predominately green and brown landscape. Some of the facilities may be reflective or shiny instead of the more subtle colors of vegetation, making them more visible from long distances. Buildings and other structures introduce a more geometric square or rectangle form into the more random and irregular form of the landscape.

Proper design and construction techniques can reduce visual impacts from recreation facilities and help maintain a more natural appearing landscape. If viewed from a higher viewpoint, facilities and recreation activities in the foreground-middleground zone would attract the attention of the casual observer. Depending on size, facilities in the background zone may also attract the attention of the casual observer. As viewed from ground level, only activities in the foreground-middleground zone would attract the attention of the casual observer.

(5) Impacts to Visual Resources from Travel Management

Major impacts from OHV use on visual resources from trail construction or as a result of unrestricted overland travel include changes in color, line, and texture on the landscape. Continuous overland OHV use leads to destruction of vegetation, which in turn results in soil exposure, creating a contrast between the adjacent greens of natural vegetation and the browns and grays of exposed soil and organic materials. A contrast in line occurs when the irregular characteristics of vegetation is altered by a more regular line in the form of a developed or constructed trail. Texture characteristics change from the natural coarse or rough textures of diverse vegetation to the smooth uniform texture of a developed trail or mineral soil area.

Most routes or trails would attract attention of the casual observer if viewed from a higher observation point and if the routes or trails were located within the foreground-middleground zone and background zone. Trails or routes that are properly designed and viewed from ground level, however, would not generally attract the attention of a casual observer, with the exception from trailhead observation points.

Major impacts from road construction are similar to those described above for OHV use. Additionally, fugitive dust is also a visual impact resulting from construction activities and from the use of gravel or natural material roads. However, fugitive dust is a short-term impact that can be temporary in nature and is dependent on the amount of traffic a road receives.

Road construction and use would attract the attention of the casual observer if viewed from a higher observation point and located within the foreground-middleground or background zones.

Roads that are properly designed and viewed from ground level, however, would not generally attract the attention of a casual observer, except as the road is being traversed, where roads intersect or when the road is at a higher elevation than the view point (traveling over a hill). Which could occur in the foreground-middleground, and background zone.

These impacts would be minimal as the planning area is mostly roadless, is not connected to the Alaska Highway System, and few roads would be constructed on or near BLM-managed lands over the life of the plan.

(6) Impacts to Visual Resources from Lands and Realty Actions

Land use authorizations such as leases and rights-of-way may result in impacts to visual resources. Most of the visual impacts from utilities would be from support structures for powerlines, communication sites, and weather stations and would impact visual resources by introducing straight, vertical lines into a horizontal landscape. Color impacts would include changes from the matte greens of natural vegetation to glossy reflective colors of metal structures and other colors of facilities such as buildings or towers. Texture and form impacts would include changes from irregular, random textures of vegetation to smooth, definite geometric shapes of buildings.

Consolidation of land ownership would reduce possible impacts to visual resources in that consolidation would eliminate the possibility of unmanaged development activities on private land located within or near BLM-managed lands. Consolidation would result in development activities taking place at access nodes along the edges of BLM-managed lands.

b) Alternative A

Under continuation of current management, visual resources would be managed on a project-by-project basis as no visual resource management classes have been established.

(1) Impacts to Visual Resources from Minerals

Impacts would be similar to those discussed under Impacts Common to All Alternatives. There would be no impacts from leasable minerals as oil and gas leasing would not occur under this Alternative. This alternative anticipates no locatable mineral development on BLM managed lands; mineral exploration may occur but is unlikely; however, without adoption of the ROPs that would be applied under all other alternatives, Alternative A has more potential for impacts to visual resources than does Alternative C, but less potential than do Alternatives B and D.

(2) Impacts to Visual Resources from Recreation Management

Impacts would be similar to those described under Impacts Common to All Alternatives. Alternative A anticipates increased levels of recreation use. Without application of the ROPs that would be applied to Alternatives B, C or D and without assignment of Visual Resource Management (VRM) classes, this alternative has more potential to adversely impact visual resources from recreation facilities and uses than would Alternatives C and D, and less potential than under Alternative B.

(3) Impacts to Visual Resources from Travel Management

Impacts would be similar to those described under Impacts Common to All Alternatives. Continued unmanaged proliferation of OHV trails would occur under Alternative A. This alternative has the most potential for adverse impacts from OHV use on visual resources because there are no OHV designations in place.

(4) Impacts to Visual Resources from Lands and Realty Actions

Impacts from land use authorizations would be similar to that discussed under Impacts Common to All Alternatives. Without adoption of the ROPs that would be applied under Alternatives B, C, and D, and with land use authorizations considered on a case-by-case basis, Alternative A has more potential for impacts to visual resources than Alternative B, C or D.

Under Alternative A, no withdrawal review would occur and ANCSA (d)(1) withdrawals would remain in place. These withdrawals, in most cases, prevent mineral leasing and locatable mineral entry, reducing the potential for impacts to visual resources as discussed under Impacts Common to All Alternatives: Impacts to Visual Resources from Mineral Exploration and Development beginning on page 4-115.

c) Alternative B

In general, Alternative B anticipates the greatest amount of resource development and adopts the least-restrictive VRM classes.

(1) Impacts to Visual Resources from Minerals

Alternative B opens the most area to mineral entry and thus allows for the highest level of mineral exploration and development. This alternative has more potential to impact visual resources than does any other alternatives. In addition to impacts discussed under Impacts Common to All Alternatives, oil and gas leasing could occur in the northern quarter of the planning area resulting in seismic exploration, exploratory drilling and the development of one oil field.

In addition, locatable mineral development could occur in the form of 3-5 small placer mines. Impacts from locatable mineral entry would be similar to those discussed under common to all alternatives. Impacts under this alternative would be greater than under Alternative A where only mineral exploration is anticipated.

Impacts associated with the seismic exploration for oil and gas, and coal would primarily be connected with the temporary support facilities, survey work and overland moves. Temporary structures (e.g. weatherports, housing mounted on sleds), vehicles (e.g. rolligons, track rigs), aircraft, and human presence and associated activity would create minimal short-term impacts on visual resources.

A longer lasting impact would be “green trails” resulting from overland moves or exploration. These trails are not always visible for the entire route. These “green trails” are quite visible from the air to the casual observer verses on the ground, where it becomes more difficult to recognize them. At best, exploration for oil and gas would be limited to 2 or 3 seismic surveys

over the life of the plan. Coal exploration activities would be minimal on most BLM-managed lands, with increased potential for exploration on lands within the Kukpowruk River Field and Cape Beaufort Field. Lands available to exploration would vary between alternatives depending on discretionary and non-discretionary closures. Alternative C has the largest area closed to exploration, while under Alternatives B and D, most of the planning area is open to exploration. Exploration activities may attract the attention of the casual observer in the foreground-middleground zone, but would be undistinguishable in the background and seldom seen zones.

Impacts to visual resources from activities associated with the development of leasable minerals would primarily be associated with the construction of support facilities. Impacts would be similar to those discussed under Impacts Common to all Alternatives Impacts to Visual Resources from Recreation. Mineral materials (gravel) would be needed for development of oil and gas facilities (drill pads and connecting roads). Gravel mining would have additional impacts to color, line, and texture in mined areas, with the removal of vegetative cover and stockpiled materials creating color contrast between the greens of vegetation and the browns of soils. Texture would change from a natural medium, subtle texture of vegetation to a course, rough contrast of disrupted soils and organic materials. Changes in line from the irregular, weak line of the natural landscape to a regular, strong line between natural vegetation and disturbed landscape could occur.

(2) Impacts to Visual Resources from Recreation Management

This alternative is similar to Alternative A even though it allows more construction of recreation facilities it is not anticipated to increase facility development due to remoteness and the expense of construction and maintaining these facilities.

(3) Impacts to Visual Resources from Travel Management

Impacts would be similar to those described under Impacts Common to All Alternatives. Continued unmanaged proliferation of OHV trails would occur under Alternative B. Impacts would be slightly less than under Alternative A because a limited OHV designation would apply to the entire planning area.

(4) Impacts to Visual Resources from Lands and Realty Actions

The types of impacts would be similar to those discussed under Impacts Common to All Alternatives. Alternative B anticipates a higher level of land use authorizations associated with increased resource development. Because the ROPs would be adopted, this alternative would have less potential impact on visual resources than would Alternative A, but more potential impact than Alternative C or D.

Alternative B Revokes all D-1 withdrawals and make the lands available to the full spectrum of the land laws. Revocation of these withdrawals would allows for more mineral leasing and locatable mineral entry, increasing the potential for impacts to visual resources compared to Alternatives A, C or D.

d) Alternative C

In general, this alternative anticipates the lowest level of resource development and adopts VRM classes that would be the most restrictive to development.

(1) Impacts to Visual Resources from Minerals

Because of area-wide constraints and 50% of the area being closed to mineral entry, Alternative C anticipates little locatable mineral exploration and no development. Combined with the most restrictive VRM classes and the application of ROPs, impacts to visual resources under this alternative would be less than Alternatives A, B or D.

Alternative C anticipates little to no leasable mineral exploration and development as the high potential fluid leasable lands are closed and leasing of solid minerals is deferred until industry shows interest. Combined with the most restrictive VRM classes and the application of ROPs, impacts to visual resources under this alternative would be more than Alternative A, but less than Alternatives B or D.

(2) Impacts to Visual Resources from Recreation Management

Alternative C would anticipate development and associated impacts to visual resources similar to those discussed under Impacts Common to All Alternatives. Facility development and associated impacts would be minor. However, this low level of facility development may be offset by visual impacts resulting from unmanaged use (such as bare ground and social trails). This alternative would implement visitor use restrictions in the Squirrel River SRMA, potentially reducing visual impacts.

(3) Impacts to Visual Resources from Travel Management

Alternative C would result in the least amount of unmanaged OHV trail development, as 100% of BLM-managed lands would be designated as limited to designated roads and trails. Consequently, this alternative would result in fewer impacts to visual resources than would any other alternatives.

(4) Impacts to Visual Resources from Lands and Realty Actions

Impacts from land use authorizations would be similar to but less than those discussed under Impacts Common to All Alternatives. Because of area-wide constraints, Alternative C anticipates the lowest level of land use authorizations and associated impacts to visual resources.

Alternative C is similar to Alternative A in that large areas would be withdrawn from mineral entry. These withdrawals, in most cases, prevent mineral leasing and locatable mineral entry, reducing the potential for impacts to visual resources as discussed under Impacts Common to All Alternatives: Impacts to Visual Resources from Minerals beginning on page 4-115.

e) Alternative D

(1) Impacts to Visual Resources from Minerals

Impacts would be the same as Alternative B for both leasable and locatable minerals.

(2) Impacts to Visual Resources from Recreation Management

Alternative D proposes construction of strategically-located recreational facilities to reduce existing impacts from dispersed use, including visual impacts. In combination with application of VRM classes and establishment of visitor use limits in specific areas, this alternative would be the most effective of all the alternatives at reducing or mitigating impacts to visual resources.

(3) Impacts to Visual Resources from Travel Management

Types of impacts would be similar to those discussed under Impacts Common to All Alternatives. Alternative D allows cross-country travel with 2,000 pound GVWR. Some unmanaged proliferation of OHV trails is expected to continue. There would be an OHV management plan developed for the Salmon Lake-Kigluaik Mountain SRMA and Squirrel River SRMA where additional limits may be placed on OHV use. This alternative would be more effective at limiting impacts to visual resources than would Alternative A or B, but would be less effective than Alternative C.

(4) Impacts to Visual Resources from Lands and Realty Actions

Alternative D anticipates a slight increase in land use authorizations. Application of the ROPs would result in fewer impacts to visual resources than under Alternative A and B. Fewer area-wide restrictions on land use authorizations would be in place, leading to a higher level of impacts than would Alternative C.

Impacts from withdrawal review would be the same as Alternative B.

9. Wilderness Characteristics

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to wilderness characteristics: Air Quality, Soil Resources, Vegetation Management, Iditarod National Historic Trail, Public Safety, Social and Economic Conditions, and Subsistence.

Proposed management of the following resources/resource uses/programs would have minor anticipated impacts to wilderness characteristics: Water Resources, Cultural Resources, Paleontological Resources, Fish and Wildlife Management, Special Status Species Management, Livestock Grazing, and ACECs and RNAs. Minor impacts would be from the result of research studies, resource inventories and other administrative actions that are anticipated to be temporary in nature (two-three weeks per year). All of these actions may require camps with temporary structures such as tents, outhouses, aircraft support and human presence, but the presence of these impacts would be temporary, short-term and will impact a very small area on the landscape.

a) Impacts Common to All Alternatives

(1) Impacts to Wilderness Characteristics from Fire and Fire Management

Both wildland and prescribed fire affect wilderness characteristics of an area. Lightning-caused wildland fire is a natural occurring phenomenon. Visually, it is intrusive, but natural and a part of the wilderness characteristics of the landscape. Prescribed fire on the other hand, is not natural and will have an impact to the natural landscape.

Fire suppression activities (firefighters, vehicles, etc) cause impacts to wilderness characteristic, especially naturalness, and if a person is in the area at the time of suppression, to solitude and to a lessor degree to primitive and unconfined recreation. These activities can have lasting effects to the natural landscape. The effects to solitude and primitive and unconfined recreation will most likely be short-term. However, changes to naturalness due to firelines and vehicle use, may be long-term.

(2) Impacts to Wilderness Characteristics from Forest Products

Timber and firewood harvest activities would have impacts similar to those described above for Fire Management in that timber activities can primarily impact naturalness for a longer period of time and affect solitude at the time of harvest activities. The removal of trees changes the density of vegetation regime, an diminishes the naturalness of the area until reforestation occurs. Any impacts to the lands other than harvest of forest products, i.e.(roads to the area, techniques of harvest, camps, etc.) will additionally affect the naturalness of the area. Clear-cutting would have the greatest impact to wilderness characteristics, while select cutting would have the least impact. Impacts to wilderness characteristics from forest actions, should the entire forest resources be impacted would be limited to the 8% of the planning area, at that is all that is forested, so it would be somewhat minimal.

(3) Impacts to Wilderness Characteristics from Minerals

Impacts associated with exploration for oil and gas, and coal would primarily be connected with the temporary support facilities, survey work and overland moves. Temporary structures (e.g. weatherports, housing mounted on sleds), vehicles (e.g. rolligons track rigs), aircraft, human presence and associated activity would create minimal short-term impact on wilderness characteristics of naturalness and solitude.

A longer lasting impact on naturalness would be “green trails” resulting from overland moves. These “green trails” are quite visible from the air to the casual observer verses on the ground they become more difficult to recognize.

The impacts from the extraction of locatable minerals would vary depending on the methods used and size of operation. Large placer mining would have the greatest impacts to naturalness and solitude, because of noise, the footprint of associated facilities, stockpiled materials, and the removal of vegetative cover. Shaft mining techniques would have the least impact to naturalness and solitude as only the above ground structures would be visible.

The impacts on wilderness characteristics from extraction activities for materials sources are similar as those described for placer mining techniques in the previous paragraph.

(4) Impacts to Wilderness Characteristics from Recreation Management

Recreation activities such as development of recreational facilities would impact naturalness and solitude and are not a part of the recreation use in an undeveloped area where wilderness characteristics exist. That said however, some facilities outside of an undeveloped area may be necessary for people to enjoy the wilderness values within an undeveloped area.

Proper design and construction techniques can reduce visual impacts from recreation facilities and help maintain a more natural appearing landscape. If viewed from a higher viewpoint, facilities and recreation activities in the foreground-middleground zone would attract the attention of the casual observer, thus impacting the solitude and primitive recreation opportunities. As viewed from ground level, only activities in the foreground-middleground, would impact the naturalness of the area and affect the feeling of solitude.

(5) Impacts to Wilderness Characteristics from Travel Management

Impacts from OHV use on the landscape from trail construction or as a result of unrestricted overland travel presents a major impact to the naturalness of the area. In addition, even though it may be ephemeral in nature, solitude is also impacted at the time of OHV use. Infrequent use of a trail is not as impacting to wilderness characteristics as continuous overland OHV use, continuous use leads to destruction of vegetation, and the naturalness of the area.

Most routes or trails would attract attention of the casual observer if viewed from a higher observation point impacting the naturalness of the area, but probably not solitude. As compared to routes or trails that were viewed from a much closer distance, all three characteristics of wilderness would be impacted. Trails or routes that are properly designed and viewed from ground level, however, would not generally attract the attention of a casual observer, with the exception from trailhead observation points.

Major impacts from roads and road construction are similar to those described above for OHV use. The footprint of the road is an impact to the natural landscape and is long-term. However, fugitive dust is a short-term impact that can be temporary in nature and is dependent on the amount of traffic a road receives. Road construction and use will impact the wilderness characteristic of the area. However, if a person gets a distance of one-half mile from this intrusion, impacts to solitude and naturalness is much diminished. Roads that are properly designed and viewed from ground level, would not generally attract the attention of a casual observer, thus enhancing the feeling of solitude and naturalness in vicinity of the road. These impacts would be minimal as the planning area is not connected to the Alaska Highway System and construction of roads on BLM-managed lands is anticipated to be minimal.

(6) Impacts to Wilderness Characteristics from Renewable Energy

Development of renewable energy sources if it were to occur on BLM-managed lands would be authorized under a land use authorization. Impacts would be the same as discussed below under Land Use Authorizations.

(7) Impacts to Wilderness Characteristics from Lands and Realty Actions

Consolidation of land ownership would reduce possible impacts to wilderness characteristics in the planning area, in that consolidation would eliminate the possibility of unmanaged development activities on private land.

Impacts from land use authorizations would be from structures for communication sites, utility lines, weather stations and research projects, etc. These structures would diminish the naturalness of the immediate area and in the surrounding areas solitude and primitive and unconfined recreation would also be reduced.

b) Alternative A

(1) Impacts to Wilderness Characteristics from Visual Resources

Under this alternative, no VRM classes would be established. Lack of visual resource management could negatively impact naturalness in areas where development occurs.

(2) Impacts to Wilderness Characteristics from Minerals

Impacts would be similar to those discussed under Impacts Common to All Alternatives. This alternative anticipates no mineral development on BLM managed lands; mineral exploration may occur but is unlikely; however, without adoption of the ROPs that would be applied under all other alternatives, Alternative A has more potential for impacts to wilderness characteristics than does Alternative C, but less potential than do Alternatives B and D.

(3) Impacts to Wilderness Characteristics from Recreation Management

Alternative A anticipates increased levels of recreation use. Without application of the ROPs that would be applied to Alternative B, C, or D and without any elevated concerns for the wilderness characteristics on the lands, this alternative has more potential to adversely impact wilderness characteristics from recreation facilities and uses than would Alternatives C and D, but most likely less potential than under Alternative B.

(4) Impacts to Wilderness Characteristics from Travel Management

Impacts would be similar to those described under Impacts Common to All Alternatives. Continued unmanaged proliferation of OHV trails would occur under Alternative A. As OHV trails increase or expand, naturalness will decrease proportionally. This alternative has the most potential for adverse impacts from OHV use on wilderness characteristics because there are no OHV designations in place.

(5) Impacts to Wilderness Characteristics from Lands and Realty Actions

Impacts from land use authorizations would be similar to that discussed under Impacts Common to All Alternatives. Without adoption of the ROPs that would be applied under Alternatives B, C, and D, and with land use authorizations considered on a case-by-case basis, Alternative A has more potential for impacts to wilderness characteristics than Alternative B, C or D.

Impacts from land ownership adjustment would be similar to that discussed under common to all. Under this alternative no lands are identified for disposal, FLPMA disposal would be unlikely to occur and there would be little to no effect on wilderness characteristics.

Under Alternative A, no withdrawal review would occur and ANCSA (d)(1) withdrawals would remain in place. These withdrawals, in most cases, prevent mineral leasing and locatable mineral entry, reducing the potential for impacts to wilderness characteristics as discussed under Impacts Common to All Alternatives.

(6) Impacts to Wilderness Characteristics from Special Designations

Under this alternative, there would be no special designations. Therefore there would be no impacts to wilderness characteristics.

c) Alternative B

In general, Alternative B anticipates the greatest amount of resource development and in general, is the least restrictive and allows the most impact to wilderness characteristics.

(1) Impacts to Wilderness Characteristics from Visual Resources

Under this alternative, VRM classes would be established. Active management of visual resources would reduce impacts to naturalness by reducing the visual impacts of various types of development. This alternative has the least restrictive VRM classes and would therefore have the lowest positive impact of Alternatives B, C, and D.

(2) Impacts to Wilderness Characteristics from Minerals

(a) Leasable Minerals

Alternatives B and D anticipate the highest level of mineral exploration and development. Oil and gas leasing could occur in the northern quarter of the planning area. Based on assumptions, approximately 6.3 million acres would be available for leasing. It is projected that 710,000 acres would be leased. This has the potential of wilderness characteristics on 710,000 acres in one way or another being impacted over the life of this plan. It is anticipated that 2-D seismic surveys would occur every four years. Assuming three crews (1crew/ seismic survey) working over the course of the plan, ongoing seismic operations are expected to affect between 600 and 3,200 acres. These impacts to wilderness characteristics would be for the most part temporary and short-term.

Impacts associated with exploration for oil and gas, and coal would primarily be connected with the temporary support facilities, survey work and overland moves. Temporary structures (e.g. weatherports, housing mounted on sleds), vehicles (e.g. rolligons track rigs), aircraft, human presence and associated activity would create minimal short-term impact on wilderness characteristics of naturalness and solitude.

A longer lasting impact on naturalness would be “green trails” resulting from overland moves or seismic exploration. These “green trails” are quite visible from the air to the casual observer verses on the ground they become more difficult to recognize.

If industry should show some interest, 43 to 55 exploration wells could be drilled (in winter). Drilling would occur over several winter seasons using ice pads, roads, and airstrips. Temporary on-site location of structures (i.e. drilling rigs); noise from generators, vehicles, aircraft, etc.; human presence; and associated activity–all would have adverse, short-term impacts on solitude, naturalness, or primitive/unconfined recreation during the winter season. These impacts are expected to be greatest within a 2-mile radius of a drill site, an area of approximately 8,000 acres per well site. Accordingly, under this alternative, there would be a temporary loss of solitude, naturalness, or primitive/unconfined recreation over an area of approximately 344,000 acres (43 wells at 8,000 acres/wellsite) to 440,000 acres (55 wells at 8,000 acres/wellsite) over the life of the plan.

Exploration wells also would leave a small mound of dirt (oil companies are required to cut off casing pipe below ground level and cover the hole with dirt), expected to be on larger than one square foot of surface impact. This is essentially a permanent impact but almost unnoticeable from several hundred feet away.

If an economically viable field were discovered, up to 182 development wells (on a total of 6 development pads encompassing 417 acres) could be possible. In addition, this scenario would also assume 23 delineation wells, 36 miles of gathering lines for produced fluids, and up to 350 miles of pipeline (less than 75 miles within the planning area). Impacts to wilderness characteristics would be the most intense during facility construction for the development and production phases. An airstrip would be centrally located to service all pads (one mile length plus one-half mile delineation for solitude = approximately 960 acres impacted). With the cessation of construction and closure of material sites, the remaining structures, human presence, and associated activity and noise would still have adverse impacts on solitude, naturalness, or primitive/unconfined recreation. Because production would most likely occur over a long period (10-30 years), impacts would be long-term. These long-term, adverse impacts are expected to be greatest within 2 miles of production or staging sites (an area of about 8,000 acres per site). Additionally, pipelines and associated facilities would impact wilderness characteristics. Assuming pipelines are elevated and except during construction and repair, there would be no associated on the ground activity. This equates to about 640 acres per mile of pipeline (buffer of one-half mile either side of the pipeline for solitude purposes). The long-term loss of solitude, naturalness, or primitive/unconfined recreation from all these development aspects together would impact an area of up to approximately 120,000 acres ([8,000 acres/pad x 6 pads] + [960acres/airstrip] + [640acres/mi. x 111miles of pipeline]).

This alternative has more potential to impact wilderness characteristics than do Alternatives A and C.

(b) Locatable Minerals

Placer mining is site specific and will impact wilderness characteristics in the vicinity of the mine. As stated in the Alternative A, placer mines vary in size, based on the extent of the operation. The average placer mine within the planning will disturb approximately 10 acres. It is also safe to assume that you need to be at least one-half mile from any placer operation to receive solitude and primitive recreation. Assumptions are that under this alternative, we can expect up to 5 placer mines, therefore we can expect up to 7,850 acres of disturbance to wilderness characteristics (5 mines x 785acres/mine).

(3) Impacts to Wilderness Characteristics from Recreation Management

The types of impacts are similar to those discussed under Impacts Common to All Alternatives. The level of impact would be slightly more than Alternative A. Even though this alternative allows more construction of recreation facilities, it is not anticipated to greatly increase facility development due to remoteness and expense of construction. One SRMA would be managed for undeveloped recreation and provide the opportunity to use and enjoy the wilderness characteristics of the area.

(4) Impacts to Wilderness Characteristics from Travel Management

Impacts would be similar to those described under Impacts Common to All Alternatives. Continued unmanaged proliferation of OHV trails would occur under Alternative B. Impacts would be slightly less than under Alternative A because a limited OHV designation would apply to the entire planning area.

(5) Impacts to Wilderness Characteristics from Lands and Realty Actions

Alternative B anticipates a higher level of land use authorizations associated with increased resource development. Because the ROPs listed in Appendix A would be adopted, this alternative would have less potential for impacts on wilderness characteristics than would Alternative A, but more potential impact than Alternative C or D.

(6) Impacts to Wilderness Characteristics from Special Designations

Impacts would be the same as under Alternative A.

d) Alternative C

In general, this alternative anticipates the lowest level of resource development and adopts VRM classes that would be the most restrictive to development and would have the least impact on wilderness characteristics.

(1) Impacts to Wilderness Characteristics from Visual Resources

Active management of visual resources would reduce impacts to naturalness by reducing the visual impacts of various types of development. This alternative has the most restrictive VRM classes and would therefore have the greatest positive impact of Alternatives B, C, and D.

(2) Impacts to Wilderness Characteristics from Minerals

Alternative C anticipates little to no leasable mineral exploration and development as the high potential fluid leasable lands are closed and leasing of solid minerals is deferred until industry shows interest. Combined with the most restrictive VRM classes and the application of ROPs, impacts to wilderness characteristics under this alternative would be more than Alternative A, but less than Alternatives B or D.

Because of area-wide constraints and about 50% of the area being closed to mineral entry, Alternative C anticipates little locatable mineral exploration and no development. Combined with the most restrictive VRM classes and the application of ROPs, impacts to wilderness characteristics under this alternative would be less than Alternatives A, B or D.

(3) Impacts to Wilderness Characteristics from Recreation Management

Alternative C would anticipate the least development and associated impacts to wilderness characteristics than would any other alternatives because of low levels of facility development and implementation of restrictions on levels of commercial recreational use. However, this low level of facility development may be offset by visual impacts (such as bare ground and social trails). Two SRMAs would be managed for undeveloped recreation and provide the opportunity to use and enjoy the wilderness characteristics of the area.

(4) Impacts to Wilderness Characteristics from Travel Management

Alternative C would result in the least amount of unmanaged OHV trail development, as 100% of BLM-managed lands would be designated as limited to designated trails. Consequently, this alternative would result in the least impacts to wilderness characteristics than would any other alternative.

(5) Impacts to Wilderness Characteristics from Lands and Realty Actions

Because of area-wide constraints, Alternative C anticipates the lowest level of land use authorizations and associated impacts to wilderness characteristics.

(6) Impacts to Wilderness Characteristics from Special Designations

Under this alternative, 11 river systems would be determined suitable for designation as wild. Interim management of these rivers to maintain values would have a positive impact on naturalness. Management actions implemented in designated ACECs would have a positive impact on naturalness.

e) Alternative D

(1) Impacts to Wilderness Characteristics from Visual Resource Management

Active management of visual resources would reduce impacts to naturalness by reducing the visual impacts of various types of development. Under this alternative, the level of positive impacts would be greater than Alternative B and less than Alternative C.

(2) Impacts to Wilderness Characteristics from Minerals

Alternative D anticipates the same level of mineral exploration and development as Alternative B. Impacts for both locatable and leasable minerals would be the same as under Alternative B.

(3) Impacts to Wilderness Characteristics from Recreation Management

Alternative D proposes construction of strategically-located recreational facilities to reduce existing impacts from dispersed use, including visual impacts. In combination with application of VRM classes and establishment of visitor use limits in specific areas, this alternative would be the most effective of all the alternatives at reducing or mitigating impacts to wilderness characteristics. However, overall, this alternative is more impacting to wilderness characteristics than Alternative C, but less impacting than Alternative A or B.

(4) Impacts to Wilderness Characteristics from Travel Management

Types of impacts would be similar to those discussed under Impacts Common to All Alternatives. Alternative D allows cross-country travel with a 2,000 pound GVWR. Some unmanaged proliferation of OHV trails is expected to continue. There would be an OHV management plan developed for the Salmon Lake-Kigluaik Mountain and Squirrel River SRMAs where additional limits may be placed on OHV use. This alternative would be more effective at limiting impacts to wilderness characteristics than would Alternative A or B, but would be less effective than Alternative C.

(5) Impacts to Wilderness Characteristics from Lands and Realty Actions

Alternative D anticipates a slight increase in land use authorizations; however, application of the ROPs would result in fewer impacts to wilderness characteristics than would Alternative A and B, but more potential impacts than would Alternative C.

(6) Impacts to Wilderness Characteristics from Special Designations

Impacts would be the same as under Alternative B.

C. Resource Uses

1. Forest Products

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to forest products are: Air Quality, Fish and Wildlife Management, Special Status Species, Cultural Resources, Paleontological Resources, Visual Resources, Wilderness Characteristics, Renewable Energy, Lands and Realty Actions, Iditarod National Historic Trail, Public Safety, and Social and Economic Conditions.

Note that with respect to Social and Economic Conditions, even though considerable change could be expected in this arena during the life of the plan, no impact is predicted to forest products. Commercial logging is not likely to occur in the reasonably foreseeable future in the planning area due to low timber volume, low productivity, scattered locations of timber stands and long distances involved in timber transport.

a) Impacts Common to All Alternatives

(1) Impacts to Forest Products from Soil, Water, and Vegetation

Proper management of soils, water, and vegetation resources will provide a positive benefit to Forest Products. Implementation of mitigation measures to protect soil, water, and vegetation on a project specific basis will reduce disturbance to forest product resources and aid in the recovery of forest habitat from permitted uses.

(2) Impacts to Forest Products from Fire and Fire Management

Forests in the planning area are generally at North American tree line limits for latitude, altitude, and continental/maritime influence. Implementation of various fire management options (Critical, Full, Modified or Limited) and level of utilization of wildland fire use will directly affect the acreage of live timber stands.

(3) Impacts to Forest Products from Livestock Grazing

Although livestock grazing may increase somewhat over the life of the plan under all alternatives, the impact on forest lands is expected to be minimal. Reindeer generally avoid hilly, forested areas because of danger from wolves. Reindeer herders usually don't utilize forested portions of their grazing allotments due to problems with predators.

(4) Impacts to Forest Products from Leasable Minerals

The northern one-quarter of the planning area is likely the only area to receive interest from industry for exploration, leasing, or development of leasable minerals. Forested lands in the planning area are confined to the southern and eastern areas, and would not be affected by any reasonable foreseeable development of leasable minerals. Coalbed methane gas exploration is not expected to occur on BLM-managed lands within the planning area. Coal occurrences and coal fields do not include forested lands under BLM management.

(5) Impacts to Forest Products from Locatable Minerals

Existing and future locatable mineral activities have the potential for minor to moderate impacts on surrounding forest lands in the East Ambler, Central Omar-Kiana, and South Seward Peninsula areas by clearing of trees as part of mine site overburden or to make room for mine site buildings and equipment, or through increased risk of human-caused wildland fires. There are no forests in the North Red Dog Area. (Geographic regions for locatable mineral activity shown in BLM 2005g.)

(6) Impacts to Forest Products from Mineral Materials

Sufficient material sources (mainly sand and gravel) exist on private lands to meet the needs of most communities with the planning area. Few mineral material disposal actions are anticipated on BLM-managed land so impacts to forest resources would be minimal. If mineral material sales occurred in forested areas, it would result in minor impacts by clearing of trees as part of mine site overburden. The one exception is mineral materials needed for oil and gas development on BLM-managed lands, but since no oil and gas leasing is expected within forested habitats in the planning area, there would be no impact on forest resources (see discussion under Leasable Minerals, Impacts Common to All Alternatives).

(7) Impacts to Forest Products from Recreation Management

Under current levels of recreation use, and under expected future increases of visitor numbers and areas accessed, low-level impacts on forests will continue: firewood harvest, use of standing dead and live trees for wall tent poles, game meat hanging racks, etc. Risk of human-caused wildland fire will increase slightly with increasing levels of recreational use.

(8) Impacts to Forest Products from Travel Management

Existing levels of four-wheeler and snowmachine use, plus anticipated increases in such use will continue to cause damage to low-growing tree seedlings and saplings, especially white and black spruce, which are the most common tree species in the planning area.

(9) Impacts to Forest Products from Subsistence

Impacts to forest products and forest resources common to all subsistence alternatives include a slight increase over the life of the plan of firewood and house log use, plus a low continuing negative impact on tree seedling and sapling growth from OHV use, especially snowmachines.

b) Alternative A

(1) Impacts to Forest Products from Soil, Water, and Vegetation

Impacts from these programs would be the same as discussed under Impacts Common to All Alternatives.

(2) Impacts to Forest Products from Fire and Fire Management

Current guidance for fire management is provided by the BLM-Alaska Land Use Plan Amendment for Wildland Fire and Fuels Management (BLM 2004b, 2005c). Fire management programs emphasize protection of human life and site-specific values while recognizing fire as an essential ecological process and natural agent of change to ecosystems. This alternative endorses wildland fire use as a resource management tool. Under this alternative, forested areas could be allowed to burn or considered for protection from wildland fire on a case-by-case basis to achieve specific objectives for forest products. For example, areas containing stands of beetle-killed white spruce could be allowed to burn or considered for protection in order to proceed with planned salvage logging by interested community households. Forest habitats would be monitored for cumulative effects of wildland fire, suppression activities, and effects of excluding fire as funding permits.

(3) Impacts to Forest Products from Locatable Minerals

Under current management, impacts to forest product resources on from locatable mineral activities have been minimal. For example, from 1989-2004 less than eight acres of surface disturbance occurred on Federal lands within forested habitats of the Ambler River, Darby Mountains, East Seward Peninsula, Omar-Kiana, and Shaktoolik High Locatable Mineral Potential Areas (Chapter III, Locatable Minerals section). The remaining seven HLMP areas in the planning area do not include forested habitats. It is estimated that low-level use was made of surrounding standing dead and live timber for firewood and miscellaneous mining camp structures during the 1989-2004 period.

(4) Impacts to Forest Products from Recreation Management

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(5) Impacts to Forest Products from Travel Management

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(6) Impacts to Forest Products from Special Designations

Under current management of the planning area, no ACECs or RNAs have been designated.

No Wild and Scenic Rivers have been designated in the planning area under current management. However, BLM would continue to manage the Squirrel River WSRA Sec. 5(a) study river to protect wild river values until the fall of 2007. At that time, the three-year period for Congress to consider the study recommendation and finding that the river is not suitable for designation as a component of the national wild and scenic rivers system will have expired. Personal use permits to harvest firewood and house logs would be allowed in the Squirrel River WSR study corridor, but none have been authorized to date.

c) Alternative B

(1) Impacts to Forest Products from Soil, Water, and Vegetation

In addition to the situation as described under Impacts Common to All Alternatives, guidelines provided in the ROPs (Appendix A) implemented on a project specific basis would reduce disturbance to forest habitats and aid in the recovery of forested habitat from permitted uses.

Proactive management of vegetative resources would benefit forested habitats by recognizing their relative scarcity in the plan area and managing for a healthy, diverse mix of forest lands. White and black spruce-lichen woodlands would be managed as priority, unique habitats. Proactive management to prevent introduction and spread of invasive and noxious plant species would help maintain forest communities in good condition.

(2) Impacts to Forest Products from Fire and Fire Management

Impacts would be similar to those discussed under Alternative A, except that the application of wildland fire use as a management tool would not be allowed. The overall impact to availability of forest products due to the difference in management practices would be small.

(3) Impacts to Forest Products from Locatable Minerals

This alternative has the highest potential for unfavorable impact on forest product resources. As all lands remaining under BLM-management would be opened to locatable mineral entry, subject to adherence to ROPs and some of the ROPs would not apply under this alternative. Within the life of the plan, three to five new placer mines might be initiated, each with an approximate 10 acre mining operation footprint, for a total of 30-50 acres of additional surface disturbance. Stands of timber directly adjacent to a stream being mined for placer gold or within the estimated 10 acre footprint would most likely be cleared, or at best drastically thinned and subject to compacted soils. Incidental use may be made of standing dead and live timber in the larger surrounding area for firewood and miscellaneous mining camp structures. Risk of human-caused wildland fire would increase. However, 30-50 acres of disturbed forest is less than 1/10 of a percent of the approximate 993,000 acres of forested habitat within the planning area, so the overall impacts would be fairly small.

(4) Impacts to Forest Products from Recreation Management

Impacts would be the same as discussed under Impacts Common to All Alternatives. Additionally, if new public use shelters or other recreation facilities were constructed, harvest of firewood, and the use of standing dead and live trees for wall tent poles, racks to hang game meat, etc. would increase at a slightly faster rate.

(5) Impacts to Forest Products from Travel Management

Even though the entire planning area would be designated as limited to OHV use, the proposed seasonal and weight restrictions are similar to current BLM management. Impacts are expected to be the same as discussed under Impacts Common to All Alternatives.

(6) Impacts to Forest Products from Special Designations

Under this alternative, no areas would be proposed for designation as an ACEC. No rivers would be recommended as suitable for designation under the Wild and Scenic Rivers Act therefore, there would be no impacts to forest products.

d) Alternative C

(1) Impacts to Forest Products from Soil, Water, and Vegetation

Impacts would be the same as Alternative B.

(2) Impacts to Forest Products from Fire and Fire Management

Impacts from fire management would be mostly the same as discussed under Alternative A. However, given the emphasis on allowing wildland fire to function in its natural ecological role, it is possible that in a few cases, potential Christmas tree or spruce cone harvest sites would not be protected from wildland fire, and opportunities for house log harvest may be slightly less. However, opportunities for personal use and harvest of morel mushrooms may be slightly higher under this alternative.

(3) Impacts to Forest Products from Locatable Minerals

Impacts to forest product resources would be lightest under this alternative. Approximately 50% of BLM-managed lands within the planning area would be closed to mineral entry to provide additional protection to sensitive areas. Impacts would be similar to those discussed in Alternative B, except the land area affected would be reduced by about one-half. The overall impact may be further reduced because areas closed to mineral entry include regions with proportionally more timbered habitat, such as major rivers in southeastern Seward Peninsula, the Nulato Hills ACEC, the upper Selawik River drainage, and the Squirrel River, due to the 300-foot riverbank setbacks.

(4) Impacts to Forest Products from Recreation Management

Impacts would be the same as discussed under Impacts Common to All Alternatives, except due to limits placed on visitor numbers and use days in the Squirrel River Special Recreation Management Area (SRMA), and possible similar limits in selected areas within the Extensive Recreation Management Area (ERMA), low-level harvest of forest timber resources may decrease slightly.

(5) Impacts to Forest Products from Travel Management

Limiting OHV use to designated trails between May 15 and October 31, and the potential to develop additional OHV limits within designated ACECs would help to decrease damage to low-growing tree seedlings and saplings and forest soils throughout the planning area.

(6) Impacts to Forest Products from Special Designations

Under this alternative, ACEC management directives in the Nulato Hills ACEC (inclusive of the Shaktoolik, Ungalik, and Inglutalik Rivers) would be beneficial to Forest Product resources. A fire management plan would be developed for the Nulato Hills ACEC to evaluate and manage for the effect of wildland fire in important lichen habitats, including white spruce-lichen woodlands. The proposed ACEC would be closed to locatable and leasable mineral entry, preventing forest habitat disturbance and eliminating a threat of long-term degradation of forest resources.

Implementation of this alternative would identify 11 river systems as potentially suitable for designation as wild under the WSR Act. As such, these river corridors would be withdrawn from mining and surface occupation for oil and gas development. Over half of the recommended rivers include forest habitat within their corridors. The number of field patrols by BLM personnel would increase, as would the level of monitoring of commercial operators, such as hunting guides and air taxi operators. These measures would directly benefit Forest Product resources by protecting forest habitats from disturbance and long-term degradation. Opportunities to harvest personal use firewood and house logs would most likely continue. However, the opportunity to permit commercial logging (even though this type of request in is not anticipated) would be lost along river corridors managed as suitable for designation under the WSR Act.

e) Alternative D

(1) Impacts to Forest Products from Soil, Water, and Vegetation

Impacts would be the same as discussed under Alternative B.

(2) Impacts to Forest Products from Fire and Fire Management

Impacts would be the same as discussed under Alternative A.

(3) Impacts to Forest Products from Locatable Minerals

Impacts from locatable minerals would be very similar to those discussed under Alternative B. One difference would be the implementation ROP FW-7a which would limit surface disturbing activities within the flood prone width of ten rivers, several of which are found in the forested southeastern edge of the planning area. If locatable mineral development were to occur along these rivers, this ROP would result in a slight reduction in impacts to forest resources.

(4) Impacts to Forest Products from Recreation Management

Impacts from recreation management would be the same as discussed under Alternative C.

(5) Impacts to Forest Products from Travel Management

Even though the entire planning area would be designated as limited to OHV use, the proposed allowable uses and weight restrictions are similar to current BLM management. Due to the potential to develop specific OHV limitations within activity-level plans for designated ACECs,

Squirrel River SRMA, and the Salmon Lake-Kigluaik SRMA, the overall negative impact to tree seedlings and saplings and forest soils may decrease slightly.

(6) Impacts to Forest Products from Special Designations

Under this alternative, four ACECs would be designated in the forested southeastern edge of the planning area: Nulato Hills ACEC, Shaktoolik ACEC, Ungalik ACEC, and Inglutalik ACEC. Impacts to Forest Product resources would be similar to those under Alternative C, except that these ACECs would be open to both locatable and leasable mineral entry, with a 300' no surface occupancy zone for leasable minerals on the Ungalik, Shaktoolik, and Inglutalik rivers. These areas have been evaluated as having a low occurrence potential for presence of oil and gas reserves, and a very low development potential for oil and gas (BLM 2005j). Only the northern one-quarter of the planning area has been evaluated as having a high occurrence potential for oil and gas, and even there the actual possibility for development has been rated as low (BLM 2005j). Therefore, oil and gas exploration, leasing, and development in the Nulato Hills is not anticipated. Locatable mining operations would be subject to ROPs and Stipulations developed through mining plans of operation and activity-level planning for the ACECs. Under this alternative, one additional ROP, FW-7a would limit locatable mineral development within 300 feet of active stream channels on the Shaktoolik, Ungalik, and Inglutalik rivers.

2. Livestock Grazing

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to livestock grazing: Air Quality, Soil Resources, Water Resources, Cultural Resources, Paleontological Resources, Visual Resources, Wilderness Characteristics, Forest Products, Mineral Materials, Recreation Management, Renewable Energy, Lands and Realty Actions, Iditarod National Historic Trail, Wild and Scenic Rivers, Public Safety, and Subsistence.

a) Impacts Common to All Alternatives

(1) Impacts to Grazing from Vegetation

Vegetation management could impact livestock grazing if invasive species were introduced that were detrimental to existing range. The potential of this happening is relatively low.

(2) Impacts to Grazing from Wildlife Management

The most important factor impacting livestock (reindeer) grazing currently is the distribution of the WACH. As the herd has grown, it has utilized more and more of the Seward Peninsula. When the herd migrates north to its calving grounds, reindeer are apt to migrate with them. Therefore, reindeer numbers have traditionally had an inverse relationship with the number of caribou in the region. This will likely remain the case under all Alternatives. High numbers of caribou will likely reduce the amount of available forage lichens for reindeer because of their grazing activity (Joly et al., submitted Rangifer).

(3) Impacts to Grazing from Special Status Species

Special Status Species could impose minor impacts on herders as new facilities would likely need to be kept away from known occurrences of Special Status Species. Relatively few structures are required by herders and almost all are pre-existing. Therefore, Special Status Species represent a minor impact with a very low probability of occurrence.

(4) Impacts to Grazing from Fire and Fire Management

Fire management could impact reindeer range. Lichens, primary winter forage for reindeer, are slow to recover from fires (Jandt et al., submitted). There may be an opportunity to reduce impacts to lichens through fire management options.

(5) Impacts to Grazing from Social and Economic Conditions

Social and economic conditions have the potential to strongly impact livestock grazing. Conditions may develop that are much more or much less favorable to herding. These conditions are largely unrelated to BLM management actions.

(6) Impacts to Grazing from Global Climate Change

Signs of global climate change are readily apparent on the Seward Peninsula where reindeer grazing occurs. Reindeer rely heavily on lichens as winter forage. Lichens are declining in the region. Although grazing by caribou contributes to this decline, it is not the only factor. The decline in lichen cover is consistent with the predicted affects of global climate change (Joly et al., submitted Rangifer). Shrubs are increasing in the region, which is also consistent with global climate change predictions (Joly et al., submitted Rangifer). Shrubs directly compete with lichens for resources such as space and sunlight. Global warming is predicted to warm soils which would give a competitive advantage to shrubs to the potential detriment of lichens. This could therefore have indirect impacts on grazing.

b) Alternative A

(1) Impacts to Grazing from Vegetation

Impacts would be the same as under Impacts Common to All Alternatives.

(2) Impacts to Grazing from Livestock Grazing

The BLM has estimated that a total of 13.8 million acres would continue to be available for reindeer grazing in 15 different allotments on the Seward Peninsula. Within these allotments 5.2 million acres are managed by the BLM, of which 3.9 million acres are selected. Livestock grazing, including reindeer, could be considered on a case by case basis for all of the BLM managed lands within the planning area (11.9 million acres of which 6.6 million are selected). New grazing permit applications would be screened for potential conflicts with wildlife and subsistence. Applications would be rejected where significant conflicts are likely to occur. The quality and quantity of forage available for livestock would be maintained. Livestock grazing management would be adjusted if watershed assessments and evaluations of rangeland health standards indicate that livestock are the reason that one or more of standards are not being

met, or if necessary to sustain other resources. Adjustments may include grazing rotation, season of use, timing, duration, utilization, or limited use riparian areas. Incidental grazing by pack animals would be considered on case by case basis. Generally speaking, this is the status quo alternative and there would be little impact to livestock grazing. The number of both reindeer and active reindeer herders could increase over the life of the plan.

(3) Impacts to Grazing from Leasable Minerals

No leasable mineral development would occur under this alternative so there would be no impacts on livestock grazing.

(4) Impacts to Grazing from Locatable Minerals

Mineral exploration would have very little impact on livestock grazing.

(5) Impacts to Grazing from Special Designations

There would be no impacts to livestock grazing as no areas would be designated.

(6) Impacts to Grazing from Subsistence

Subsistence activities have a minor impact on reindeer herding as reindeer are occasionally killed by hunters looking for caribou. Reindeer and caribou are subspecies of the same species, Rangifer tarandus, and can be hard to differentiate at a distance.

c) Alternative B

(1) Impacts to Grazing from Vegetation

Impacts would be the same as under Impacts Common to All Alternatives.

(2) Impacts to Grazing from Livestock Grazing

This alternative's impacts would be nearly identical to those of Alternative A. Approximately 11.9 million acres of BLM managed lands throughout the planning area would be open for consideration of livestock grazing, which would include bison. The number of both reindeer and active reindeer herders could increase over the life of the plan.

(3) Impacts to Grazing from Leasable Minerals

An oil and gas field could negatively affect grazing by destroying habitat and displacing free-ranging livestock, if livestock were to be in the area of the field. There are currently no livestock in the portion of the planning area where oil and gas development is forecasted, but under this alternative livestock grazing could be permitted in these areas.

(4) Impacts to Grazing from Locatable Minerals

The impact of 3-5 average size placer mines (Minerals-Locatable resource use) would likely have very little impact on livestock grazing. Individual herders could be more significantly impacted if, in the unlikely event, a mining operation happened to be centered on crucial livestock calving and/or wintering areas.

(5) Impacts to Grazing from Special Designations

There would be no impacts to livestock grazing as no areas would be designated.

(6) Impacts to Grazing from Subsistence

Impacts to grazing from subsistence would be essentially the same as Alternative A.

d) Alternative C

(1) Impacts to Grazing from Vegetation

Vegetation impacts are diminished as there is a lower chance of invasive plants because of the prohibition on livestock grazing, which often need feed sources.

(2) Impacts to Grazing from Livestock Grazing

The BLM has estimated that 10.7 million acres would continue to be available for reindeer grazing in 13 different allotments on the Seward Peninsula. Within this region 3.3 million acres are managed by the BLM, of which 2.2 million acres are selected. The entire planning area would be closed to livestock grazing, with exception of reindeer on the aforementioned allotments and incidental use of pack animals. Reindeer grazing permit renewals and new applications would be screened for potential conflicts with wildlife and subsistence. Applications would be rejected where significant conflicts are likely to occur. Allotments that have not had reindeer for 10 or more years, due to conflicts with caribou, would be denied renewal and the allotments would be permanently retired. The quality and quantity of forage available would likely be increased. Reindeer grazing management would be adjusted if watershed assessments and evaluations of rangeland health standards indicate that livestock are the reason that one or more of standards are not being met, or if necessary to sustain other resources. Adjustments may include grazing rotation, season of use, timing, duration, utilization, or limited use riparian areas. The number of both reindeer and active reindeer herders could increase over the life of the plan, though not as much as under Alternative A.

(3) Impacts to Grazing from Leasable Minerals

No leasable mineral development would occur within grazing areas under this alternative so there would be no impacts on livestock grazing.

(4) Impacts to Grazing from Locatable Minerals

Impacts from locatable minerals would be the same as Alternative A.

(5) Impacts to Grazing from Special Designations

Reindeer grazing would not be allowed in the portions of allotments that fell within proposed ACECs. The estimated 10.7 million acres open to reindeer grazing does not include closed lands within the ACECs.

(6) Impacts to Grazing from Subsistence

Subsistence activities would impact reindeer grazing less than in Alternative A because there would be fewer areas where caribou and reindeer were found together.

e) Alternative D

(1) Impacts to Grazing from Vegetation

Vegetation impacts are diminished as there is a lower chance of invasives because of the prohibition on livestock grazing, which often need feed sources.

(2) Impacts to Grazing from Livestock Grazing

The BLM has estimated that a total of 12.6 million acres would continue to be available for reindeer grazing in 15 different allotments on the Seward Peninsula. Within this region 4.1 million acres are managed by the BLM, of which 2.9 million acres are selected. The entire planning area would be closed to livestock grazing, with exception of reindeer on the aforementioned allotments and incidental use of pack animals. Reindeer grazing permit renewals and new applications would be screened for potential conflicts with wildlife and subsistence. Applications would be rejected where significant conflicts are likely to occur. The quality and quantity of forage available would be maintained or increased. Reindeer grazing management would be adjusted if watershed assessments and evaluations of rangeland health standards indicate that livestock are the reason that one or more of standards are not being met, or if necessary to sustain other resources. Adjustments may include grazing rotation, season of use, timing, duration, utilization, bank alteration or limited use riparian areas. The number of both reindeer and active reindeer herders could increase over the life of the plan, though not as much as under Alternative A.

(3) Impacts to Grazing from Leasable Minerals

An oil and gas field would likely not affect grazing as there are currently no livestock (including reindeer) in this portion of the planning area and none would be allowed under this alternative.

(4) Impacts to Grazing from Locatable Minerals

The impact of placer mines would be similar to those found in Alternative B.

(5) Impacts to Grazing from Special Designations

There would be no impacts to reindeer grazing as it would be allowed in within the ACECs.

(6) Impacts to Grazing from Subsistence

Subsistence activities would impact reindeer grazing as in Alternative A.

3. Minerals

a) Leasable Minerals

(1) Alternative A

(a) Oil and Gas Leasing

Within the planning area, 4.8 million acres were made available for oil and natural gas leasing through PLO 6477 (Seward 1008 Study). This PLO modified the ANCSA (d)(1) withdrawals and opened parts of the planning area to fluid mineral entry. For the purposes of analysis, it is assumed that under Alternative A no leasing would occur as appropriate NEPA analysis must be completed and approved before Federal oil and gas lease sales can take place. There are no active oil and gas leases in the planning area and no oil and gas leasing would occur under Alternative A. Additionally, no withdrawal review would occur and all ANCSA (d)(1) withdrawals would remain in place, pending future legislation or unrelated management direction.

The lack of NEPA analysis and retention of ANCSA (d)(1) withdrawals would preclude oil and gas leasing in the planning area. Therefore, under this alternative no oil and gas exploration and development would occur, rendering these resources unavailable.

(b) Solid Leasable Minerals

Under Alternative A, all unleased BLM-managed public lands (including selected lands) within the planning area, subject to leasing under 43 CFR 3400.2, would be open for coal exploration and non-energy leasable mineral prospecting. Within the planning area, 11.9 million acres (nearly 100%) are available for exploration and prospecting. The only area not available for exploration would be where two coal leases exist. Exploration of Federal coal would be handled on a case-by-case basis.

two leases in the planning area are preferential right coal leases. Both are located within the Cape Beaufort Field. The leases expire in 2009 unless the lessee showed development consistent with the lease agreement. Further leasing under any of the alternatives would require additional NEPA analysis, including the coal screening process outlined under 43 CFR 3425.

(2) Alternative B

(a) Oil and Gas Leasing

Under Alternative B, all existing ANCSA (d)(1) withdrawals would be revoked to allow increased opportunities for mineral exploration and development, pending Native and State conveyances.

Approximately 11.9 million acres (6,642,000 selected) of BLM-managed lands within the planning area would be open to mineral entry subject to the ROPs and Stips. Oil and Gas Stips #2, #6 and #7 and ROP FW-3c would not apply to Alternative B. Zero acres of the planning area would be open with special stipulations (e.g., timing/seasonal limitations). Approximately 23,800 acres would be subject to No Surface Occupancy (NSO). This figure represents the total number of individual 300-foot setbacks on select rivers within the planning area. Setback

distances that do not preclude the drill from reaching its target reservoir can limit exploration and development. For example, if a potential exploration target was determined to be within the NSO zone, the added cost of directional drilling could render the project uneconomical. Additionally, if a shallow target were previously defined through geophysical exploration, it could be technically unfeasible for an operator to directionally drill into such a reservoir. Consequently, these resources could be unavailable for future generations. Under this alternative, zero acres would be closed to oil and gas leasing.

(b) Solid Leasable Minerals

Under Alternative B, 11.9 million acres (100%) are available for coal exploration and non-energy leasable mineral prospecting subject to the ROPs and Stips. The only area not available for exploration would be where two coal leases exist. Selected lands, unless specifically closed, are open to coal exploration. Exploration of Federal coal would be handled on a case-by-case basis. With no closure restrictions to the lands under this alternative, coal exploration and general resource inventories would be maximized to their full potential.

(3) Alternative C

(a) Oil and Gas Leasing

Under Alternative C, land restrictions would significantly diminish interest in the fluid mineral resources. Withdrawals would be maintained or recommended for all proposed ACECs (Nulato Hills, WACH Insect Relief/Calving Habitat, Squirrel River, Kigluaik Mountains, McCarthy's Marsh, and Upper Kuzitrin River). These withdrawals would eliminate areas that possess geologic potential for oil and gas resources. The WACH Insect Relief/Calving Habitat ACEC is located in an area that possesses high occurrence potential for oil and gas. Additional closures would come from State and Native land selections which have a segregation against oil and gas leasing and would only be open if retained in long-term Federal ownership.

Approximately 1,763,000 acres (13%) of the BLM-administered lands within the planning area would be open subject to the ROPs and Stips. Of that, 1,428,000 acres are State- or Native-selected lands, leaving approximately 335,000 acres available for leasing.

Lands available subject to special stipulations are roughly 5,351,000 acres (41%) with 3,592,000 acres selected. A seasonal restriction applies to both the WACH winter range and the muskox habitat area. Additional closures would come from State and Native land selections which have a segregation against oil and gas leasing and would only be open if retained in long-term Federal ownership.

Approximately 181,000 acres (1%) of the planning area would be open to leasing subject to No Surface Occupancy (NSO). Of the 181,000 acres, 78,000 are selected. Stipulation #2 would not apply to this alternative as PLO 6477 would be retained. Additional 300-foot NSO setbacks would be applied to tributaries of the Pah, Shaktoolik, Ungalik, Inglutalik, Tubutulik, Kuzitrin, Fish, and Noatak rivers. In addition, setbacks would be applied on both sides of the upper portion mainstems and tributaries of the Agiapuk, Buckland, Squirrel, Omar, Kivalina, Pick, Kukpowruk, Ipewik, and Nilik rivers and Kiliovilik Creek (Upper Selawik), as well as the Koyuk River including the East Fork.

Oil and gas development in a NSO area could require directional drilling to extract hydrocarbon resources. Should areas with NSO occur beyond the technically feasible reach for directional

drilling, some hydrocarbon resource may be rendered unrecoverable. Product price fluctuations may require premature abandonment that would decrease the recoverability of the resource and potentially create an irretrievable incremental loss of resources. This is not likely with an NSO area composed of a 300-foot buffer around select sensitive streams. However, a 300-foot NSO buffer can limit exploration and development. For example, if a potential exploration target was determined to be within the NSO zone, the added cost of directional drilling would render the project uneconomical, and therefore miss the discovery. Additionally, if a shallow target pool were previously defined through geophysical exploration, it could be technically unfeasible for an operator to directionally drill such a reservoir. Consequently, these resources could be unavailable for future generations.

Approximately 5,830,000 acres (44%) of the planning area would be closed to oil and gas leasing. Closing these acres to leasing would preclude oil and gas exploration and development and render these resources unrecoverable.

Given these constraints, it is assumed that no oil and gas development would occur under this alternative and seismic exploration would be unlikely.

(b) Solid Leasable Minerals

Under Alternative C, approximately 7.2 million acres (55%) are available for coal exploration and non-energy leasable mineral prospecting subject to the ROPs and Stips. Selected lands, unless specifically closed, are open to exploration and prospecting. Exploration of Federal coal would be handled on a case-by-case basis.

Closed lands encompass nearly 5.9 million acres (45%). Areas closed to coal exploration include all proposed ACECs/RNAs as well as the streams with 300-foot setback per PLO 6477: Pah, Shaktoolik, Ungalik, Inglutalik, Tubutulik, Kuzitrin, and Fish rivers, and west bank of Noatak River; 300’ setback from bankfull stage on either side of tributaries of above mentioned rivers (including Boston Creek); 300-foot setback from bankfull stage on both sides of the upper portion mainstems and tributaries of the following rivers: Agiapuk, Buckland, Squirrel, Omar, Kivalina, Pick, Kukpowruk, Ipewik, and Nilik rivers and Kiliovilik Creek (Upper Selawik), Koyuk River including East Fork. These withdrawals would eliminate areas that possess geologic potential for coal and other non-energy leasable minerals. Consequently, these resources could be rendered as unrecoverable.

Given these constraints, it is assumed that little to no coal exploration or non-energy leasable mineral prospecting would take place under this alternative.

(4) Alternative D

(a) Oil and Gas Leasing

Under Alternative D, existing ANCSA (d)(1) withdrawals would be revoked or modified to allow for increased opportunities for oil and gas exploration and development, pending Native and State conveyances. This alternative would not close any lands, but rather implement an adaptable management approach. Oil and gas activities would be subject to timing restrictions and NSO.

Approximately 6,441,000 acres (54%) of the BLM-administered lands within the planning area would be open to leasable mineral activities subject to the ROPs and Stips. Of that figure, 4,242,000 acres are selected.

Approximately 5,420,000 acres (45%) of the planning area would be open to leasing subject to special stipulations (e.g., timing limitations), with roughly 2,350,000 acres subject to segregation from selections. Areas subject to special stipulations would include the Squirrel River SRMA, McCarthy's Marsh, Upper Kuzitrin River, Nulato Hills ACEC, as well as the WACH calving and insect relief habitat. The calving and insect relief habitat encompass the same lands that were given a high oil and gas occurrence potential rating. These constraints would limit exploration and development during specific time periods and increase recovery costs.

Approximately 52,000 acres (less than 1%) of the planning area would be subject to NSO (18,000 acres selected). The 52,000 acres represents the total number of individual 300-foot setbacks on the Kivalina, Ungalik, Shaktoolik, Inglualik, Tubutulik, Kuzitrin, Agiapuk, Pah, Noatak, and Koyuk rivers. Setback distances that do not preclude the drill from reaching its target reservoir can still limit exploration and development. For example, if a potential exploration target was determined to be within the NSO zone, the added cost of directional drilling could render the project uneconomical. Additionally, if a shallow target were previously defined through geophysical exploration, it could be technically unfeasible for an operator to directionally drill into such a reservoir. Consequently, these resources could be unavailable for the life of this plan.

The areas that show moderate to high potential for oil and gas and are currently State- or Native-selected, may likely be conveyed to the selecting entities. However, potential does exist for the leasing of oil and gas on BLM-managed lands. Exploration and development would proceed at the level described in the Reasonable Foreseeable Development scenario under the Analysis Assumptions for Leasable Minerals beginning on page 4-11. Should Federal leasing take place, the BLM-Alaska State Office would assume lease administration responsibilities and oversight of field operations.

(b) Solid Leasable Minerals

Under Alternative D, approximately 11.9 million acres (100%) are available for coal exploration and non-energy leasable mineral prospecting subject to the ROPs and Stips (Appendix A). Selected lands, unless specifically closed, are open to exploration and prospecting. Exploration of Federal coal would be handled on a case-by-case basis.

Certain areas within the planning area (about 8% of BLM-managed land) are open but subject to special conditions outlined in the ROPs. The following rivers have 300-foot setbacks (ROP FW-7a) that would require special conditions to be met in order to conduct exploration: Kivalina, Ungalik, Shaktoolik, Inglualik, Tubutulik, Kuzitrin, Agiapuk, Pah, Noatak, and the Koyuk including the East Fork. Additional restrictions for the Nulato Hills are outlined in ROP FW-3e. These special conditions could have a negative effect on the exploration for non-energy leasable minerals by precluding access to a known energy resource if the conditions could not be met. In that case, the resource would be considered unrecoverable.

b) Locatable Minerals

(1) Impacts Common to All Alternatives

State- and Native-selected lands will remain closed to mineral entry and location until conveyances are complete. Mining operations on withdrawn lands will require a validity exam prior to approval of a Plan of Operations. Mining operations using cyanide in the processing of amenable ores will require a Plan of Operations. Mining claim surface occupancy is guaranteed but must remain reasonably incident to current levels of mining activity. Bonding is required of all mining operations other than those notice level operations that were grandfathered. Reclamation of surface disturbance is required. Undue and unnecessary degradation will remain the standard for mining operations on BLM lands. The right of reasonable access across BLM lands to unpatented Federal mining claims is assured. Cultural resources encountered during surface disturbing activities are subject to the Antiquities Act.

(2) Alternative A

Under Alternative A, no withdrawal review would occur and current ANCSA (d)(1) withdrawals would remain in place. Under the Northwest MFP, withdrawal review was conducted on portions of the planning area and some areas were opened to mineral entry and location in 1983 (Map 3-29). There were at least two (d)(1) withdrawals that were not opened. Certain lands in the Lisburne and Selawik Mining Districts are only open to metalliferous locatable minerals and not for non-metalliferous. Under this alternative these lands would retain the non-metalliferous restriction. In addition, there are other locatable mineral closures beneath land selections that if the lands are not conveyed will remain closed to mineral entry. This alternative offers no process to address these closures.

The BLM would continue to administer existing, validly filed, Federal unpatented mining claims on selected lands through filings of Notices and Plans of Operations, but the potential for future exploration and development on BLM-managed lands would be limited. Once the selection process is completed, which is expected during the life of this plan, these withdrawals would continue to discourage mining interests and lock up blocks of land to exploration and evaluation of its mineral potential. Much of this land has been unavailable for mineral assessment for more than 30 years. In the meantime markets for new commodities have developed, ore deposit theory has advanced significantly, and new mining and milling processes that are less expensive, more efficient and environmentally friendly have been developed.

(3) Alternative B

Revocation of withdrawals under Alternative B would result in increased exploration and development activity, pending State and Native conveyances. Most operations would be small-scale placer mining operations, but potential would exist for larger mining operations on a scale of (5,000-7,000 tons per day) similar to what is being proposed as the Rock Creek Mine near Nome. However, given the limited mineral potential on remaining Federal lands and mining operation locations predominately on private and conveyed lands, it is expected that no more than five new modest-scale (250 cubic yards per day) placer mines will develop over the life of this plan. It is further expected that no new hard rock mines will develop to production during the life of this plan on Federal lands, primarily due to the long (more than 20 years)

development time usually needed to bring a hard rock mine from discovery to production. Administration of Notices and Plans of Operations, compliance, and mine reclamation would be conducted by BLM under the 3809 and 3715 regulations.

(4) Alternative C

Under Alternative C, less potential exists for mineral exploration and development than under any other alternative due to the maintenance or recommendation of withdrawals for all five ACECs, and setbacks along certain rivers (see table below). Some mining activity could continue to occur on valid existing claims, but new development would be doubtful based on proposed area-wide constraints. The BLM would continue to regulate surface disturbing activities on valid Federal claims through Notices and Plans of Operations, and the ROPs would be implemented. In addition, before a Plan of Operations could be approved on withdrawn lands, a validity examination would have to be conducted by the BLM to verify that there is a discovery of a valuable mineral deposit on the claims in question.

Under Alternative C the river banks of the following rivers, creeks, and tributaries from mean high water 300 feet back are closed to locatable minerals. Under Alternative D, ten rivers are subject to ROP FW-7a which establishes strict operating criteria within 300 feet of the banks of active stream channels or within the flood-prone width, whichever is narrower. The locatable mineral potential within these closures or 300-foot zones is discussed in Table 4-7.

Table 4-7. Proposed Riverbank Closures or 300-foot Flood-prone Zones (ROP FW-7a) under Alternatives C and D

River	Alternative(s)	Remarks
Pah	C, D	The main stem and tributaries lie outside any producing placer provinces. There are no known placer occurrences or APMA filings in conflict with the proposed closures or flood-prone zone. The nearest known mineral occurrences lie in the Clear and Caribou creeks tributaries in the Hogatza River drainage to the south. This producing placer province is active with a recent history of numerous APMA filings.
Shaktoolik	C, D	There is one known placer occurrence, no APMA filings and it lies just outside the Ungalik producing placer province. At one point the Shaktoolik brushes the eastern edge of the Shaktoolik HLMP and tributary (closure or flood-prone zone) that incorporates a known placer mineral occurrence in the headwaters area.
Ungalik	C, D	Main stem contains five known placer gold occurrences and APMA filings. APMA filings are located on Native (IC'd) and Native selected lands. The proposed closure or flood-prone zone of the river channel and Christmas Creek tributary cut through the center of a producing placer province that includes VABM Ungalik, Christmas Mt., and Christmas Creek. These uplands define an area of known mineral potential (KMPA) and HLMP which encompasses the lower Ungalik and touches the mid reach of the Shaktoolik. The HLMP is characterized by antimony-gold and gold-PGE mineralization.
Ingutalik	C, D	Main stem encompasses no APMA filings and is not located within a producing placer area. There is a single placer mineral occurrence (Au) along the middle reaches of the river.

River	Alternative(s)	Remarks
Tubutuluk	C, D	Main stem and tributaries are not within a placer producing area. The drainage basin on the Tubutluik from just above Caribou Creek to just below Clear Creek is defined by hard rock occurrences as a KMPA. These known mineral occurrences of gold, silver +/- tin, uranium, and PGE's dot the tributaries of the Tubutulik. Two known placer occurrences on main stem- Au,Ag,W,Bi,Pb. No APMA filings on main stem. Au, Sn, W known placer occurrence on Caribou Creek, an upper tributary with APMA filings upstream of the occurrence. Above Caribou Creek these APMA filings are located on State lands surrounded by State-selected lands. There are APMA filings on Clear Creek and unnamed minor tributary. These APMA filings are located on dual selected lands.
Kuzitrin	C, D	There are no known mineral occurrences within the active flood plain of the Kuzitirin/Noxapaga main stem. There are a number of placer occurrences on the northern tributaries of this system. There are a number of placer occurrences on Boulder Creek, the north bank of the upper Noxapaga River above Boulder Creek and the upper reaches of the Noxapaga. These occurrences define a producing placer region including the south side tributaries of Birch and Belt creeks which have setbacks on them. In addition a KMDA covers the north side of this river pair extending along the north bank from below Bunker Hill to the upper reaches of the Noxapaga. For hard rock there are two known lode mineral occurrences. The Wonder Gold lode (Au, Pb & Hg) is located in the Coffee Creek drainage. The other is a Au/Ag prospect in the Dahl Creek drainage. While there has been APMA filings on these tributaries (Dahl, Coffee, Garfield and Boulder creeks, the Kougarok River and the upper Noxapaga), these lands are either State or State-selected. A small part of the area has been IC'd to the Native corporation. The BLM's only remaining active notice of mining are Federal claims on State-selected lands of the upper Noxapaga tributary.
Fish	C	The main stem closure includes the river channel in the flats and enters the Fish River Canyon, where producing placer area starts. There are known placer gold occurrences on the tributaries in the Fish River canyon and downstream, and this defines the known producing placer province. There are no APMA filings indicating no mining activity since 1989. For hard rock the KMDA includes the upland area of the Fish River canyon and extends out into the flats to encompass recent interest in what have been described as roll front type uranium deposits. Uranium anomalies have been known to occur in the Flats since the late 1960's.
Noatak	C, D	The main stem and tributaries have no known placer occurrences or APMA filings and do not lie within any producing placer provinces.
Boston Creek	C	No known placer occurrences. No APMA filings. Not within a placer producing or HLMP area.
Agiapuk	C, D	The Agiapuk below the confluence of American Creek lies totally outside the producing placer region. There is one known placer mineral occurrence on the Agiapuk between Flat and Eureka creeks. It has not been active recently. There is one known placer occurrence on the south bank of the upper Agiapuk drainage. No APMA filings in the area from 1989. No known lode occurrences are affected by the setback.

River	Alternative(s)	Remarks
Agiapuk Tributaries	C	There is one known placer gold occurrence on an unnamed, south bank tributary of the upper Agiapuk, but it is not included in a closure. There is a known placer occurrence on Alene Creek, tributary to North Creek which flows into the Aigipuk River above American Creek There has been no active mining since 1989 (no APMA filings), it is affected by the closure on the North/Alene creeks. There are no known lode occurrences affected by these stream closures, though the upper reaches of these tributaries above American Creek confluence drain the KMDA here. Activity since 1989 has been limited to south flowing streams into Grantley Harbor.
Buckland	C	Main stem flows across the northeastern corner of a producing placer province but there are no know placer occurrences or APMA filings on the main stem.
Buckland Tributaries	C	Fairhaven Creek, western tributary to the lower Buckland drains a known placer gold occurrence that is well upstream of the proposed closures. No APMAs have been filed. There are two other placer gold occurrences on minor tributaries east of Buckland and west of the Selawik Hills. One is in the placer producing province the other not. The HLMP in the northern part of the drainage, the Selawik Hills, is known for its uranium occurrences.
West Fork Buckland	C	The main stem and tributaries have no known placer occurrences or APMA filings and do not lie within any producing placer provinces.
Middle Fork Buckland	C	The main stem and tributaries have no known placer occurrences or APMA filings and do not lie within any producing placer provinces.
Squirrel	C	No placer occurrences or APMA filings on the main stem.
Squirrel Tributaries (including North Fork and No Name Creek)	C	Excluding Timber and Klery creeks there are no placer occurrences or APMA filings. It is outside any producing placer provinces. Klery Creek has several known placer occurrences and APMA filings along its length. Upper Timber Creek has one known placer occurrence and several APMA filings. APMA filings on both are located on State-selected lands. Klery Creek lies wholly within a producing placer province and Timber Creek's upper end just touches the producing placer province.
Omar	C	No placer occurrences or APMA filings. Outside any producing placer provinces.
Omar Tributaries	C	No placer occurrences or APMA filings. Outside any producing placer provinces. In the northern part of the HLMP there are known mineral occurrences of Kipushi style copper, lead, zinc mineralization. There has been no active exploration on these occurrences since the mid-1970s and they are on State lands.
Kivilina and Tributaries	C, D	The main stem and tributaries have no known placer occurrences or APMA filings and do not lie within any producing placer provinces.
Pick and Tributaries	C	No placer occurrences or APMA filings. Outside any producing placer provinces.
Kukpowruk and Tributaries	C	No known placer occurrences or APMA filings. Outside any producing placer provinces.
Ipewik	C	The main stem and tributaries have no known placer occurrences or APMA filings and do not lie within any producing placer provinces.
Nilik and Tributaries	C	The main stem and tributaries have no known placer occurrences or APMA filings and do not lie within any producing placer provinces.

River	Alternative(s)	Remarks
Kiliovilik Creek and Tributaries	C	The main stem and tributaries have no known placer occurrences or APMA filings and do not lie within any producing placer provinces.
Koyuk	C, D	There are no APMA filings and the main stem is outside any known placer producing areas.
East Fork Koyuk	C, D	There are no APMA filings or known placer occurrences. Parts of the river channels within the closure or flood-prone zone cross a producing placer area.
Koyuk and East Fork Tributaries	C	There are no known placer occurrences or APMA filings on South-side tributaries. On the North side, the Peace River and Dime Creek have known placer occurrences. Sweepstakes Creek, tributary to Peace River has had recent activity but it is well above the proposed closure. Dime Creek contains known placer occurrences for gold and platinum and there have been recent APMA filings within proposed stream closures. Lands where recent activity has occurred are a mixture of BLM, State, and Native selected lands. Lode placer occurrences in the Dime Creek drainage above Haycock have recently been prospected for Ni-Pt-PGEs as shown by the recent APMA filings. Peace River, Dime Creek and East Fork drain a producing placer area.

Under Alternative C, impacts (see Table 4-7) of the river closures on mining exploration and development of known mineral occurrences would dramatically discourage further expenditure of funds in the planning area. In particular, two areas where there has been recent mining interest are in direct conflict with the proposed closures: the upper Noxapaga River tributaries and upper Dime Creek at Haycock and above.

The upper Noxapaga River tributaries drain a large block of State and State-selected lands. Mining activity is occurring on both State claims and Federal placer claims on State-selected lands. Application of proposed closures would trigger a validity exam on these Federal in-holdings before any further mining activity could occur.

Recent hard rock exploration of upper Dime Creek targeted historic known placer occurrences of placer platinum with the placer gold recovered from this area. Today the price of platinum is more than twice that of gold. The land status is mixed in this location, a combination of State and BLM lands. Exploration for lode source of the platinum and PGEs was launched from adjacent State claims onto BLM lands. No claims were located on BLM lands but continued demand for platinum could trigger more exploration. Proposed closures would definitely discourage exploration of this occurrence.

Under Alternative C, several ACECs would be closed to locatable mineral entry, subject to valid existing rights. Known placer mineral occurrences, APMA fillings, and producing placer provinces within each area are shown in the table below.

Table 4-8. Potential ACEC Units Under Alternatives C and D

ACEC Units	Alternative(s)	Remarks
Ingutalik River ACEC	C, D	No known placer mineral occurrences, no APMA filings and not within any producing placer provinces.
Ungalik ACEC	C, D	Only conflict is the southwestern corner intersects with the eastern part of a producing placer province with a single placer gold and antimony mineral occurrence on Christmas Creek No APMA filings in the area.
Shaktoolik ACEC	C, D	No known placer mineral occurrences, no APMA filings and not within any producing placer provinces.
Northern Nulato Hills ACEC	C, D	There are no known placer mineral occurrences, no APMA filings and the area is not included in any producing placer province (Buckland River basin south of Selawik Hills).
Western Arctic Caribou Insect Relief ACEC	C, D	There are no known placer mineral occurrences, no APMA filings and the area is not included in any producing placer province.
Mount Osborn and Kigluiak ACEC	C, D	Though the area encroaches on the margin and a corner of two separate producing placer areas, there is a single placer mineral occurrence for tungsten in the southeast corner of the ACEC on a tributary to the Grand Central River. On the north side of the Kigluaiks there are known occurrences of graphite, an industrial, locatable mineral, whose potential for development would be curtailed by inclusion in this ACEC.
McCarthys Marsh ACEC	C	
Upper Kuzitrin River ACEC	C	

Of the areas listed above only the Kigluaik ACEC/Mount Osborn ACEC would significantly curtail exploration interests in known mineral occurrences. This would be the industrial mineral, graphite found along the north flank and spine of the Kigluaik Mountains arch.

(5) Alternative D

As under Alternative B, revocation of all remaining withdrawals could result in some increased exploration and development activity, pending State and Native conveyances. This increased exploration and development would most likely be characterized as 3-5 small-scale (250 cubic yards per day) placer mining operations, limited mainly due to the lack of mineral potential on BLM lands. Development of mineral deposits on adjoining State and private lands could encourage exploration for mineral extensions onto adjacent Federal lands in some favorable instances. The potential would exist for exploration and development activities with the target of development a medium scale, hard rock mining operation (5,000-7,000 tons per day) similar to the recently proposed Rock Creek/Big Hurrah Mine. It is further expected that no new hard rock mines will develop during the life of this plan on Federal lands, primarily due to the long (more than 20 years) development time usually taken to bring a hard rock mine from discovery to production. Administration of Notices and Plans of Operations, compliance, and mine reclamation would be conducted by the BLM on BLM-managed lands.

Known mineral occurrences and mineral potential areas affected by ROP FW-7a, protection of aquatic and riparian habitat, as proposed under Alternative D (Kivalina River, Ungalik River, Shaktoolik River, Inglutalik River, Koyuk River including East Fork, Tubutulik River, Kuzitrin

River, Agiapuk River, Pah River, and Noatak River) are outlined in Table 4-7. Additionally, portions of the Mount Osborn ACEC would be restricted by ROP SS-4, strictly limiting any withdrawal or discharge of water from the tarn lakes that are identified as containing landlocked populations or Arctic char. Impacts are summarized in. This would negatively affect locatable mineral development by curtailing exploration interests in known mineral occurrences as discussed under Alternative C. The ACECs designated under Alternative D would be open to mineral entry, but would require a mining Plan of Operations.

Implementation of ROP FW-7a on the Kivalina River would have no impact on developing mineral resources as it is neither within a designated Placer Producing Area or a Known Mineral Deposit Area (KMDA).

Implementation of ROP FW-7a on the lower Ungalik River crosses both a designated Placer Producing Area and Known Mineral Producing Area. The Ungalik River, below the confluence of Diamond Creek has supported mining activities since at least the 1930s and a small bucketline dredge was actively mining the adjacent alluvial floodplain as recently as the early 1980s. There are patented mining claims on the hills and river floodplain in the vicinity of VABM Ungalik hills covering both lode and placer gold deposits. Nearby, Christmas Mountain, a known mineral occurrence in the KMDA, is an upland location outside the flood-prone zone but tributaries draining this mountain empty directly into the Ungalik. There may be indirect effects of this riverbank restriction to exploration and mining.

Table 4-8. This would negatively affect locatable mineral development by curtailing exploration interests in known mineral occurrences as discussed under Alternative C. The ACECs designated under Alternative D would be open to mineral entry, but would require a mining Plan of Operations.

Implementation of ROP FW-7a on the Kivalina River would have no impact on developing mineral resources as it is neither within a designated Placer Producing Area or a Known Mineral Deposit Area (KMDA).

Implementation of ROP FW-7a on the lower Ungalik River crosses both a designated Placer Producing Area and Known Mineral Producing Area. The Ungalik River, below the confluence of Diamond Creek has supported mining activities since at least the 1930s and a small bucketline dredge was actively mining the adjacent alluvial floodplain as recently as the early 1980s. There are patented mining claims on the hills and river floodplain in the vicinity of VABM Ungalik hills covering both lode and placer gold deposits. Nearby, Christmas Mountain, a known mineral occurrence in the KMDA, is an upland location outside the flood-prone zone but tributaries draining this mountain empty directly into the Ungalik. There may be indirect effects of this riverbank restriction to exploration and mining.

c) Mineral Materials

(1) Impacts Common to All Alternatives

A NEPA review is required for all mineral material extraction operations on BLM lands. Section 106 of the National Historic Preservation Act required a cultural resource evaluation be conducted and resources located cleared prior to conduct of any surface disturbance. Reclamation is required. Under interim management guidelines, mineral material sales and free use permits are not conducted on selected lands without written consent of the potential future land owner. Material sales and permits are not issued on un-certificated native allotments. Moneys collected from sales and permits on selected lands are put into escrow in favor of the future land owner.

Demand for mineral materials is driven by development projects which in turn which traditionally are driven by availability of Federal highway monies or State project monies. Unlike locatable minerals it is not driven by opening and closings of lands to mineral material sales regulations. Consequently the level of activity is much the same across the Alternatives A, B, and D of the plan alternatives. In Alternative C the restricting of riverbeds, ocean beach/lagoon, and lakeshore mineral material sources essentially closes all Federal lands in the planning area to sales and permits for mineral materials. Should a public works project develop in an area where mineral materials are not available by these de facto closures, public pressure through the political process would likely force the development of these mineral material resources.

(2) Alternative A

Development of mineral materials sites on BLM-managed lands would not be constrained under Alternative A except as restricted by interim management guidelines for selected lands. No unencumbered Federal lands would be closed to mineral material sales and permits.

(3) Alternative B

Development of mineral materials sites on BLM-managed lands would not be constrained under Alternative B except as restricted by interim management guidelines for selected lands and applicable ROPs. No unencumbered Federal lands would be closed to mineral material sales and permits.

(4) Alternative C

Development of mineral materials sites on BLM-managed lands would most likely be severely constrained under Alternative C. Under this alternative some unencumbered Federal lands would be closed to the operations of the Mineral Materials Sales regulations, but more importantly limitations on the type of mineral material deposit that could be developed would amount to a de-facto closure of public lands to the operation of this program.

Federal lands within the McCarthy's Marsh and Kigluaik ACEC would be closed to mineral materials sales and permits. In McCarthy's Marsh in particular this would curtail the maintenance of airstrips at Wagon Wheel, Omalik and elsewhere along the Mosquito Fork Creek, and preclude construction of any new airstrips. These airstrips would be mostly related to mineral exploration and development. This area is part of the HLMP for polymetallic veins, sulfide veins, and placer commodities gold, uranium and rare earths, tin, tungsten, and PGEs. The additional restriction of not allowing mineral material sales permits on riverbed, ocean beach/lagoon and lakeshores would preclude development of transportation corridors and house and cabin construction. This restriction is a defacto closure of all BLM-managed lands in the planning area to material sales and permits and would place severe restrictions on local economic development and construction of infrastructure in support of locatable minerals development.

(5) Alternative D

Impacts would be the same as discussed under Alternative B.

4. Recreation Management

For a more detailed description of the recreation proposals by alternative, see Table 2-14.

Table 4-9. Special Recreation Management Area Designations by Alternative

Area	SRMA Acreage by Alternative							
	A		B		C		D	
	Acres	%*	Acres	%*	Acres	%*	Acres	%*
Squirrel River	0	0	726,000	6	726,000	6	726,000	6
Salmon Lake/ Kigluaik	0	0	0	0	244,000	2	244,000	2
Total	0	0	0	0	970,000	8	970,000	8

* Percent of BLM-managed lands (11,913,000 acres) within the planning area.

Table 4-10. Management Emphasis Areas within the Extensive Recreation Management Area by Alternative

Area	Management Area Acreage by Alternative							
	A		B		C		D	
	Acres	%*	Acres	%*	Acres	%*	Acres	%*
Agiapuk River	0	0	0	0	220,000	2	0	0
Bendeleben Mountains	0	0	0	0	399,000	3	0	0
McCarthy Marsh	0	0	0	0	229,000	2	0	0
Koyuk River	0	0	0	0	217,000	2	0	0
Buckland River	0	0	0	0	215,000	2	0	0
Inglutalik River	0	0	0	0	295,000	2	0	0
Ungalik River	0	0	0	0	273,000	2	0	0
Nulato Hills			0		2,001,000	15	0	0

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to Recreation Management: Forest Products, Livestock Grazing, Wilderness Characteristics, and Public Safety.

a) Impacts Common to All Alternatives

(1) Impacts to Recreation from Air Quality and Soil and Water Resources

Proposed or permitted uses would be analyzed through a NEPA document and measures enacted to mitigate impacts to watersheds. Healthy watersheds support a wide variety of recreational opportunities for present and future generations.

(2) Impacts to Recreation from Fish and Wildlife Management

Management of fish and wildlife habitats to provide environments to support viable populations of fish and wildlife will have a direct impact on recreation. By enhancing or altering wildlife habitats, the animals used for recreational hunting, fishing, and trapping would be either increased or deceased. Viewing opportunities of wildlife may be increased or decreased as well. Recreation could be enhanced through the introduction of sought after big game animals if habitat would support such introduction.

(3) Impacts to Recreation from Vegetation

Proper management of the vegetation, especially critical wintering habitat for the WACH (WACH), muskox, and winter moose browse will provide quality habitat to support wildlife for recreational use. Proper vegetation management will also preserve viewsheds that enhance the quality of recreational experiences.

(4) Impacts to Recreation from Special Status Species

Recreation can be impacted through specific limits on OHV use or from camp sites on areas that contain Special Status Species. Due to the lack of detailed knowledge within the planning area, no area has been limited or restricted from OHV use due to Special Status Species and therefore no impact is anticipated under this alternative. Proposed or permitted uses would be analyzed through a NEPA document and measures enacted if Special Status Species were encountered or known to be impacted. If Special Status Species are impacted from recreational use, the use can relocated to areas where this Species is unlikely to be encountered.

(5) Impacts to Recreation from Fire and Fire Management

Fire promotes vegetation and wildlife diversity, which can enhance recreation opportunities in both the short- and long-term. Vegetative diversity provides variation in vegetation types, providing variation in form, texture, and color and enhancing scenic qualities. Long-term opportunities for wildlife viewing or hunting may be enhanced by new vegetation growth (willow moose browse) and improved habitat quality. Wildland or prescribed fire may be used to improve wildlife habitat thereby increasing wildlife numbers to the benefit of recreational users. Negative effects of fire on recreation are generally short-term and are directly related to fire's effects on specific resources used in recreation, such as recreation facilities. Effects of fire on the critical wintering habitat of the WACH may negatively impact recreation if fire burns the lichen biomass and alters the winter migration of the WACH.

Effects on visual and cultural resources, wildlife, and vegetation would have immediate and direct effects on use of these resources for camping, sightseeing, hunting, and other activities. Recreation users are generally mobile, thus, if recreation is precluded by fire in one area, they generally can find an alternate area in which a similar recreational activity can be pursued. However, smoke thick enough to limit aircraft flights could result in impacts on recreational and commercial activities. Existing and future BLM structures and facilities will be protected (including the Salmon Lake Campground Facility) to the benefit of recreational users.

(6) Impacts to Recreation from Cultural and Paleontological Resources

Protection and possible interpretation of these resources would enhance recreation opportunities and experiences for those seeking these types of experiences.

(7) Impacts to Recreation from Forest Products

Current levels of firewood gathering, commercial harvests and house log permitting on BLM-managed lands have little effect on recreation. This is due largely to a small population and the distance to communities from stands of timber on BLM managed lands. However, if significant sales of forest product took place due to bark beetle infestations or from commercial timber harvests, recreational users would see increased trails, potential dislocation of wildlife and alteration of view sheds. Consideration of existing recreation facilities or trails is given on a case-by-case basis during consideration of these types of permits, with appropriate buffers provided between sale areas and trails/facilities. The continuation of forestry practices at this level would have little to no effect on recreation.

(8) Impacts to Recreation from Locatable Minerals

Existing small placer mining operations (disturbing less than five acres) have provided secondary access to recreational opportunities. A semi-primitive motorized management structure would be enhanced through the development of small placer mining operations. Often these operations provide remote air landing strips and localized trails. Large-scale mining operations with associated infrastructure (such as roads and powerlines) are not anticipated within the life of the plan.

Mineral development has the potential to create impacts to recreation, particularly if development occurs in areas that provide primitive or semi-primitive recreation experiences. Construction of necessary infrastructure would compromise any primitive, semi-primitive, or semi-primitive motorized experience. Mineral development has the potential to impact the viewshed. Public access into areas of development would have secondary effects on adjacent areas by increasing visitor use and may lead to the development of additional dispersed campsites and trails. In areas managed for a roaded-natural experience, additional access provided by mineral development could positively affect the recreation experience by offering additional roaded access to otherwise inaccessible areas.

(9) Impacts to Recreation from Travel Management

Acquisition of easements across or around private lands will be from willing landowners on a case-by case basis. Acquired easements may be necessary due to emerging land transfer issues. Recreational opportunities may be enhanced through acquired easements.

(10) Impacts to Recreation from Renewable Energy

Requests for permits would be acted upon on a case by case basis. If development were to occur, its impacts on recreation would be similar to those discussed under Impacts Common to All Alternatives: Impacts to Recreation from Mineral Exploration and Development beginning on page 4-157.

(11) Impacts to Recreation from Subsistence

Subsistence may impact recreation use if subsistence resources are limited. Recreational uses of fish and game resources may be limited or eliminated to all users except Federally qualified subsistence users as required under ANILCA or through regulatory changes by the Federal Subsistence Board.

b) Alternative A

(1) Impacts to Recreation from Fish and Wildlife Management

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(2) Impacts to Recreation from Visual Resources

Under this alternative, no visual management classes have been established.

(3) Impacts to Recreation from Livestock Grazing

Under this alternative, reindeer grazing may be authorized. Reindeer and caribou do compete for the same ranges in some instances and therefore grazing may impact the recreational hunter seeking caribou. Areas where caribou and reindeer conflicts occur will affect the recreational user through regulatory issues with fish and game management. Reindeer may overgraze their ranges and limit caribou feed. Reindeer viewing can enhance the recreational experience for those wishing to view wildlife. Reindeer also draw other predatory wildlife, such as grizzly bear, wolves and wolverine to the area. These predators enhance the recreational opportunity for those interested in viewing, hunting and trapping.

(4) Impacts to Recreation from Leasable Minerals

There would be no impacts from oil and gas leasing as leasing would not occur under this alternative.

(5) Impacts to Recreation from Locatable Minerals

Impacts would be the same as discussed under Impacts Common to All Alternatives.

(6) Impacts to Recreation from Mineral Materials

Most gravel pit development occurs within or adjacent to existing roads and highways. Consequently, gravel extraction has little impact on recreation experiences but can negatively impact visual resources. In the planning area, old gravel pits provide de-facto parking areas and motorized play areas. Given current development levels and the lack of BLM lands along the existing road system, no effects to recreation would occur under this alternative.

(7) Impacts to Recreation from Recreation Management

No SRMAs would be designated under Alternative A. Facilities enhancement (such as the addition of public use cabins, trails or interpretive panels) may be added to the range of recreational experiences currently available. Recreational opportunities would be primarily limited to independent remote backcountry experiences and through guided tours.

Current levels of environmental education and interpretation would continue, providing minimal opportunities to increase public awareness regarding cultural and natural resources, encourage ethical and sustainable use, and establish collaborative working relationships with the State, Native, or village corporations, and special interest groups.

Recreational conflicts between user groups (guides, transporters, and local users) in the Squirrel River and other areas within the planning area would not be addressed under this alternative.

(8) Impacts to Recreation from Travel Management

Semi-primitive motorized recreation opportunities would be maintained on lands currently undesignated for OHV use. OHV use would be allowed on all BLM-managed lands within the planning area subject to the 2,000 pound GVWR, trail proliferation would continue, with increased user conflicts between individuals seeking no OHV use and those wishing to use OHVs in their recreational pursuits. Associated impacts to visual resources (establishment of trails) would continue. In the planning area, some primitive and most semi-primitive recreation experiences would trend towards semi-primitive motorized or roaded-natural experiences. No primitive recreational experience is available under this alternative. However, given their remote location and lack of existing infrastructure, most BLM lands will have characteristics of a primitive recreational experience.

There is no anticipated impact to recreation from potential roads under this alternative. As discussed in the Resource Assumption section above, there is no foreseeable road construction unless economically viable resource development (minerals primarily) takes place or the State of Alaska proposes specific roads for public access in northwest Alaska across BLM managed lands. A request for road proposal would be acted upon on a case by case basis.

(9) Impacts to Recreation from Lands and Realty Actions

No lands have been identified for disposal under this alternative. There would be no impact to recreation if land disposal does not occur. If disposal was to occur, development on privatized lands may bring a heavy concentration of recreational users which may negatively impact adjacent Federal land or recreational users on adjacent Federal lands. Private landowners may limit access for recreational users to adjacent Federal lands.

Under Alternative A, acquisitions would continue to be considered on a case-by-case basis as opportunities arise. Where acquisitions of private inholdings occur, particularly in heavy use recreation areas, there would be a benefit to the recreation program by eliminating the potential for private development or limitations on access.

Land use authorizations such as leases and permits often result in additional development that may result in adverse effects on areas being managed for a semi primitive recreation

experience. These effects may include impacts to visual resources, increased visitor encounters, and a diminished recreation experience. Alternative A would address mitigation of these effects on a case-by-case basis. The 300-foot setback on certain area rivers would mitigate potential negative recreation effects within river corridors (visual and fish resources primarily).

No withdrawal review would take place and, pending some other legislation, all ANCSA (d)(1) withdrawals would be maintained. Some BLM lands would continue to be closed to mineral entry. Small mineral development may enhance recreational access by providing for remote airstrips and localized OHV trails.

(10) Impacts to Recreation from Special Designations

No ACECs or RNAs, which provide measures for the protection of specific resource values, would be designated under this alternative. In general, resource values would be afforded less protection and wildlife viewing, hunting and fishing opportunities and other recreational use may decrease without the protective measures offered by these designations. There would be no impacts from wild and scenic river management as no rivers would be determined suitable.

c) Alternative B

(1) Impacts to Recreation from Fish and Wildlife Management

Impacts would be similar to those under Impacts Common to all Alternatives. Increased monitoring and application of the ROPs would provide additional protection to wildlife and fisheries habitat, benefiting wildlife related recreation.

(2) Impacts to Recreation from Visual Resources

Under this alternative the Squirrel River and the Kigluaik Mountains would be classified as VRM class II and III. The remainder of the plan area would be class IV. A class II and III designation would protect important viewsheds for recreational users. These classes could also impede recreational use by limiting facility construction or OHV use that may enhance recreational use for certain user groups.

(3) Impacts to Recreation from Livestock Grazing

Impacts would be the same as discussed under Alternative A, except bison may add to viewing opportunities.

(4) Impacts to Recreation from Leasable Minerals

Oil and gas development has the potential to create impacts to recreation, particularly if development occurs in areas that provide primitive or semi-primitive recreation experiences. Construction of roads, pipelines, powerlines, and other necessary infrastructure would compromise any primitive, semi-primitive, or semi-primitive motorized experience. By creating linear features (such as roads and pipelines) across the landscape, oil and gas development has the potential for significantly impacting visual resources. Such structures may also affect movements of the WACH which provides world class hunting and guiding opportunities on BLM

lands. Limited public access (winter overland crossings) into areas of development would have secondary effects on adjacent areas by increasing visitor use and may lead to the development of additional dispersed campsites and trails. Additional access provided by oil and gas winter roads could positively affect the recreation experience by offering additional trails for winter snowmachine use.

(5) Impacts to Recreation from Locatable Minerals

This alternative anticipates the greatest opportunity for exploration and development for locatable minerals. Dependent on gold prices, there would be a moderate increase in small placer operations on BLM-managed lands. Large operations are possible during the planning period, but would occur on State or private lands. Roads or infrastructure necessary for those operations, however, may cross BLM-managed lands. Impacts would be similar to but slightly greater than those discussed under Impacts Common to All Alternatives beginning on page 4-157.

(6) Impacts to Recreation from Mineral Materials

Impacts would be the same as those discussed under Alternative A.

(7) Impacts to Recreation from Recreation Management

One SRMA, the Squirrel River (726,000 acres), is proposed under this alternative. This alternative would limit the number of special recreation permits available and visitor use days in the Squirrel River, primarily impacting the sport hunter who relies upon guided hunts. Limiting use levels could enhance the experience of the sport hunter due to less competition for resources and a more dispersed camping setting. The limits may also deny an opportunity for some hunters to experience the area, if the guided hunting is not available due to limitations on the number of permits and visitor use days available. This alternative would also negatively impact the commercial service providers by limiting their potential client base. Limits in the Squirrel River may relocate recreational users to other areas or deny the recreational opportunity previously offered in a dispersed recreational management. Relocation of recreational users to other areas may negatively affect recreational users in those areas by increasing competition for campsites and resources.

(8) Impacts to Recreation from Travel Management

The lifting of the 2,000 pound GVWR limit during the winter months under this alternative may increase the potential for recreational opportunities by allowing larger OHV use in an unrestricted environment. It may also allow commercial operators (and private recreational enthusiasts with large OHV vehicles) the opportunity to travel in more comfort during the winter months. Impacts from roads would be the same as discussed under Alternative A.

(9) Impacts to Recreation from Lands and Realty Actions

Impacts from FLPMA disposal would be the same as discussed under Alternative A.

Under this alternative, BLM would consider acquisition of parcels along the Iditarod NHT through purchase or exchange with willing owners. This would increase the opportunity to enhance recreational use along the Iditarod NHT by increasing public lands which may be

developed to enhance visitor use, such as build or permit shelter cabins and create permanent access rights.

Impacts from land use authorizations would be the same as discussed under Alternative A.

This alternative would revoke all existing ANCSA (d)(1) withdrawals, which would allow increased mineral exploration and development on unencumbered BLM lands and on lands currently selected that are relinquished because of over-selection by the State or Native corporations. The effects of mineral exploration and development on recreation are discussed under Impacts Common to All Alternatives beginning on page 4-157.

Alternative B would add the Red Dog-Kuchiak Mine Corridor as proposed by Arctic Slope Regional Corporation (ASRC). Designation of the corridor itself would have no impact on recreation. However, if a road or utility such as a powerline were developed within the corridor, impacts would be similar to that discussed under Travel Management above. There would be increased potential for access into the planning area for recreational use. However, this would primarily affect local residents, as the corridor would connect to the Red Dog mine road which is not readily accessible to most outside recreational users.

(10) Impacts to Recreation from Special Designations

Impacts would be the same as discussed under Alternative A.

d) Alternative C

(1) Impacts to Recreation from Fish and Wildlife Management

Impacts would be similar to Alternative B; however, increased protection for lichen habitat for the WACH will further caribou management, a game species sought by recreational users. Additional oil and gas leasing Stips instituting seasonal restrictions in caribou calving and insect relief habitat would further protect crucial caribou habitats and would enhance hunting related recreation opportunities.

(2) Impacts to Recreation from Visual Resources

Impacts would be the same as discussed under Alternative B, except more area would be designated as Class II and III, and thus more restrictions on recreational enhancements could be placed in these areas. Alternatively, more viewsheds are protected, especially along river corridors where most recreation takes place.

(3) Impacts to Recreation from Livestock Grazing

Impacts would be the same as discussed under Alternative A, except that some areas known for caribou habitat would not be open to grazing which may enhance recreational opportunities for caribou hunting.

(4) Impacts to Recreation from Leasable Minerals

There would be no impacts from oil and gas leasing as it would not occur under this alternative. Seismic exploration could occur, but would be unlikely, as high potential lands would be closed to leasing. Impacts to recreation from seismic exploration would be negligible.

(5) Impacts to Recreation from Locatable Minerals

This alternative would close the Nulato Hills, WACH insect relief area, Squirrel River, Kigluaik Mountains, McCarthy Marsh, and the upper Kuzitrin River to locatable mineral entry. The Squirrel River has some of the best recreational hunting opportunities within the planning area and by eliminating potential impacts to wildlife in this area from mining that opportunity would be further protected. The other areas that are proposed as closed to mining in this alternative offer spectacular scenic vistas and prime habitat for ungulate populations. These areas are prime recreational use areas. By closing areas important to wildlife and river corridors, the potential impacts to recreation identified in the Impacts Common to All Alternatives are minimized.

(6) Impacts to Recreation from Mineral Materials

The following areas would be excluded from mineral material sale or development under this alternative: McCarthy Marsh, Kigluaik Mountains, riverbeds, ocean beach/lagoon and lakeshores. The excluded areas may adversely impact recreation by decreasing the economic viability of roads in the areas excluded. New roads would allow for greater recreational access opportunities. Conversely, the lack of material in these areas may prevent roads from being developed which would keep the recreational experience largely semi primitive and roadless.

(7) Impacts to Recreation from Recreation Management

Two areas totaling 970,000 acres would be designated as SRMAs under Alternative C: Squirrel River (726,000 acres) and Salmon Lake/Kigluaik (244,000 acres). Additional management attention would be focused on certain areas shown in Table 4-10 within the Extensive Recreation Management Area (ERMA) referred to as recreation management zones. This would allow for more intensive management and preservation of identified high value recreation resources to ensure the maintenance of the recreation experiences currently available. The proposed focus on recreation management zones within the ERMA under this alternative as compared with Alternative D, would afford enhanced protections to the watersheds, preserving high value recreation resources.

The establishment of visitor use limits in specific areas discussed above would help ensure the quality of recreation experiences for commercial and non-commercial users while protecting the resources. However, establishment of visitor use limits may limit recreational opportunities for some as well as opportunities for commercial development or expansion for others.

Impacts to commercial recreation in the Squirrel River would be similar to those discussed under Alternative B but more restrictive as air taxis would be required to obtain a permit and would be limited in number.

Increased delivery of environmental education and interpretation would increase public awareness regarding cultural and natural resources, encourage ethical and sustainable use,

and establish collaborative working relationships with the State, Native or village corporations, and special interest groups.

By electing not to develop additional facilities in the SRMAs and recreation management zones designated under this alternative, the demand for increased developed visitor services and the opportunity to direct visitor use to sustainable locations would be negatively affected. Unmanaged use of undeveloped areas would ultimately increase resource damage, resulting in the proliferation of user-created dispersed camping areas, and trails. The failure to promote the addition of public use cabins to the range of recreational experiences currently available would limit opportunities for those seeking road-accessible and remote backcountry experiences. The demand for public use cabins would not be met except for the Salmon Lake/Kigluaik SRMA where facilities may be permitted.

Proposed management of SRMAs and recreation management zones under this alternative has the potential to affect recreation more than any other alternative proposed.

(8) Impacts to Recreation from Travel Management

This alternative would restrict OHV use to designated trails during the snow-free season and keep the current maximum 2,000 pound GVWR limit throughout the planning area during the winter. This alternative would diminish opportunities for free and unrestricted OHV use. Seasonal restrictions would provide opportunities for those seeking a non-motorized experience during the brief summer months, an opportunity that is unavailable under other alternatives. Limiting OHV use to designated trails would allow also provide additional areas were recreational users could avoid encounters with OHVs.

In designated ACECs or SRMAs, future area specific plans may further limitation OHV use including designated trails, seasonal restrictions, weight limits or seasonal closures. The uncertainty of these future plans makes the impacts on recreation largely unknown. Areas that may be limited or closed would enhance recreational experiences for those seeking a primitive non- motorized experience.

The restrictions proposed in this alternative would impact the vast majority of recreational users by strictly limiting OHV use where no limits have been in place before. There may be areas that recreational users will have difficulty accessing due to the lack of designated trails, or where a specific recreational use may no longer be available. For example, big game hunting by OHV in the non-winter months would be restricted. These restrictions will lead to a different type big game hunting experience (backpacking) or require hunters to go to the additional expense of chartering aircraft. The restrictions may also affect hunter success rates in that OHV access provides the recreational user a larger geographic area to pursue game resources.

This alternative will impact recreational use more than any other alternative in the plan. This alternative will have a greater affect on non-local recreational users as their visits generally occur in the snow-free season when OHV designations would be the most restrictive.

Impacts from roads would be the same as discussed under Alternative A.

(9) Impacts to Recreation from Lands and Realty Actions

There would be no impacts to recreation from FLPMA disposal as no lands would be made available for disposal.

Impacts from acquisitions would be the same as discussed under Alternative B.

R&PP leases and FLPMA permits would not be authorized within any ACEC. Leases and permits often result in additional development. The absence of development would help to maintain existing recreation experiences which are largely semi primitive in nature. Due to the large number of ACEC and RNAs in this alternative, there may be recreational opportunities that will not be available to communities wishing to develop recreational sites or to commercial operators seeking an advanced level of recreational amenities such as a remote lodge setting. The development of facilities to enhance visitor use and experience would be limited under this alternative more than any other alternative.

Alternative C would result in mineral withdrawals on 6.5 million acres of land, thus preventing mineral development and its associated impacts (both positive and negative) on recreation.

(10) Impacts to Recreation from Special Designations

Under this alternative, 5.6 million acres in five areas would be designated as ACECs. ACEC designation would provide additional protection to WACH calving and insect relief habitat in the northwest, winter caribou habitat in the Nulato Hills, salmon habitat in the Shaktoolik, Ungalik and Inglutalik Rivers, and moose, caribou, salmon, and waterfowl habitats in McCarthy's Marsh and upper Kuzitrin River, potentially increasing hunting related recreational opportunities. There may be negative impacts to recreation from designation if additional restrictions are placed on OHV use and other recreational activities.

There are 11 river systems that have been identified as eligible for designation as wild under the WSR Act (Table 2-21). It is difficult to predict what effect future designation may have on recreational users. The outstandingly remarkable values for which rivers were identified (primarily fish resources) would continue to be protected. It is likely that recreational users would benefit from the recommendation of these rivers as suitable for designation.

e) Alternative D

(1) Impacts to Recreation from Fish and Wildlife Management

Impacts would be the same as discussed under Alternative C.

(2) Impacts to Recreation from Visual Resources

Impacts would be similar to Alternative C, except more area is classified as VRM Class III and IV and less area is Class II. This alternative would provide less protection for important viewsheds. Conversely, there would be less likelihood of facilities or trails being limited due to visual concerns.

(3) Impacts to Recreation from Livestock Grazing

Impacts would be the same as discussed under Alternative C.

(4) Impacts to Recreation from Leasable Minerals

The impacts associated with oil and gas development would be the same as those discussed under Alternative B, except that oil and gas leasing Stipulations #6 and #7, and ROP FW-3c to protect caribou habitat would be implemented under this alternative.

(5) Impacts to Recreation from Locatable Minerals

Effects to recreation are similar to those described under Alternative B.

(6) Impacts to Recreation from Mineral Materials

Impacts would be the same as discussed under Alternative A.

(7) Impacts to Recreation from Recreation Management

Two areas totaling 970,000 acres would be designated as SRMAs under Alternative D: Squirrel River (726,000 acres), and Salmon Lake/Kigluaik Mountains (244,000 acres). These designations would allow for the development of comprehensive management strategies, with the identification of specific goals and objectives, that would help preserve high value recreation resources while managing recreation experiences. More developed recreation opportunities could be provided to the public.

Development of additional facilities would redirect recreational use to specific areas, alleviating unmanaged use of other areas while meeting public demand associated with increasing visitation. Management objectives for other areas, such as those managed for a primitive experience, could be improved by directing use to more sustainable locations if those areas are selected for the developments. The increased delivery of environmental education and interpretation would enhance public awareness regarding cultural and natural resources, encourage ethical and sustainable use, and establish collaborative working relationships with the State, Native or village Corporations, and special interest groups.

The addition of public use cabins to the range of opportunities currently available would provide opportunities not only for those seeking road accessible experiences, but also to those seeking a remote, backcountry experience.

The establishment of visitor use limits in specific areas would help ensure positive recreation experiences for commercial and non-commercial users while protecting the resources. However, the establishment of visitor use limits could also limit recreational opportunities for some users if implementation-level planning results in the use of permit systems.

The ERMA would not receive the management emphasis provided in Alternative C. These areas would continue to have dispersed recreational use with occasional user conflicts.

(8) Impacts to Recreation from Travel Management

This alternative would be the second most effective (after Alternative C) at maintaining a diversity of recreational experiences across the landscape based on measures to regulate OHV use. All BLM-managed lands would be designated as limited to OHVs with a 2,000 pound GVWR limitation. Impacts to recreation in the ERMA would result in a gradual trend away from primitive recreation experiences towards semi-primitive motorized or roaded natural experiences.

In areas designated as ACEC or SRMA, limits may be imposed on OHV use including: limiting use to designated trails, seasonal weight restrictions or seasonal closures. The unmanaged proliferation of trails outside of these areas would continue to some extent because trails would not be designated. In these areas, designations would not be enforced until implementation-level planning occurred. Where OHVs are limited to designated trails, BLM would more intensively manage OHV use, reducing impacts to natural and cultural resources, thus benefiting the recreational user. Primitive, semi-primitive and semi-primitive motorized recreation experiences would be maintained in these areas. Some users may be temporarily displaced during the seasonal closures which may increase OHV use in other areas. A degree of uncertainty remains as to the future implementation-level planning and the impacts of limiting OHV use to designated trails or seasonal closure of areas.

Impacts from roads would be the same as discussed under Alternative A.

(9) Impacts to Recreation from Lands and Realty Actions

Lands available for future disposal in Nome and Kotzebue are small isolated tracts that will not affect recreation. The effects of land disposal upon recreation are the same as Alternative A.

Impacts from acquisitions would be the same as discussed under Alternative B.

Impacts from land use authorizations would be the same as discussed under Alternative C.

Impacts from withdrawal review would be the same as discussed under Alternative B.

(10) Impacts to Recreation from Special Designations

Impacts would be similar to those discussed under Alternative C. Additional protection would be provided to natural and cultural resources by designation of 3.6 million acres of ACEC in six areas. McCarthy's marsh and the upper Kuzitrin would not be designated as ACECs under this alternative, potentially providing less protection for moose, caribou and waterfowl habitats.

Where special designations are applied, effects under Alternative D would be similar to those described under Alternative C. However, Alternative D would provide less protection than that afforded by Alternative C as McCarthy's Marsh, Kuzitrin River and portions of the Kigluaik Mountains would not be designated. OHV restrictions from seasonal closures, weight limits or designated trail use will impact the recreational user as described in Alternative C.

5. Travel Management/OHV

An overview of Travel Management can be found in Chapter II. The table below summarizes the Off-highway Vehicle (OHV) designations.

Table 4-11. OHV Designations by Alternative

OHV Designation	Alternative							
	A		B		C		D	
	Acres	%*	Acres	%*	Acres	%*	Acres	%*
undesignated	11.9 million acres	100	0	0	0	0	0	0
Limited to 2,000 pound GVWR seasonally	11.9 million acres limited yearlong	100	June 1-October 31, 11.9 million acres	100	Nov. 1-May 14 with adequate snow/frost 11.9 million acres	100	7.4 million acres, outside of ACEC and SRMA limited yearlong	62%
Limited w/out 2,000 pound GVWR seasonally	0	0	Nov. 1-May 31, During adequate frost/snow 11.9 million	100	0	0	0	0
Limited to designated trails w/2,000 pound GVWR limitation	0	0	0	0	May 15-Oct 31 11.9 million acres	100	0	0
Limited with seasonal closures, weight restrictions or designated trails through activity plan	0	0	0	0	In ACECs and SRMAs (6.7 million acres) through activity plan	51%	In ACECs, RNAs or SRMAs (4.5 million acres) through activity plan	38%

* Percent of BLM-managed lands (11,913,000 acres) within the planning area.

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to travel management/OHV: Air Quality, Soil and Water Resources, Vegetation, Fish and Wildlife Management, Cultural Resources, Paleontological Resources, Public Safety, and Subsistence.

a) Impacts Common to All Alternatives

(1) Impacts to Travel Management/OHV from Special Status Species

Travel can be impacted through specific limits on OHV use or on trail development within areas that contain Special Status Species. Proposed or permitted uses such as trail construction or

designation would be analyzed and measures enacted to minimize impacts. If it is determined that OHV use or trail construction may negatively affect a Special Status Species, the use may be limited to seasons when the species is not present, or the trail relocated to areas where the species is unlikely to be encountered.

(2) Impacts to Travel Management/OHV from Fire and Fire Management

Existing and future structures and facilities will be prioritized for protection (including the Salmon Lake Campground). Construction of fire lines if not rehabilitated may create new trails that would be available for OHV users. Travel and OHV use would likely not be interrupted due to fire management activities except on a short-term, temporary basis. In forested areas, falling trees may affect trail travel after a fire occurs. It is anticipated that there would be little impact to travel management and OHV from fire management.

(3) Impacts to Travel Management/OHV from Livestock Grazing

This activity does increase OHV use (primarily in the winter) and may have the potential for roads or trails to support the industry. Given the difficult economic viability in recent years of reindeer grazing due to caribou interactions, there would be little to no effect on travel management and OHV use under any alternative.

(4) Impacts to Travel Management/OHV from Travel Management

Fixed wing and helicopter access will remain largely unregulated on all BLM managed lands unless specifically addressed through the development of a RAMP or ACEC management plan or through regulation.

Consistent with ANCSA, the BLM would continue to administer 17(b) easements that access public lands across Native lands. Where 17(b) easements access public lands other than BLM-managed lands, the BLM would attempt to transfer management responsibility of the easement to the appropriate agency. Easement termination would only occur where documented non-use exists and would be subject to public involvement. To ensure maintenance of access to public lands as ANCSA conveyances take place 17(b) easements would be extended or new easements reserved as needed. There would be little to no decrease in access currently provided by 17(b) easements under any alternative.

There is no foreseeable road construction unless economically viable resource development (minerals primarily) takes place or the State proposes specific roads for public access in northwest Alaska across BLM-managed lands. A request for road proposal would be acted upon on a case by case basis. If roads were developed, access opportunities for OHV users would increase.

(5) Impacts to Travel Management/OHV from Renewable Energy

Renewable energy projects would be authorized through the appropriate land use authorization on a case-by-case basis. Impacts would be similar to those discussed under Land Use Authorizations for each alternative.

(6) Impacts to Travel Management/OHV from Subsistence

No issues are identified that would affect travel or OHV use through subsistence use other than the ANILCA protections for access would continue under all alternatives.

b) Alternative A

(1) Impacts to Travel Management/OHV from Visual Resources

No VRM designations are in place, so there would be no impacts.

(2) Impacts to Travel Management/OHV from Forest Products

Current levels of firewood gathering, commercial harvests and house log permitting on BLM-managed lands have little effect on travel management and OHV use. This is due largely to a small population and the distance to communities from stands of timber on BLM-managed lands. However, if significant sales of forest product took place due to beetle bark infestations or from commercial timber harvests, trails and or roads would be needed. These roads or trails could be maintained after the sale for public use. The continuation of forestry sales and practices at current levels would have little to no effect on travel management or OHV use.

(3) Impacts to Travel Management/OHV from Minerals

(a) Leasable Minerals

There would be no impacts as leasing would not occur under this alternative.

(b) Locatable Minerals

There would be little to no effect due on travel management and OHV use from Locatable Minerals.

(c) Mineral Materials

Most gravel pit development occurs within or adjacent to existing highway right-of-ways. Consequently, gravel extraction has potential to impact travel management. Given current development levels, no effects on travel management or OHV would occur.

(4) Impacts to Travel Management/OHV from Recreation Management

No SRMAs would be designated under Alternative A. There would be little effect to travel or OHV use under this alternative other than the 2000 pound GVWR limit on OHVs would continue.

(5) Impacts to Travel Management/OHV from Travel Management

All BLM-managed lands within the planning area would remain “undesignated” to OHV use (limited to 2,000 pound GVWR) as specified in the Northwest MFP (BLM 1982). There would

be no opportunity for vehicles larger than 2,000 pounds without a permit under this alternative. Generally, this would mean the public could not use standard pickup trucks, jeeps, and track vehicles anywhere in the planning area without a permit unless a specific 17(b) easement or right-of-way allowed such use.

(6) Impacts to Travel Management/OHV from Lands and Realty Actions

No lands have been identified for FLPMA disposal under this alternative. There would be no impact to travel or OHV if land disposal does not occur. If disposal was to occur, development on privatized lands may bring new roads and trails near adjacent Federal lands. Private landowners may limit access for users to adjacent Federal lands.

Under Alternative A, acquisitions would continue to be considered on a case-by-case basis as opportunities arise. Where acquisitions of private inholdings occur, particularly in heavy use recreation areas, there would be a benefit to the travel and OHV use by eliminating the potential for limitations on access through private development.

Land use authorizations such as leases and permits often result in additional developments that may result in increased travel opportunities and OHV trails.

Under Alternative A, no withdrawal review would take place and some lands would continue to be closed to mineral entry. Small mineral development may enhance access by providing for remote airstrips and localized OHV trails.

(7) Impacts to Travel Management/OHV from Special Designations

No ACECs or wild and scenic rivers would be designated under this alternative.

c) Alternative B

(1) Impacts to Travel Management/OHV from Visual Resources

Under this alternative the Squirrel River and the Kigluaik Mountains would be classified as class II and III. The remainder of the plan area would be class IV. A class II and III designation may prohibit road or trail development or increase the costs of such development to mitigate the effects on visual resources.

(2) Impacts to Travel Management/OHV from Forest Products

Impacts would be similar to Alternative A. Timber harvest would be considered in special management areas under this alternative. Downed timber salvage sales may impact travel and OHV use. There could be a need for trails or roads for timber harvest under this alternative which then may be available for OHV use.

(3) Impacts to Travel Management/OHV from Minerals

(a) Leasable Minerals

Oil and gas development has the potential to create impacts to travel management and OHV use, particularly if development occurs in areas that may provide access from improved infrastructure to BLM lands. Construction of winter roads, pipelines, powerlines, and other necessary infrastructure would help develop needed road and trail infrastructure. Public access into areas of development would have secondary effects on adjacent areas by increasing visitor use and may lead to other developments.

(b) Locatable Minerals

This alternative anticipates the most exploration and development for locatable minerals given the revocation of all ANCSA (d)(1) withdrawals and the lack of area-wide constraints such as ACEC designations. There would be a moderate increase in small placer operations on BLM-managed lands. Large operations are possible during the planning period, but would occur on State or private lands. Roads or infrastructure necessary for those operations, however, may cross BLM-managed land. Greater impacts to travel management and OHV use are anticipated under this alternative compared to any other alternative. Increased trails and remote airstrip development (fixed wing) would be likely under this alternative. Road development (localized unless a large mineral deposit is developed) is likely if mineral development takes place.

(c) Mineral Materials

Similar to alternative A but increased opportunity for leasing and locatable minerals and the potential for road development may increase sales of mineral materials. New roads may be developed and turn outs created from gravel pit development.

(4) Impacts to Travel Management/OHV from Recreation Management

One SRMA, the Squirrel River, is proposed under this alternative. Limits on the number of special recreation permits available and visitor use days in the Squirrel River would be implemented. OHV use may be limited in an activity level plan. OHV use is likely to be affected in this alternative. Because OHV designations within SRMAs would be further developed through activity plans, the effect on travel is somewhat unknown.

(5) Impacts to Travel Management/OHV from Travel Management

All BLM-managed lands within the planning area would be designated as limited for OHV use. The lifting of the 2,000 pound limit during the winter months under this alternative will increase the potential for travel by allowing use of larger OHVs in an unrestricted environment. The lifting may allow commercial operators (and private recreational enthusiasts with large OHV vehicles) the opportunity to travel in more comfort during the winter months. The use of the larger vehicles is currently allowed under permit. This is the only alternative where vehicles larger than 2,000 pounds could travel on BLM-managed lands without a permit. No alternative gives an opportunity for travel on BLM-managed lands with vehicles over 2,000 pounds during the summer and fall months without a permit.

(6) Impacts to Travel Management/OHV from Lands and Realty Actions

Impacts from FLPMA disposal would be the same as under Alternative A.

Under this alternative, the BLM would consider acquisition of parcels along the Iditarod NHT through purchase or exchange with willing owners. When feasible, BLM would acquire less than fee title to property if management goals could be achieved. This would increase the opportunity to enhance OHV use along the Iditarod NHT by increasing public lands which may be developed and create permanent access rights.

Impacts from land use authorizations would be the same as under Alternative A.

This alternative would revoke all existing ANCSA (d)(1) withdrawals, which would allow increased mineral exploration and development on unencumbered BLM lands and on lands currently selected that are relinquished because of over-selection by the State or Native Corporations. Increased travel and OHV use under this alternative is expected due to the increased potential of mineral exploration and development by making more lands available.

Alternative B would add the Red Dog-Kuchiak Mine Corridor as proposed by ASRC. Designation of the corridor would have a direct impact on travel management if a road or utility such as a powerline were developed within the corridor. There would be increased potential for access into the planning area for a variety of public uses. However, this would primarily affect local residents, as the corridor would connect to the Red Dog mine road which is not readily accessible to most outside users.

(7) Impacts to Travel Management/OHV from Special Designations

No ACECs or wild and scenic rivers would be designated under this alternative.

d) Alternative C

(1) Impacts to Travel Management/OHV from Visual Resources

Impacts would be the same as those discussed under Alternative B, except more areas would be designated as Class II and III, leading to more restrictions on potential road and OHV trail development.

(2) Impacts to Travel Management/OHV from Forest Products

No wood salvage or commercial harvests would be allowed under this alternative. No increase in access or OHV use is anticipated under this alternative.

(3) Impacts to Travel Management/OHV from Mineral Materials

The following areas would be excluded from mineral material sale or development under this alternative: McCarthy Marsh, Kigluaik Mountains, riverbeds, ocean beach/lagoon and lakeshores. The excluded areas may adversely impact travel by decreasing the economic

viability of roads in the areas excluded. New roads would allow for greater access opportunities.

(4) Impacts to Travel Management/OHV from Recreation Management

The Squirrel River SRMA and Salmon Lake-Kigluaik SRMA would be designated and additional management attention would be focused on certain areas (Table 2-14) within the ERMA. Within the SRMAs, BLM may further limit OHV use. Air taxi's would be required to obtain a permit and would be limited in number within the Squirrel River, reducing access. Visitor use levels would be limited in the Squirrel River, reducing opportunities for recreation. Positive benefits may accrue because limits on visitor use levels will improve the quality of the recreational experience for some users. Levels of commercial recreation (guides and outfitters) would be limited in parts of the ERMA identified in Table 2-14, reducing opportunity for visitors dependant upon guides and outfitters.

(5) Impacts to Travel Management/OHV from Travel Management

All BLM-managed lands within the planning area would be designated as limited for OHV use. This alternative would restrict OHV use to designated trails during the snow-free period and keep the current maximum 2,000 pound GVWR limit throughout the planning area during the winter months. This alternative would diminish the free and unrestricted OHV use in the planning area.

In designated ACEC or SRMAs, further limitations may be placed upon OHV use including designated trails, seasonal restrictions, weight limits or seasonal closures through area specific plans. The uncertainty of these future plans makes the impacts on travel management and OHV use largely unknown.

Restrictions proposed in this alternative would impact the vast majority of users by strictly limiting OHV use where no limits have been in place before. There may be areas users will have difficulty reaching due to the lack of designated trails.

This alternative will impact OHV and travel use more than any other alternative. It will have a greater affect on non local users who visit the planning area primarily during the summer/fall months when OHV designations would be the most restrictive.

(6) Impacts to Travel Management/OHV from Lands and Realty Actions

Impacts from FLPMA disposal would be the same as under Alternative A.

Impacts from acquisition would be the same as under Alternative B.

R&PP leases and FLPMA permits would not be authorized within any ACEC. Leases and permits often result in additional development. The absence of development would decrease development of roads, trails, and OHV use. Due to the large number of ACECs in this alternative, there may be travel opportunities that will not be available to communities wishing to develop roads in these areas.

Alternative C would result in mineral withdrawals on 5.6 million acres of land within ACECs, thus preventing mineral development and its associated impacts (both positive and negative) on travel management and OHV use.

(7) Impacts to Travel Management /OHV from Special Designations

Under this alternative, 5.6 million acres in five areas would be designated as ACECs. There may be negative impacts to Travel Management and OHV from designation of ACECs if additional restrictions are placed on OHV use and access during development of activity plans.

There are 11 rivers within the planning area that have been identified as eligible for designation as wild under the WSR Act (Table 2-21). It is difficult to predict what effect a listing may have on travel management and OHV use. The outstandingly remarkable values for which the 11 rivers were identified (primarily fish resources) would continue to be protected. It is likely that OHV and travel use would be restricted to some extent within those rivers recommended as suitable.

e) Alternative D

(1) Impacts to Travel Management/OHV from Visual Resources

Impacts would be similar to those discussed under Alternative C, except more areas are classified as Class III and IV, the less restrictive classes. Fewer Class II areas are designated than alternative C but more than Alternatives A and B.

(2) Impacts to Travel Management/OHV from Forest Products

Impacts would be the same as those discussed under Alternative B.

(3) Impacts to Travel Management and OHV from Minerals

(a) Leasable Minerals

The impacts associated with leasable mineral development would be the same as Alternative B.

(b) Locatable Minerals

In areas open to locatable mineral entry, anticipated levels of mining activity and effects to travel management and OHV use are similar to those described under Alternative B.

(c) Mineral Materials

Impacts would be the same as those discussed under Alternative A.

(4) Impacts to Travel Management/OHV from Recreation Management

Two areas would be designated as SRMAs: Squirrel River (726,000 acres), and Salmon Lake/Kigluaik Mountains (244,000 acres). These designations would allow for the development of comprehensive travel management strategies, with the identification of specific goals and objectives, that would help preserve high value recreation resources while managing recreation experiences. OHV use and travel management would be addressed in a RAMP. The effect of this RAMP is unknown as specific management has not been determined. It is likely that OHV use in these areas would be more limited in some manner that is more restrictive than under Alternatives A or B.

(5) Impacts to Travel Management/OHV from Travel Management

Within the ERMA, all BLM-managed lands would be designated as Limited to OHV use. A maximum 2,000 pound GVWR would apply.

In areas designated as ACEC or SRMA BLM may impose additional limits on OHV use including: type of vehicle, limiting use to designated trails, seasonal restrictions or seasonal closures. The unmanaged proliferation of trails in other areas would continue. To some extent designations would not be enforced until implementation-level planning occurred. Impacts to Travel Management and OHV in these areas would be a gradual trend toward semi-primitive motorized or roaded natural experiences. Within areas where OHVs are limited to designated trails, the BLM would more intensively manage the effects of OHV use.

In SRMAs and ACECs some users may be temporarily displaced during the seasonal closures which may increase use in other areas. A degree of uncertainty remains as to future implementation-level planning, the potential to limit OHV use to designated trails or seasonal closure of areas, and the impacts that this planning would have on the OHV user.

(6) Impacts to Travel Management/OHV from Lands and Realty Actions

Impacts from FLPMA disposal would be similar as those discussed under Alternative A. Lands identified as available for FLPMA sale in Nome and Kotzebue under this alternative are small isolated tracts that will not affect travel management or OHV use.

Impacts from acquisitions would be the same as under Alternative B.

Impacts from land use authorizations would be the same as under Alternative C.

Impacts from withdrawal review would be similar as Alternative B.

(7) Impacts to Travel Management/OHV from Special Designations

Impacts would be similar to those discussed under Alternative C. Additional protection would be provided to natural and cultural resources by designation of 3.6 million acres of ACEC in six areas. McCarthy's Marsh and the Upper Kuzitrin would not be designated as ACECs under this alternative.

Where special designations are applied, effects under Alternative D would be similar to those described under Alternative C. However, Alternative D would provide less protection than that afforded by Alternative C as McCarthy's Marsh, the upper Kuzitrin River and portions of the Kigluaik Mountains would not be designated.

Protective measures described for permitted activities in the ROPs would apply to both alternatives. OHV restrictions from seasonal closures, weight limits or designated trail use will impact travel management and OHV use as described in Alternative C.

6. Renewable Energy

a) Impacts Common to All Alternatives

Renewable energy projects would be permitted through the appropriate land use authorization. Impacts to renewable energy would be the same as those discussed for Land Use Authorizations beginning on page 4-174.

7. Lands and Realty Actions

For a detailed description of the lands and realty actions proposals by alternative, see Table 2-19.

a) Land Use Authorizations

(1) Impacts Common to All Alternatives

(a) Impacts to Land Use Authorizations from Vegetation and Special Status Species

The management of vegetation, including Sensitive Status Species, could have several impacts on land use authorizations. The need to protect Sensitive Status Species and riparian and wetland vegetation would impact land use authorizations. Facilities proposed for construction under various land use authorizations where these types of vegetation are present may need to be mitigated, constructed in alternate locations, or, in extreme cases, dropped from consideration.

(b) Impacts to Land Use Authorizations from Fish and Wildlife Management

The management of wildlife and fisheries habitat, including Special Status Species, would have several consequences. The need to protect Special Status Species as well as certain other species of fish and wildlife and their habitat would impact land use authorizations. Facilities proposed for construction under various land use authorizations that could result in adversely affecting wildlife or fisheries habitat may need to be mitigated, constructed in alternate locations, or in some cases, dropped from consideration. These types of actions (restructuring of actions

to mitigate impacts to fish and wildlife) could increase processing costs and time for both the Federal and non-Federal parties.

(c) Impacts to Land Use Authorizations from Fire and Fire Management

Wildland fire poses a threat to structures and personal property; prescribed fires are planned and risks are mitigated. Permits and leases are issued with the provisions listed in the ROPs. Sites are prioritized for protection based on the fire management option designated for the site. A protection response is also dependant on other factors including but not limited to the availability of firefighting resources, the site condition and location, surrounding vegetation, and the statewide situation at the time of the threat. Increase in authorizations and land use increase the potential for human-caused fires.

(d) Impacts to Land Use Authorizations from Cultural Resources

The management of cultural resources could affect land use authorizations. These lands and realty actions are considered Federal undertakings and must avoid inadvertent damage to Federal and non-Federal cultural resources through compliance with Section 106 of the National Historic Preservation Act. In some cases, cultural inventories would need to be completed prior to these Federal undertakings, and impacts to important cultural sites would need to be avoided by project redesign, project abandonment, and/or mitigation of adverse impacts through data recovery. Actions taken to avoid impacts could include rerouting a proposed use authorization. Such actions (restructuring of actions to mitigate impacts to cultural resources) can increase processing costs and processing time for both the Federal and non-Federal parties.

(e) Impacts to Land Use Authorizations from Paleontological Resources

The impacts from the management of paleontological resources would be very similar to those of cultural resources as described in the previous paragraph. Land use authorizations occurring in known fossiliferous areas may require that adequate time and resources be allocated to conducting an inventory of these resources. The discovery of scientifically-important paleontological resources could result in the rerouting or redesign of proposed use authorization. Such actions (restructuring of actions to mitigate for paleontological resources) can increase processing costs and time for both the Federal and non-Federal parties.

(f) Impacts to Land Use Authorizations from Visual Resources

Visual resource management would affect land use authorizations such as rights-of-ways, leases, and permits. Facilities would need to meet objectives for the particular VRM class in which a project was proposed, which could entail mitigation, relocation, or elimination of certain facilities resulting in additional time and costs in project development.

(g) Impacts to Land Use Authorizations from Minerals

The management of leasable, salable, and locatable minerals under all alternatives would likely result in requests for land use authorizations such as rights-of-way and permits for utilities and access.

(h) Impacts to Land Use Authorizations from Travel Management

Consistent with ANCSA, the BLM would continue to manage 17(b) easements that access public lands across Native lands. Where 17(b) easements access public lands other than BLM-managed lands, the BLM would attempt to transfer management responsibility of the easement to the appropriate agency. Easement termination would only occur as a matter of law, or where

documented non-use exists and would be subject to public involvement. There would be little to no decrease in access currently provided by 17(b) easements.

Permits or other use authorizations are required for all OHV use which exceeds the various limits in the various alternatives.

(i) Impacts to Land Use Authorizations from Renewable Energy

Any renewable energy development proposed for public lands could result in requests for land use authorizations such as rights-of-way and permits.

(j) Impacts to Land Use Authorizations from Hazardous Materials

Land use authorizations for uses which would involve disposal or storage of materials which could contaminate the land would not be issued. The presence of contaminants may lead to actions such as the modification or abandonment of a landownership adjustment proposal, or remediation in the form of cleanup and removal of the contaminants.

(2) Alternative A

(a) Impacts to Land Use Authorizations from Travel Management

This alternative is the current situation which requires a permit for the use of vehicles exceeding 2,000 pounds gross vehicle weight. Historically, few permits have been requested or issued for vehicles which exceed the 2,000 pound GVWR limit.

(3) Alternative B

(a) Impacts to Land Use Authorizations from Forest Products

This alternative proposes inventory and possible commercial harvest of forest products for commercial logging, salvage cutting, and firewood harvest. Rights-of-ways and permits would be required for roads or use of vehicles exceeding weight limits. Road construction could require obtaining easements to cross lands under other ownerships.

(b) Impacts to Land Use Authorizations from Travel Management

This alternative would require the fewest number of permits of OHV use exceeding the weight or seasonal limits.

(4) Alternative C

(a) Impacts to Land Use Authorizations from Recreation Management

This alternative proposes facilities such as foot and pack animal trails, cross country ski trails, and interpretative signs within the Salmon Lake-Kigluaik SRMA. These facilities could require a right-of-way depending on their location.

(b) Impacts to Land Use Authorizations from Travel Management

This alternative is the most restrictive of OHV use, and would require more permits to be issued than the other alternatives.

(5) Alternative D

(a) Impacts to Land Use Authorizations from Forest Products

This alternative proposes beetle-killed spruce salvage cutting, small sales, and personal house log and firewood harvest. Rights-of-ways and permits would be required for roads or use of vehicles exceeding weight limits.

(b) Impacts to Land Use Authorizations from Recreation Management

Impacts would be the same as under Alternative C.

(c) Impacts to Land Use Authorizations from Travel Management

This alternative would require more permits for OHV use than Alternatives A and B, and less than Alternative C.

b) Disposal Actions

(1) Impacts Common to All Alternatives

(a) Impacts to Disposal Actions from Vegetation

The need to protect Sensitive Status Species and riparian and wetland vegetation would impact disposal actions. Disposal actions in areas where these types of vegetation are present may need to be mitigated, moved to alternate locations, or, in extreme cases, dropped from consideration.

(b) Impacts to Disposal Actions from Fish and Wildlife Management

The need to protect Special Status Species as well as certain other species of fish and wildlife and their habitat would impact disposal actions. Disposal actions in areas where wildlife or fisheries could be adversely affected may need to be restructured or eliminated from consideration. These types of actions (restructuring of actions to mitigate impacts to fish and wildlife) could increase processing costs and time for both the Federal and non-Federal parties.

(c) Impacts to Disposal Actions from Cultural Resources

The management of cultural resources could affect disposal actions. These actions are considered Federal undertakings and must avoid inadvertent damage to Federal and non-Federal cultural resources through compliance with Section 106 of the National Historic Preservation Act. Cultural inventories would need to be completed prior to these Federal undertakings, and impacts to important cultural sites would need to be avoided by project redesign, project abandonment, and/or mitigation of adverse impacts through data recovery. Actions taken to avoid impacts could include restructuring or abandoning a disposal action. Such actions (restructuring of actions to mitigate impacts to cultural resources) can increase processing costs and time for both the Federal and non-Federal parties.

(d) Impacts to Disposal Actions from Paleontological Resources

The impacts from the management of paleontological resources would be very similar to those of cultural resources as described in the previous paragraph. Disposal actions occurring in

known fossiliferous areas may require that adequate time and resources be allocated to conducting an inventory of these resources. The discovery of scientifically-important paleontological resources could result in the restructuring or abandoning of the disposal action. Such actions (restructuring of actions to mitigate for paleontological resources) can increase processing costs and time for both the Federal and non-Federal parties.

(e) Impacts to Disposal Actions from Hazardous Materials

Lands proposed for disposal would need to be inventoried for the presence of hazardous materials. The presence of contaminants may lead to actions such as the modification or abandonment of a disposal action, or remediation in the form of cleanup and removal of the contaminants.

c) Acquisitions

(1) Impacts Common to All Alternatives

(a) Impacts to Acquisitions from Vegetation

The management of vegetation, including Sensitive Status Species, could result in acquisition needs being identified. In the case of an easement, it could determine the routing of the easement.

(b) Impacts to Acquisitions from Fish and Wildlife Management

The management of wildlife and fisheries habitat, including Special Status Species, could result in acquisition needs being identified. In the case of an easement, it could determine the routing of the easement.

(c) Impacts to Acquisitions from Cultural Resources

The management of cultural resources could result in acquisition needs being identified. In the case of an easement, it could determine the routing of the easement. Acquisitions are considered Federal undertakings and must avoid inadvertent damage to Federal and non-Federal cultural resources through compliance with Section 106 of the National Historic Preservation Act. Cultural inventories would need to be completed prior to these Federal undertakings, and impacts to important cultural sites would need to be avoided by project redesign, project abandonment, and/or mitigation of adverse impacts through data recovery.

(d) Impacts to Acquisitions from Paleontological Resources

The impacts from the management of paleontological resources would be very similar to those of cultural resources as described in the previous paragraph. Acquisitions occurring in known fossiliferous areas would require that adequate time and resources be allocated to conducting an inventory of these resources. The discovery of scientifically-important paleontological resources could result in the rerouting or redesign of an easement acquisition.

(e) Impacts to Acquisitions from Travel Management

Transportation and facilities management could require that easements be acquired for any BLM roads or other types of facilities to be located on non-Federal lands.

(f) Impacts to Acquisitions from Hazardous Materials

Lands proposed for acquisition would need to be inventoried for the presence of hazardous materials. The presence of contaminants may lead to actions such as the modification or abandonment of an acquisition, or remediation in the form of cleanup and removal of the contaminants.

(2) Alternative A

Impacts would be the same as Impacts Common to All Alternatives.

(3) Alternative B

Impacts would be the same as Impacts Common to All Alternatives.

(4) Alternative C

(a) Impacts to Acquisitions from Recreation Management

This alternative proposes facilities such as foot and pack animal trails, cross-country ski trails, and interpretative signs within the Salmon Lake-Kigluaik SRMA. If they are not entirely on public land, an easement or other authorization would need to be acquired from the landowner.

(5) Alternative D

(a) Impacts to Acquisitions from Recreation Management

Impacts would be the same as Alternative C.

D. Special Designations

1. Areas of Critical Environmental Concern

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to Areas of Critical Environmental Concern (ACECs): Air Quality, Soil Resources, Water Resources, Fish and Wildlife, Special Status Species, Cultural Resources, Paleontological Resources, Visual Resources, Wilderness Characteristics, Forest Products, Renewable Energy, Lands and Realty Actions, Iditarod National Historic Trail, Wild and Scenic Rivers, Public Safety, Social and Economic Conditions, and Subsistence.

a) Impacts Common to All Alternatives

There are no impacts common to all alternatives for ACECs and RNAs, other than all mining activity (even less than five acres) within an ACEC would require a mining plan in lieu of just filing a notice.

b) Alternative A

There are currently no ACECs in the planning area. Under this alternative, no ACECs would be created and thus there would be no impacts to them.

c) Alternative B

Impacts would be the same as discussed under Alternative A.

d) Alternative C

Alternative C would result in special management provisions being applied to an estimated 43% (5,591,000 acres) of the planning area. Management identified under ROPs (Appendix A) would provide protection of relevant and important values of these ACECs. The following sites would be designated under this alternative:

- WACH calving grounds and critical insect relief areas.
- Nulato Hills
- McCarthy's Marsh
- Upper Kuzitrin River
- Kigluaik Mountains

These five potential ACECs would be designated based on resource values and the need for special management (beyond standard provisions) to protect relevant and important values (values for each area are discussed in Chapter III). Management would result in limitations or restrictions placed on other resource uses and activities in order to prevent irreparable damage to the identified values. In some cases, special research projects would be initiated. This alternative provides the most protection to fish habitat as it is the most restrictive towards permitting development within active stream channels.

(1) Western Arctic Caribou Herd Calving and Insect Relief ACEC

Impacts to caribou and their habitat are under Alternative C are discussed under Wildlife beginning on page 4-80. There would be few impacts to relevant and important values in this ACEC as it would be closed to mineral leasing and location; designated as a right-of-way avoidance area; closed to livestock grazing; limited to designated roads and trails; closed to FLPMA leases; and would be unavailable for disposal.

(2) Nulato Hills ACEC

Impacts to caribou and their habitat under Alternative C are discussed under Wildlife beginning on page 4-80. Impacts to special status plants under Alternative C are discussed under Special Status Plants beginning on page 4-91. There would be few impacts to relevant and important values in this ACEC as it would be closed to mineral leasing and location; designated as a right-of-way avoidance area; closed to livestock grazing; limited to designated roads and trails; closed to FLPMA leases; and would be unavailable for disposal. In addition, impacts from commercial recreation could be reduced by placing limitations on the number of special recreational use permits issued. A fire management plan developed to protect lichen range for caribou would support the purpose of this ACEC.

(3) McCarthy's Marsh ACEC

Impacts to wildlife habitat under Alternative C are discussed under Wildlife beginning on page 4-80. There would be few impacts to relevant and important values in this ACEC as it would be closed to mineral leasing and location; designated as a right-of-way avoidance area; closed to livestock grazing; limited to designated roads and trails; closed to FLPMA leases; and would be unavailable for disposal. In addition, impacts from commercial recreation could be reduced by placing limitations on the number of special recreational use permits issued. A fire management plan developed to protect lichen range for caribou would support the purpose of this ACEC.

(4) Upper Kuzitrin River ACEC

Impacts to wildlife habitat under Alternative C are discussed under Wildlife beginning on page 4-80. There would be few impacts to relevant and important values in this ACEC as it would be closed to mineral leasing and location; designated as a right-of-way avoidance area; closed to livestock grazing; limited to designated roads and trails; closed to FLPMA leases; and would be unavailable for disposal.

(5) Kigluaik Mountains ACEC

Impacts to wildlife habitat under Alternative C are discussed under Wildlife beginning on page 4-80. Impacts to special status plants under Alternative C are discussed under Special Status Plants beginning on page 4-91. There would be few impacts to relevant and important values in this ACEC as it would be closed to mineral leasing and location; designated as a right-of-way avoidance area; closed to livestock grazing; limited to designated roads and trails; closed to FLPMA leases; and would be unavailable for disposal. In addition, impacts from commercial recreation could be reduced by placing limitations on the number of special recreational use permits issued.

e) Alternative D

Alternative D could result in special management provisions being applied to an estimated 31% (3,655,000 acres) of the planning area providing protection of relevant and important values. BLM-managed lands in six areas would be designated as ACECs. Designation of the Mount Osborn ACEC would be delayed until conveyances are complete. There would be no designation of ACEC on State-selected lands unless the State concurs with designation. After conveyances are complete, lands remaining in BLM ownership would be incorporated into existing ACECs. The following sites would be designated under this alternative:

- Shaktoolik watershed
- Inglutalik watershed
- Ungalik watershed
- WACH critical insect relief areas
- Nulato Hills
- Mount Osborn ACEC

These areas would be designated based on resource values and the need for special management (beyond standard provisions) to protect relevant and important values. Management would result in limitations or restrictions placed on other resource uses and activities in order to protect identified values and to prevent irreparable damage to the identified values.

(1) Shaktoolik Watershed and Inglutalik Watershed ACECs

Impacts to fish and their habitat under Alternative D are discussed under Fish beginning on page 4-64. Impacts to caribou under Alternative D are discussed under Wildlife beginning on page 4-82. The area would be open to mineral exploration, leasing, and location. Surface occupancy for leasable mineral activities would be prohibited within 300 feet of the river. Development of three to five placer mines would likely have little effect on this ACEC unless they were located within it. It is possible that a placer mine could be located on the river itself with detrimental effects on anadromous and resident fish populations. The Shaktoolik watershed contains vital migratory, spawning and rearing habitat for Chinook, coho, chum, and pink salmon populations that comprise important subsistence and commercial fisheries in eastern Norton Sound. Increased sedimentation due to erosion from development within active stream channels is the principal deleterious impact to be avoided. Other activities such as OHV use, dispersed recreation, and realty actions could have minor impacts on relevant and important values.

(2) Ungalik Watershed ACEC

Impacts would be the same as discussed under the Shaktoolik Watershed ACEC, except that locatable mineral entry would be prohibited within 300 feet of the river. The potential effects of placer mining on fisheries, riparian habitat and aquatic habitat would be greatly reduced because of this prohibition. There is higher mineral potential in the Ungalik watershed than in either the Shaktoolik or Inglutalik watersheds. However, placer mining could still occur on State managed lands within navigable portions of the riverbed itself. Impacts from mining in the active stream channel are the primary concern for the fisheries habitat. For a summary of impacts and

problems associated with increased sedimentation in fish-bearing streams, see Impacts to Fish from Sedimentation beginning on page 4-53.

(3) Western Arctic Caribou Herd Insect Relief ACEC

The highest potential for impacts to relevant and important values in this ACEC would be oil and gas development which is projected for this general area. The impacts of oil and gas development on caribou under Alternative D are discussed under Wildlife beginning on page 4-82. Impacts of oil and gas development on fish habitat under Alternative D are discussed under Fish beginning on page 4-64. Development of oil and gas has the potential to dramatically reduce the primary utility of this ACEC, which is to protect crucial caribou habitats. Reasonably foreseeable development scenarios for oil and gas include: 710,000 acres leased, up to 3,200 miles of seismic lines, nearly 200 wells drilled, numerous facilities including buildings, roads, and an airstrip, one million cubic yards of gravel borrowed and deployed, and a pipeline connecting the field to existing oil infrastructure to the northeast. Because of the scope of development possible within this proposed ACEC, an activity plan would be completed prior to oil and gas development to determine appropriate stipulations to protect caribou and their habitat. Other activities such as OHV use, dispersed recreation, and realty actions could have minor impacts on relevant and important values.

(4) Nulato Hills ACEC

Impacts to caribou and their habitat under Alternative D are discussed under Wildlife beginning on page 4-82. Impacts to special status plants under Alternative D are discussed under Special Status Plants beginning on page 4-94. Although this ACEC would be open to most types of resource uses, impacts to relevant and important values should be minimal due to its remote location and the low potential for mineral development. Impacts from most activities likely to occur in the area could be mostly mitigated during the permitting stage. The ACEC would be designated a ROW avoidance area, which would lower the potential for road construction within the ACEC. The impacts of roads on caribou are discussed under Cumulative Impacts, Wildlife on page 4-220. Grazing should have little to no impact as currently there are no reindeer in this allotment. Should a herd be reestablished, there would be potential to impact the purpose of the ACEC because the reindeer may utilize lichens in a small portion of the winter range. Locatable mineral development would likely have only minor and localized effects on the purpose of the ACEC (protect winter range of the WACH) given their small size of projected disturbance in relation to the overall size of the ACEC. An Activity Plan would be developed for this ACEC. Of primary concern would be to develop fire management objectives to protect lichen range. Mitigation measures to limit detrimental surface activities from development activities would also be addressed in case of the unlikely event viable minerals deposits are found and utilized.

(5) Mount Osborn ACEC

Potential impacts from OHV use would be reduced due to the development of an OHV plan, which may result in seasonal or other limits on OHV use. The issue of increasing fishing pressure on the BLM Special Species arctic char inhabiting the Kigluaik Mountain lakes due to increasing recreational use may be mitigated by development of an OHV plan to manage access to the ACEC. Impacts to special status fish under Alternative D are discussed under Special Status Fish beginning on page 4-95. Placer mining could occur within the ACEC but a mining plan of operations would be required reduce the potential impacts of this activity. In

addition, ROP SS-4 would be implemented around lakes supporting Kigluaik Arctic char, reducing the potential for mining related impacts to char habitat. The greatest potential for impacts to relevant and important values would be recreational use. The ACEC is located north of Nome with nearby road access and is located within a Special Recreation Management Area. If recreational use was negatively affecting resources values, additional limitations on levels and types of uses allowed could be implemented.

2. Iditarod National Historic Trail

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to the Iditarod National Historic Trail: Air Quality, Soil Resources, Water Resources, Fish and Wildlife Management, Special Status Species, Cultural Resources, Paleontological Resources, Wilderness Characteristics, Livestock Grazing, Forest Products, Renewable Energy, Public Safety, Social and Economic Conditions, and Subsistence.

(a) Impacts Common to All Alternatives

The Iditarod National Historic Trail (INHT) would continue to be managed under existing cooperative agreements and comprehensive management plan. The values of the trail would be maintained. Surface disturbing actions associated with mineral development or land use authorizations could directly impact the trail. Given the low level of mineral development and land use authorizations anticipated, and the small amount of the trail under BLM-management, instances where these activities would occur on or immediately adjacent to the trail would be rare and every effort would be made to either avoid the trail or mitigate the impact. As an existing trail, the INHT would continue to be open to OHV use. Continued OHV use, particularly if it occurs during the snow-free season could impact the trail itself. If damage to the trail is sufficient to cause concern, trail improvement work may be undertaken. Any potential impacts to the INHT would be avoided or mitigated to the extent possible.

(b) Impacts Common to All Action Alternatives (B, C, and D)

The BLM would consider acquisition of parcels along the Iditarod NHT through purchase or exchange with willing owners. There would be beneficial impacts from consolidation of trail ownership. VRM management classes would be established, further protecting the viewshed along the trail.

3. *Wild and Scenic Rivers*

Wild and Scenic River areas are not essentially natural resources or resource uses, but represent statutory decisions to protect certain resources or uses over a long period of time. For this reason, impacts of various alternatives on Wild and Scenic River areas should be examined by looking at the impacts on resources and uses described elsewhere in this chapter. This section provides cross-references and a brief summary of impacts from interim management on the Squirrel River, and briefly documents a mitigating measure designed to aid long-term protection of water quality in Alternative D.

The most basic characteristics of a wild and scenic river are free-flow and unpolluted waters. Impacts of the various alternatives on free-flow and water quality are described in the Air Quality and Soil and Water Resources section beginning on page 4-27.

Seven outstandingly remarkable values were identified for the eligible river areas. Each of these values has a corresponding section in this chapter where an assessment of potential impacts may be found, as shown in the table below:

Table 4-12. Outstandingly Remarkable Values Cross-reference for Eligible Rivers

Outstandingly Remarkable Value	Eligible River Areas with this Value	Applicable DEIS Sections in Chapter IV
Fish habitat	Kivalina, Inglutalik, Fish, Upper Buckland/Fish, Ungalik, Shaktoolik, Koyuk/Peace/East Fork, Tubutulik, Agiapuk, Kiliovilik, Nilik/Ipewik/Kukpuk	Fish Management beginning on page 4-57
Water Quality for Subsistence Production and Domestic Use	Kivalina	Air, Soil, and Water beginning on page 4-31
Scenery	Ungalik, Shaktoolik	Visual Resources beginning on page 4-115
Primitive Recreation	Ungalik, Shaktoolik	Recreation management beginning on page 4-155
River Recreation	Koyuk/Peace/East Fork	Recreation management beginning on page 4-155
Moose Habitat	Fish River (McCarthy's Marsh)	Wildlife Management beginning on page 4-70
Caribou Habitat	Fish River (McCarthy's Marsh)	Wildlife Management beginning on page 4-70

a) Impacts Common to All Alternatives

The Squirrel River area that was designated for study under section 5(a) of the Wild and Scenic Rivers Act will be managed to monitor and protect wild river values until fall of 2007, pursuant to the BLM interim management policies, while congress considers the study recommendation finding the river area non-suitable for addition to the national wild and scenic rivers system. In addition to the basic requirement to protect water quality and the free flowing nature of the stream, the following outstandingly remarkable values will be protected during this time period:

- **Cultural Heritage Values:** Management actions will protect the fundamental relationship of the Iñupiat culture to the land. Native place names, traditional associations, and cultural concerns will be acknowledged and documented.
- **Fisheries Values:** Habitat for Dolly Varden, chum salmon, pike, grayling, and whitefish will be monitored and protected from degradation within the discretionary authority of BLM.
- **Recreation Values:** The Squirrel River area provides outstanding opportunity for primitive recreation, particularly boating, fishing, photography and sport hunting. These uses will be monitored, and protected from degradation within the discretionary authority of BLM.
- **Scenic Values:** The Squirrel River area will be managed to protect scenic values through the fall of 2007.

The 11 river areas described as *eligible* in Table 3-36 will be managed—to the extent possible using BLM discretionary authority—to protect the outstandingly remarkable values identified in the table until a final decision is made on the suitability or non-suitability of these rivers as additions to the national wild and scenic rivers system.

b) Alternative A

Under this alternative, no rivers are found to be suitable for addition to the national wild and scenic rivers system; however, there is little likelihood of significant impacts to water quality, free flow, or outstandingly remarkable values in the identified eligible river areas, simply because no dams or significant streamside development is proposed. Potential impacts to outstandingly remarkable values are minimal, and are described in several sections in this chapter, as indicated in the table above.

c) Alternative B

Same as Alternative A.

d) Alternative C

Under this alternative, all the eligible rivers are recommended as suitable additions to the national wild and scenic rivers system. This would provide maximum protection to water quality and free-flow, as the BLM would gain additional authority to review Federal authorizations for water resources projects, and would be mandated to protect the outstandingly remarkable values of designated rivers.

e) Alternative D

Under this alternative, no rivers are found to be suitable for addition to the national wild and scenic rivers system, but BLM would develop and implement a water quality monitoring plan for the eligible river areas, which would provide additional information that could be used to protect water quality in these areas. Otherwise, the impacts of Alternative D are the same as those of Alternatives A and B.

E. Social and Economic

1. Public Safety

a) Abandoned Mine Lands

(1) Impacts Common to All Alternatives

Fluctuation of the gold process and other economic situations all lead to the potential of abandonment of active mining activities. Bankruptcy, negative cash flow for an operation, or an unsuccessful exploration program all lead to the potential of abandonment of potentially hazardous substances, solid wastes and petroleum products at a site. In time these products and wastes result in potential environmental liabilities and physical hazards. Economic viability of potential responsible parties that operated at these sites is often marginal at best. This results in the increased likelihood of expenditures of Federal funds to clean up and remediate an abandoned site or reclamation claims being made against a bond if available.

b) Hazardous Materials Management

(1) Impacts Common to All Alternatives

Any increase of human activity such as but not limited to commercial mineral development, increase in rights-of-way, special recreation permits, subsistence, or recreation all have the potential for increasing the likelihood of spills or unauthorized waste disposal activities. Compliance to insure stipulations are completely adhered to is both economically and practically infeasible. Generally, this is not an issue and most users of public lands attempt to comply with laws, regulations, and conditions of approval. Because of the remoteness of the planning area and cost for properly disposing of wastes and conducting environmental investigations of spills, non-compliance occurs.

Additional future impacts to lands are associated with negotiation of alternative cleanup levels for existing hazardous materials management sites. This is a process where less stringent cleanup levels that are protective of public health and safety are authorized by the State. Often times these may also include institutional controls. An example of an institutional control can be associated with a long-term monitoring program of groundwater, a land use restriction for residential use based on contaminants that still may be present, or a limitation based on a closed landfill. These should generally be avoided. However, where appropriate these need to be evaluated on a case-by-case basis and ensure that any potential limitation of use is consistent with the scope of this plan.

2. Social and Economic Conditions

a) Social and Economic

(1) Impacts Common to All Alternatives

(a) Impacts to Social and Economic from BLM Expenditures

Income generated by BLM expenditures in the planning area, including expenses for field operations, services, and personnel are expected to remain similar to current contributions, or increase slightly, across all alternatives.

(b) Impacts to Social and Economic from Forest Products

Individual and subsistence use of forest products is typical in the planning area. There is **v**irtually no commercial demand, few permits for individual use, and no expectation of change in current pattern of use. The demand for forest products on BLM administered land within the plan area is not expected to change in the foreseeable future. Therefore, the effect on the regional economy is very low for all alternatives.

(c) Impacts to Social and Economic from Recreation Management, Travel Management, and Special Designations

Dispersed visitor use is estimated at 2,000 visitor user days in a fiscal year for the entire planning area (BLM/RMIS). BLM has not ascertained to what degree access to the planning area for commercial or public recreation is provided by local businesses. OHV management will not have economic effects on the area. Access to subsistence resources will remain unaffected.

(d) Impacts to Social and Economic from Leasable Minerals

Coal leasing is deferred in the planning area under all alternatives. Exploration for coal is allowed on 7 to 12 million acres under the alternatives. All alternatives have the same known resources on land open to exploration. No effect on the region's economy is expected to result from exploration under any alternative.

No employment would be generated from cleanup of small spills of less than 500 bbl, large spills of 500 bbl from a pipeline, or a 900 bbl crude or diesel spill from a facility. On-site workers engaged in other operations would clean up spills of these sizes.

(2) Alternative A

(a) Impacts to Social and Economic from Livestock Grazing

Reindeer grazing would continue at its present level or change as conditions warranted. The entire planning area is open to leasing, with exception of segregated lands (selected land.) The reindeer herds would continue to be limited and discouraged by the high population level of the WACH.

BLM does not charge a fee for grazing other than a $10 administrative fee. Total industry revenue was estimated at 1.1 million in 1996. This included fourteen herds, of 300-8000 animals each. In 2004, BLM estimated that 7500 animals were maintained by 5 allotment holders. Herds range on lands under multiple land ownership, making it difficult to isolate the effect of BLM management. Currently, only 5 of the 15 BLM grazing allotments on the Seward Peninsula are actively in use. The local population of the Seward Peninsula is not dependent on reindeer herding. More people and communities benefit and are supported by subsistent hunting of the WACH than depending on the reindeer herding industry. Reindeer herding practices can conflict with subsistence lifestyles and demands, introduce disease to wild caribou and other ungulates, and require considerable subsidy actions by the government and private enterprise to manage effectively. Although in communities with a resident herder, the reindeer industry provides some limited opportunity for seasonal employment. There is no seasonal employment on inactive leases.

Economic effects upon grazing will be strictly influenced by the caribou population, not directly by BLM grazing management.

(b) Impacts to Social and Economic Conditions from Leasable Minerals

The area is closed to mineral leasing. Therefore, management under this alternative will not result in contributions to the regional economy.

(c) Impacts to Social and Economic Conditions from Locatable Minerals

Approximately half of the land managed by BLM in the planning area was technically opened to mineral entry by PLO 6477, which revoked some ANCSA Section 17 (d)(1) withdrawals. However, State and native selections continue to segregate much of this land, preventing new mineral entry. Mining activity is currently taking place only on claims predating selections. Planning decisions do not limit mining on existing claims. Under this alternative, little or no new mining activity is expected. The effect to the regional economy is expected to be very low.

(d) Impacts to Social and Economic from Lands and Realty Actions

FLPMA permits, leases, and sales would continue to be processed on a case by case basis. There is no record of previous FLPMA sales. No economic effect is expected.

(3) Alternative B

(a) Impacts to Social and Economic from Livestock Grazing

Impacts from livestock grazing would be the same as Alternative A.

(b) Impacts to Social and Economic from Leasable Minerals

Most of the planning area (11.9 million acres) is open to mineral leasing. However, selected lands will remain segregated from leasing until the land selections are revoked or relinquished.

1. Revenues

Long term oil prices must be over $34.31 per barrel to encourage production where an oil pipeline must be constructed to connect with existing lines at the Alpine field. This is based on current costs. Leases may be offered as early as 2008, and exploration may begin during the

period 2008 to 2012. Leases are most likely to lie within the North Slope Borough boundaries, based on resource potential. Economic effects of an oil field will more likely result within the North Slope Borough, and less likely to result in change in the Northwest Arctic Borough or remainder of the planning area.

Bonus bids in the 2004 lease sale for Northwest NPR-A brought the State of Alaska and the Federal government each about $27 million dollars in revenue. In NPR-A the royalty revenue is split equally between the State and Federal government. The Northwest NPR-A was considered to have a full economic potential of 2.1 billion barrels of recoverable oil. A hypothetical field in the planning area is estimated to have 500 million barrels of recoverable oil, about 350 miles distant from the nearest oilfield and pipeline infrastructure. Given this situation, the bonus bids are expected to be much lower for a field in the planning area. The State of Alaska transferred part of its share of bonus bids to the NSB in 1998 following the Northeast NPR-A lease sale (DOI 2003).

Rent is charged for lease acreage until it produces oil and therefore royalty. The Federal government charges $1.50/acre for the first five years and $2.00/acre for the second five years of a typical 10 year lease. Rents are split with the State in the same manner as royalties. 1,404 million acres were leased in the Northwest NPR-A sales (of 5,816,919 acres offered).

Royalties will be based on 16.67% of the well head value of oil and be split between the State (90%) and Federal government (10%). The State received a total of approximately $1.755 billion from rents, bonus bids, and royalties statewide during Calendar year 2005.

Property tax may be assessed by the State and shared with the North Slope Borough. The borough could receive the equivalent of its 18 mil property tax from the State. The BLM estimates property tax to NSB at $52.98 million over the 30 year life of the field. NSB collected approximately $199 MM property tax from all sources during 2003-04 fiscal year.

2. Employment and Income

Northwest arctic oil industry employment and income will vary from low levels during exploration phase (2008 to 2012) increasing during development and dropping again during production phases. Workers will travel to the oilfield from other parts of the United States (27%) and from other parts of Alaska (58%), with very few workers originating from North Slope Borough or Northwest Arctic Borough (15%) (Hadland 2005). The North Slope Borough has the distinction of providing over 5000 jobs to workers living in other boroughs, States, or countries. These are typically oil field jobs.

In the NW NPR-A FEIS BLM and MMS assume only 7% local NSB employment through all the phases of an oilfield. They also assume a much higher multiplier effect in Anchorage and Fairbanks than in Barrow or other villages. Indirect employment is much higher in Southcentral Alaska and the Fairbanks North Star Borough than in remote boroughs. The NW NPR-A portrays indirect NSB employment effects in the range of 1:3 to 1:4. One worker in the borough is added for every 3 to 4 project workers. In Southcentral Alaska and Fairbanks North Star Borough the relationship is given as 1:2; one additional indirect worker for each two project workers.

The Interim Report *The Economic Multiplier* shows that in rural areas the multiplier has a value only a little more than one (ISER 2005). Most goods and services purchased by businesses and households in small towns come directly from larger trade centers outside the local market. In

this instance, sources are outside the planning area. The Institute of Social and Economic Research at the University of Alaska in Anchorage estimates that in rural census areas in Alaska it would take $15 or more of purchasing power flowing into the region to produce $1 of income in a support business within the region itself.

The table below was taken from the Northwest NPR-A IAP/FEIS (USDI 2003). It estimates direct and indirect effects of a hypothetical oil field in Northwest NPR-A with nearly three times (1,470 MMbbl) the recoverable resource as the hypothetical scenario in northwest Alaska considered in this plan. The intent is to illustrate a comparative oil field (estimate.) It is likely, since the recoverable resource is lower in the planning area, each phase of work would result in less direct and indirect employment. However, a major oil transmission line is required. Over the life of the project, the labor schedule would compare more closely to the table below.

The effect of the employment and income on the United States is negligible.

Table 4-13. Effects of the Alternative on Employment and Personal Income by Place of Residence with Oil at $30/bbl[1]

Phase of Activity	Employment Expressed as Annual Average Jobs			Total Personal Income Expressed as Annual Average in Millions of Constant 1999 $		
	Direct Workers	Indirect & Induced Workers	Total	Direct Workers	Indirect & Induced Workers	Total
North Slope Borough[2]						
Exploration Phase	4	1	5	0.4	0.1	0.5
Development Phase	60	20	80	4.8	2.0	6.8
Production Phase	9	3	12	0.6	0.3	5.0
Southcentral Alaska[3] and Fairbanks North Star Borough						
Exploration Phase	52	26	78	4.2	0.8	5.0
Development Phase	800	400	1,200	64.0	12.0	76.0
Production Phase	340	170	510	27.0	5.0	33.0

[1] $30 per barrel.
[2] Communities in the North Slope Borough, but not worker enclaves.
[3] Southcentral Alaska includes the Municipality of Anchorage, the Matanuska-Susitna Borough, and the Kenai Peninsula Borough.

Source: MMS, "Arctic IMPAK: 1st Step Model" and "Arctic IMPAK: 2nd Step Model."

(c) Impacts to Social and Economic from Locatable Minerals

Approximately half of the land managed by the BLM in the planning area was technically opened to mineral entry by PLO 6477. Revocation of remaining ANCSA Section 17 (d)(1) withdrawals would allow new mineral entry. Under this alternative three to five new placer operations could begin over the life of the plan. Up to 50 new jobs may be created, adding income of $150K to $250K per annum to the regional economy. A portion of this income would

be paid to workers who do not live in the region, and much of the capital investment would be spent outside the region. The effect to the regional economy is expected to be very low.

(d) Impacts to Social and Economic from Lands and Realty Actions

FLPMA permits, leases, and sales would continue to be processed on a case by case basis. Under the Alternative A approximately half of BLM managed lands in the planning area are currently withdrawn from mineral entry either by ANSCA (d)(1) withdrawals or segregated from mineral entry or leasing due to State or Native selection.

(3) Alternative C

(a) Impacts to Social and Economic from Livestock Grazing

Reindeer grazing would be allowed on about one-quarter the acreage in the planning area. No operations on existing allotments would be closed or otherwise effected. The reindeer herds would continue to be limited and discouraged by the presence of the WACH which is at a high population level. Economic effect upon grazing will be strictly influenced by the caribou population, not directly by BLM grazing management.

(b) Impacts to Social and Economic from Leasable Minerals

The portion of the planning area identified for oil and gas potential is closed to leasing under this alternative. The effect on the regional economy is expected to be the same as Alternative A.

(c) Impacts to Social and Economic from Locatable Minerals

Impacts from locatable minerals would be the same as Alternative A.

(d) Impacts to Social and Economic from Lands and Realty Actions

Impacts from lands and realty actions would be the same as Alternative A.

(4) Alternative D

(a) Impacts to Social and Economic from Livestock Grazing

Reindeer grazing would be allowed on about one-third the acreage in the planning area. No operations on existing allotments would be closed or otherwise effected. However, grazing may not be allowed on currently inactive leases. The reindeer herds would continue to be limited and discouraged by the presence of the WACH which is at a high population level. Economic effect upon grazing will be strictly influenced by the caribou population, not directly by BLM grazing management.

(b) Impacts to Social and Economic from Leasable Minerals

Almost all BLM-managed land in the planning area (11.9 million acres) is open to fluid mineral leasing. Selected lands will remain segregated from leasing until the land selections are revoked or relinquished. Land with the highest potential for oil and gas would be open under this alternative. The effect on the regional economy is expected to be similar to Alternative B.

(c) Impacts to Social and Economic from Locatable Minerals

Impacts from locatable minerals would be the same as Alternative B.

(d) Impacts to Social and Economic from Lands and Realty Actions

An undetermined number of tracts in five townships near Nome and Kotzebue would be offered for sale under FLPMA regulations. Since the number of tracts is not yet clear, the value of the sale(s) is indeterminate. However, Sales would bring revenue to the Federal government and consolidate management. Revenue to the local area would not change as there is no property tax in the Northwest Arctic Borough, and the Nome area is an unorganized borough.

Table 4-14. Summary of Estimated Direct Input to Employment, Income, and Revenue

Action	Alternative	Employment	Income/year ($ K)	Revenue ($MM)	Notes
Forest Products	All	Low	Very low	0 (all alternatives)	none
Recreation	All	Unspecified slow growth	Unspecified slow growth	0 (all alternatives)	[1]
Oil & Gas	A, C B and D	0 60-860	0 4,600 to 68,800	0 7,400	[2]
Placer Mining	A B C D	0 10-50 5-15	0 $150 to 250 $50 to $150	0 (all alternatives)	[3]
Reindeer Grazing	All	$35,000 labor income	0	0	[4]

[1]Employment and income are unspecified. McDowell Group studies for the US Forest Service and others, conducted in the 1990s, showed most (>60%) recreation related employment and income was generated in Southcentral Alaska. In their report, the planning area is combined with other interior regions (McDowell Group 1999a).
[2]Revenue shown is combination of property tax and royalty payments for the life of the field. Calculation of tax and royalties were made using a Microsoft Excel Model developed by the Minerals Management Service (MMS 2005).
[3]New placer mining operations would likely be very small. As in some other parts of Alaska, mining is often a family or small business. As such, there may not be opportunity for wage based employment. The employment figures presented in this table are maximum numbers. Income is based on production per location. This is estimated at $50K per operation per year.
[4]Total of all costs for the industry is $588K. Year 2000 value of products was $781,628 ($386,628 antler + $395,000 Meat at $2.20-$2.50/lb). Revenue from antler sales has fallen in the last ten years. Industry wide cost estimate is for 14 herds, these are not all on BLM managed land, or may include BLM leases and other land used by the same herder. (Carlson 2005)

b) Environmental Justice

Seventy to eighty percent of the population in the planning area are Iñupiat and Yup'ik people, recognized minorities. Theirs is a significantly subsistence based economy characterized by high unemployment, low labor force participation, and relatively low income where the cost of

living is very high. Therefore, activities restricting subsistence practices, access, and resources will certainly affect a large segment of the local population. Arguably, creation of jobs and income provide positive effects on the environmental justice population.

Activities not associated with mineral extraction or oil and gas activities likely to occur in the planning area would primarily be transitory in nature, of short duration, and highly localized. Under all alternatives the effects of recreation, forestry, and grazing would be similar. Activities could temporarily divert, deflect, or disturb subsistence species from their normal patterns. These activities could alter the availability of subsistence species in traditional harvest areas, which could in turn affect harvest patterns by requiring hunters to travel further in pursuit of resources. Increased travel distances would result in greater expenditures for fuel and equipment, and increased wear and tear on equipment. Consequently, there could be an effect on the subsistence hunting activities of local minority populations as a result of these activities. The effect would be likely minor, short term, and highly localized. Expansion of reindeer grazing by increasing herd size would likely benefit local minority populations as jobs on the Seward Peninsula could result from herding and handling activities.

Alternatives B, or D would allow oil and gas activities in areas formerly unavailable for leasing. Year-round activities could increase the amount of area affected, increase the duration of effects, and spread the effects where development occurs in the planning area. Disturbances caused by development under Alternatives B, and D would be greater than under Alternative A. Mining of locatable minerals under Alternatives B, C, or D would not be likely to adversely affect local people since small placer operations would be seasonal, and short duration.

F. Subsistence

1. Impacts Common to All Alternatives

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to subsistence: Paleontological Resources, Visual Resources, Wilderness Characteristics, Special Designations, and Public Safety. The following resources/resource uses/programs would have negligible effects on subsistence that would be minimized through appropriate mitigation.

a) Impacts to Subsistence from Fire and Fire Management

Fire management has the potential to impact wildlife or wildlife habitat in a variety of ways, and these impacts would result in impacts to subsistence if they: 1) depleted a subsistence resource population; 2) altered the range of a subsistence species away from the traditional use area; or 3) resulted in an easier route of access for non-subsistence users into subsistence use areas, increasing the potential for competition of the resource.

Impacts as a result of fire are expected to be minimal within the planning area, as fire has been and continues to be a normal part of the ecosystem. Mitigation measures designed to reduce the impacts of fire suppression activities include limitations on the use of tracked, or off-road vehicles; measures to prevent the introduction of invasive or noxious plant species; establishment of riparian buffer zones; and rehabilitation of fire and dozer lines. Impacts as a result of suppression efforts are expected to be minimal, as most BLM-managed lands are far from the road system, minimizing the use of mechanized equipment.

b) Impacts to Subsistence from Cultural Resources

Under all alternatives, the BLM is required to inventory cultural resource sites under Section 110 of the National Historic Preservation Act. However, extensive inventory efforts consisting of cultural resource surveys, especially those involving helicopter use, do have the effect of temporarily displacing resources in the areas to be investigated. If the research was to occur in a traditional subsistence use area, the displacement of resources may have a temporary impact on subsistence for the duration of the project. Additional project-specific subsistence stipulations and ROPs created in response to the proposed activity, such as limitations or directions regarding helicopter use would serve to minimize the potential impacts.

c) Impacts to Subsistence from Locatable Minerals

Some mining exploration may occur under any alternative. Potential impacts to subsistence resources would include the temporary displacement of wildlife from harvest areas. In addition, mining activity may also result in access constraints by subsistence users, or by an increase in competition for resources if miners took the opportunity to hunt. These impacts would be minimal due to the very low level of activity anticipated (less than four notices per year), the very minimal amount of acres disturbed (less than 20 acres year within the 11.9 million acres of BLM-managed land), and the seasonal and temporary nature of the activity. Additional project-

specific subsistence stipulations and ROPs created in response to the proposed activity, such as limitations in the timing or location of the proposed activity, would serve to minimize the potential impacts.

d) Impacts to Subsistence from Mineral Materials

Mineral material disposal has both direct and indirect impacts on wildlife and their habitat, and therefore, has an impact on subsistence. In addition, mineral material activity may also result in access constraints by subsistence users, or by an increase in competition for resources. However, these impacts would be very minimal under most alternatives, as sufficient material sources exist on private lands to meet the needs of most communities within the planning area and few mineral material disposal actions are anticipated, unless a new road or other infra-structure is built on or near BLM-managed land. Additional project-specific subsistence stipulations and ROPs created in response to the proposed activity, such as limitations in the timing or location of the proposed activity, would serve to minimize the potential impacts.

e) Impacts to Subsistence from Renewable Energy

If renewable energy sources such as wind are developed on BLM-managed lands within the planning area there are minor impacts on subsistence. Direct impacts include temporary disturbance and displacement of subsistence resources during construction and maintenance activities from the area of affect. However, to be most useful, these types of development need to be located near population centers and most land near villages is private. Therefore, little renewable energy development is anticipated on BLM-managed lands, and actual impacts would not have population level effects on key subsistence resources.

f) Impacts to Subsistence from Lands and Realty Actions

BLM-managed lands are generally remote from settled areas within the planning area, and the demand for realty actions is expected to be generally low over the life of the plan. However, some displacement of subsistence resources from the area of activity may occur, resulting in an impact to subsistence. Additional project-specific subsistence stipulations and ROPs created in response to the proposed activity, such as limitations or directions regarding helicopter use, would serve to minimize the potential impacts.

2. Impacts to Subsistence Common to Alternatives B, C, and D

Several management actions for programs or resources detailed in Chapter II are common to Alternatives B, C, and D. The following describes the impacts to subsistence from these shared management parameters.

a) Impacts to Subsistence from Air Quality and Soil and Water Resources

Under Alternatives B, C, and D, support for a program of monitoring and assessment of riparian areas for proper functioning condition, water quality in critical aquatic habitats and important

recreation use areas, soils in those areas of high resource value, and impacts to OHV trails are proposed. Management decisions include setting area-wide restrictions or other protective measures in cooperation with the appropriate Federal, State, local, or tribal requirements, and applying site-specific resource protections following the ROPs listed in Appendix A for any proposed activity on BLM lands.

In general, any effort to protect soil, water and air serves to protect the wildlife resources upon which subsistence users depend, by allowing the wildlife to live in a healthy, naturally-functioning environment. Restrictions with regard to subsistence use on Federal lands can only be effected by the Federal Subsistence Board, and so those proposed under the monitoring and assessment program described above would have little to no effect on subsistence. However, extensive research projects, especially those involving helicopter use, do have the effect of temporarily displacing resources in the areas to be investigated. If the research was to occur in a traditional subsistence use area, the displacement of resources may have a temporary impact on subsistence for the duration of the project. Additional project-specific subsistence stipulations and ROPs created in response to the proposed activity, such as limitations or directions regarding helicopter use would serve to minimize the potential impacts.

b) Impacts to Subsistence from Vegetation

Vegetation management actions common to all action alternatives include identifying and monitoring lichen-rich plant communities — which are important food resources for reindeer and caribou — as well as the presence and spread of noxious and invasive plant species within the planning area. Any effort to protect vegetation that is important to wildlife that is a primary subsistence resource benefits subsistence use. However, extensive research projects, especially those involving helicopter use, do have the effect of temporarily displacing resources in the areas to be investigated. If the research was to occur in a traditional subsistence use area, the displacement of resources may have a temporary impact on subsistence for the duration of the project. Additional project-specific subsistence stipulations and ROPs created in response to the proposed activity, such as limitations or directions regarding helicopter use, would serve to minimize the potential impacts.

c) Impacts to Subsistence from Fish and Wildlife Management

Management actions under Alternatives B, C, and D for fisheries include implementing an extensive inventory and monitoring program of fish habitat, populations, and genetic stocks. Additionally, the BLM would enter into cooperative projects to implement the priority restoration work identified in the Norton Sound Aquatic Habitat Management Plan and the Norton Sound/Bering Strait Regional Comprehensive Salmon Plan, in order to increase habitat productivity in streams/lakes currently utilized by anadromous fish but producing below potential. All of these efforts serve to positively impact subsistence use of fish, by ensuring a healthy, renewable resource base. However, extensive research efforts may have the effect of temporarily limiting access to particular locations by subsistence users. Additional project-specific subsistence stipulations and ROPs created in response to the proposed activity, such as limitations or directions regarding helicopter use, would serve to minimize the potential impacts.

Management actions under Alternatives B, C, and D for wildlife include implementing an inventory and monitoring program of the habitats and populations of important subsistence and Special Status Species in order to provide the necessary information to develop subsistence regulations and bag limits on Federal lands as required by the Federal Subsistence Board. Additionally, the BLM would work cooperatively with State and other Federal agencies to implement the WACH Strategic Management Plan, the Seward Peninsula Muskox Cooperators Plan, Boreal Partners in Flight Conservation Plan, and other cooperative management efforts. All of these efforts serve to positively impact subsistence use of wildlife, by ensuring a healthy, renewable resource base. However, extensive research projects, especially those involving helicopter use, do have the effect of temporarily displacing resources in the areas to be investigated. Likewise, research efforts that may temporarily stress an animal population may result in the death of a few animals. If the research was to occur in a traditional subsistence use area, the displacement of, or the slight reduction in available resources may have an impact on subsistence for the duration of the project. Additional project-specific subsistence stipulations and ROPs created in response to the proposed activity, such as limitations or directions regarding helicopter use, would serve to minimize the potential impacts.

d) Impacts to Subsistence from Special Status Species

Impacts from management actions on Special Status Species to subsistence would be the same as those identified for vegetation and fish and wildlife above.

e) Impacts to Subsistence from Forest Products

Under Alternatives B, C, and D, a baseline forest inventory of the plan area would be conducted to determine location of both commercial and non-commercial timber, and old growth stands. Extensive inventory efforts, especially those involving helicopter use, do have the effect of temporarily displacing resources in the areas to be investigated. If the inventory was to occur in a traditional subsistence use area, the displacement of, or the slight reduction in available resources may have an impact on subsistence for the duration of the project. Additional project-specific subsistence stipulations and ROPs created in response to the proposed activity, such as limitations or directions regarding helicopter use, would serve to minimize the potential impacts.

f) Impacts to Subsistence from Recreation Management

Under all action alternatives a baseline inventory of the plan area would be conducted to determine location of recreational opportunities and monitor changes in use patterns. Extensive inventory efforts, especially those involving helicopter use, do have the effect of temporarily displacing resources in the areas to be investigated. If the inventory was to occur in a traditional subsistence use area, the displacement of, or the slight reduction in available resources may have an impact on subsistence for the duration of the project. Additional project-specific subsistence stipulations and ROPs created in response to the proposed activity, such as limitations or directions regarding helicopter use, would serve to minimize the potential impacts.

g) Impacts to Subsistence from Travel Management

Under Alternatives B, C, and D a baseline inventory of the plan area would be conducted to identify existing trails and assess resource impacts. Extensive inventory efforts, especially those involving helicopter use, do have the effect of temporarily displacing resources in the areas to be investigated. If the inventory was to occur in a traditional subsistence use area, the displacement of, or the slight reduction in available resources may have an impact on subsistence for the duration of the project. Additional project-specific subsistence stipulations and ROPs created in response to the proposed activity, such as limitations or directions regarding helicopter use, would serve to minimize the potential impacts.

3. Alternative A

Alternative A would continue present management practices and levels of resource use based on the existing Northwest MFP (BLM 1982), supplemented by direction contained in existing laws, regulation and policy. Few uses would be limited or excluded as long as they were consistent with State and Federal laws. Activities would be analyzed through the NEPA process, including an ANILCA 810 evaluation, on a case-by-case basis, and any identified impacts from the proposed action to subsistence would be mitigated through appropriate consultation and stipulations.

a) Impacts to Subsistence from Livestock Grazing

Reindeer grazing would be managed using the current system of assessing permits on a case-by-case basis. Grazing by reindeer can indirectly impact wildlife, especially caribou, by degrading habitat or reducing the availability of the preferred forage species; by the transference of diseases from reindeer to caribou; by reindeer herders attempting to separate their reindeer from caribou, or by disturbing wintering moose by reindeer herding activities, resulting in increased stress on these animals. Grazing may negatively impact brown bear and wolf populations due to the increased number of these animals harvested by herders in defense of life and property. Any impact on the WACH would have an associated impact on subsistence, as every community in the planning area utilizes harvests from the WACH for subsistence.

b) Impacts to Subsistence from Leasable Minerals

There would be no impacts to subsistence from leasable minerals under Alternative A as no leasing would occur. No exploration is anticipated.

c) Impacts to Subsistence from Locatable Minerals

Impacts would be the same as discussed under Impacts Common to All Alternatives.

d) Impacts to Subsistence from Mineral Materials

Impacts would be the same as discussed under Impacts Common to All Alternatives.

e) Impacts to Subsistence from Recreation Management

Under Alternative A, the planning area would be managed for dispersed recreational use. Recreational activities would be monitored on a casual basis. Public use trail shelters may be constructed if funding is available. No special recreation management areas would be designated. Conflicts due to increasing recreational use levels in the Squirrel River and other areas would not be addressed. Under this alternative, no limits would be set on commercial recreational use levels, however, the amount of recreational use would be dependant upon social and economic factors, and current hunting regulations.

It is anticipated that high levels of both commercial and non-commercial recreational use would continue along the Squirrel River, particularly during the moose hunting season in September. There are currently 10 guides licensed to provide hunting services in Game Use Area 23-06. Use of OHVs by guides may result in the creation of new trails into areas that were previously not easily accessible at this time of year. Wildlife used for subsistence purposes may be temporarily stressed or displaced due to the large number of camps and extensive amount of aircraft use. The Squirrel River is an important subsistence use area to residents from Kotzebue, Kiana, Noatak, and Noorvik, and the issue of impacts arising from guided hunting has been raised at community meetings (BLM 2004c). Additionally, subsistence users in Koyuk have expressed major concerns about the impact of sport-hunters in the Norton Bay area. Direct impacts to subsistence use are a result of increased competition for resources by sport hunters and guides in these heavily-used areas, as well as other units in the planning area.

Subsistence hunters in other areas of the state have also expressed a reluctance to hunt in areas that are actively used, either for development purposes or for intensive recreational activities, such as the guiding activity described above (BLM 2005i). This is not only because of the safety factor (i.e., not wanting to accidentally shoot another person), but also because of the perceived lack of “wildness” of the animals within these areas. As a result, subsistence users tend to shift away from their traditional harvest areas when too much activity from outside sources occurs within them.

Indirect impacts to subsistence can occur because of displacement of wildlife due to concentrated recreational activity. Local residents have expressed concern that migrating caribou may be diverted if they encounter high levels of activity along their migration route, resulting in animals not passing through traditional subsistence hunting areas. While caribou may be delayed by a day or two, or diverted slightly to the east or west, the current level of recreational use is not expected to significantly affect caribou migration routes.

f) Impacts to Subsistence from Travel Management

Under Alternative A, the planning area would remain undesignated and cross-country use of OHVs weighing 2,000 pounds or less GVWR would be allowed throughout. Sensitive habitat areas would not receive additional protection from OHV impacts. As a result, impacts to

subsistence may occur due to the displacement of or harm to wildlife if OHV activity was concentrated in a key traditional use area, and essential habitat destroyed.

Currently, traditional Iñupiat hunters rarely utilize OHVs for the harvest of wildlife in the planning area. However, non-Iñupiat subsistence users may utilize OHVs, and therefore, may have the beneficial impact of easier access to harvest areas under this alternative.

4. Alternative B

Alternative B focuses on resource development. In this alternative, constraints to protect resource values or habitat would be implemented in very specific geographic areas rather than across the planning area or in special designations. Seasonal stipulations for oil and gas leasing in caribou habitat would not apply under this alternative (Appendix A). Travel and trail restrictions would be minimized. The Squirrel River would be an SRMA to focus management on recreational use. In other areas recreation management would focus on dispersed recreation and management of permits.

a) Impacts to Subsistence from Livestock Grazing

This alternative has the potential for the greatest impacts to subsistence resources from grazing because of the potential impacts to the WACH. Under this alternative the entire planning area would be open to reindeer grazing, in effect reducing the amount of habitat available for the WACH. However, it is unlikely that new reindeer grazing operations would be established outside of the Seward Peninsula during the life of the plan, due to the difficulties of managing a reindeer herd in the presence of caribou.

In addition, grazing by bison could be authorized on the Seward Peninsula under this alternative. Potential impacts to wildlife from authorization of bison grazing include competition with other herbivores including moose, caribou and muskox; potential for disease transmission to subsistence species; and stress or disturbance to subsistence resources from bison herding activities. Moose populations on the Seward Peninsula are currently low. Competition between moose and bison could negatively affect moose recovery efforts, thus limiting the amount of potentially harvestable resources to subsistence users.

b) Impacts to Subsistence from Leasable Minerals

(1) Seismic Exploration

Under this alternative, seismic exploration for oil and gas or coal would be allowed during the winter months (from December to April), and this activity could have direct impacts on subsistence resources, including temporary displacement and stress to wildlife. In general, large mammal responses to seismic activities in the planning area are expected to be a temporary avoidance of the local area, with reoccupation of the area after the exploration activities are complete.

Seismic exploration would have minimal effects on caribou as exploration would occur during the winter when most of the WACH has migrated south of the Brooks Range. However, some portion of the WACH winters on the North Slope or Cape Lisburne area every year, and these

animals could be temporarily disturbed due to seismic activity and associated air travel to and from the seismic areas. Unlike caribou, muskox are not able to travel and dig through snow easily. In the winter, they search out sites with shallow snow, and greatly reduce movements and activity to conserve energy, causing them to be more susceptible to disturbances during the winter. Repeated disturbances of the same animals during winter could result in increased energetic costs that could increase mortality rates

Subsistence activities that occur during the winter season, and therefore could be affected by seismic exploration or exploratory drilling include: furbearer hunting and trapping, fishing, and hunting of large mammals such as caribou, moose, and muskox. Recent testimony by community members from Barrow and Nuiqsut, where seismic activity is common has indicated that seismic exploration does interfere with overland travel by snowmachine (Brower 2002). Specifically, the deep ruts left in the snow by seismic vehicles create difficult terrain to traverse, and result in excessive wear-and-tear on both snowmachines and the sleds that are pulled behind them. Replacement or repair of these tools that are used for subsistence harvesting is costly. However, despite the hindrance and annoyance, seismic exploration does not create a substantial barrier between communities and subsistence resources.

Indirect impacts to subsistence resources from seismic operation may include degradation of habitat (impacts to soil and vegetation) due to seismic exploration. These types of impacts would be reduced by implementation of the ROPs, including the standard practice of limiting seismic surveys to the winter when the ground is frozen and covered with snow (ROP Veg-2e).

(2) Exploratory Drilling

Impacts to subsistence from exploratory drilling would be similar to those discussed under seismic exploration. Exploratory drilling will also only be allowed during the winter, so disturbance would result primarily from aircraft and surface traffic, and activities associated with ice road and drill pad construction. Wildlife may temporarily avoid the local area but would reoccupy the area after the exploration activities are complete.

Exploratory drilling activities could alter the availability of subsistence species in traditional harvest areas through direct interference with hunts. This direct interference could affect harvest patterns by causing a failed hunt, or by requiring hunters to travel further for a successful harvest because the subsistence resources are more wary than normal following a disturbance or are deflected from traditional harvest areas following the presence of vehicles and aircraft. Increased travel distances would result in greater expenditures for fuel and equipment, as wear and tear on snowmachines, outboards, and four-wheel vehicles would occur.

Impacts to subsistence would also result if access to traditional use areas was limited by the exploration activity due to safety factors and/or regulations. This type of access limitation is rare, and is only anticipated to result in temporary and localized effects to subsistence use.

(3) Development

Under this alternative, the reasonably foreseeable scenario is that at most, only one oil field would be developed in the northern quarter of the planning area, most likely what is considered insect-relief habitat for the WACH (see section 3(b), Wildlife, for potential impacts to WACH). It would consist of several well pads connected to a central processing facility (CPF) and airstrip. Development would occur within 25 miles of the CPF with five total satellite fields (including the

CPF). Although initial construction would occur primarily during winter, development will bring year-round facilities and activities to wildlife habitat in the vicinity of the CPF in the northern part of the planning area. Potential effects of development activities to subsistence resources include direct habitat loss from gravel mining and oil field facilities, and indirect habitat loss through reduced access caused by physical or behavioral barriers created by roads, pipelines, and other facilities.

During the construction phase, caribou and other large mammals would most likely avoid the area of development, due to the noise and disturbance caused by construction activities. The effects of disturbance from permanent oil and gas facilities on terrestrial mammals during the production phase would be of relatively long duration (10-30 years), but would be local in nature. This disturbance would consist of noise from the CPF, noise and visual impacts from traffic on the roads between the production pads and the CPF, and aircraft flights to the area. These effects would continue until species were able to habituate to the new environment, which could take several years (e.g., for infrastructure), or could never occur (e.g., for human and vehicle activities; Murphy and Lawhead 2000). Subsistence resources such as caribou, moose, and muskox would likely avoid the area of oil and gas activity and new infrastructure, which would make them more difficult to locate and harvest by hunters. As a result, the expense associated with the harvest of subsistence resources could increase, possibly reducing the amount of traditional foods available to the community. These effects would continue until species were able to habituate to the development and associated structures.

Access by subsistence users could be hindered by pipelines or other infrastructure, resulting in users from Point Lay or Point Hope having to travel greater distances to avoid any barriers. Based on data from Pedersen et al. (2000) and Pedersen and Taalak (2001), as a consequence of oil development, Nuiqsut harvesters avoid development. The avoidance of development by harvesters has two aspects: 1) the concern that discharging a firearm near the various facilities and infrastructure will result in liability for damage, death to a worker, or serious environmental consequences (e.g., an oil spill resulting from a punctured pipeline); and 2) the belief that animals that have habituated to oil and gas infrastructure are contaminated and not safe for human consumption (BLM 2005i). While this sentiment has not been documented for subsistence users within the planning area, it may still apply should development occur. As a result, the total area of any development in the planning area could be effectively removed from the traditional harvest area of a given community.

(4) Effects of Spills

The effects of oil spills on subsistence species would depend upon the size of the oil spill and the environment in which the oil spill occurred. Spills contained on pads (small and some large) would likely have few long lasting or wide-ranging effects on subsistence species. In addition, oil spills (small and large) on the land, if they did not escape to a waterway and occurred on snow or frozen ground, would likely have few long lasting or wide-ranging effects on subsistence species if properly cleaned up. On-land oil spills could affect small numbers of terrestrial mammals and waterfowl that were unable to avoid the spill area, but would be unlikely to have population-level effects, unless the spill seeped into a lake, river or stream. Oil spills directly into a water body, particularly under conditions that made them difficult to contain, such as breakup or broken ice, could spread widely and be toxic to fish and waterfowl. In the nearshore environment, a large spill, particularly during broken ice or storm conditions, could also affect marine mammals, such as seals, and beluga and bowhead whales.

Under Alternative B, the parameters to be used to analyze impacts of a large oil spill are defined as: 1) a release of 500 to 900 bbls; 2) the oil spill reaches the environment, with no cleanup or containment; and 3) the location and timing of the spill is that of greatest potential impact to the resource or program. For subsistence, the potential greatest impact as a result of a large spill would result if the spill occurred in the spring, just before breakup, and resulted in a release of crude oil into a river or stream below the ice, which in turn was released during breakup into the near coastal waters of the Chukchi Sea during the breakup surge. If oil were to be spilled in a waterway in large volumes, waterfowl, fish, and marine mammals could be fouled, contaminated, or killed. A large spill may be immediately toxic to fish, and could contaminate them for years even in apparently cleaned habitats. Waterfowl and marine mammal populations could be affected by the death of animals from hypothermia caused by oiling, reactions to toxic components of spilled oil, and gastric distress resulting from attempts to clean themselves. In addition, scavengers feeding on their remains, such as foxes, could also be harmed.

If a large spill were to occur on the tundra near or within the core calving or insect-relief area of the WACH during the period of intensive use by the caribou, the spill itself may not widely affect the herd. However, an extensive clean-up effort consisting of people, machinery and helicopter use could have the result of seriously stressing the herd, resulting in increased mortality or decreased productivity.

A large oil spill into nearshore marine or coastal riverine environments within the planning area could cause injury or death to sea mammals or cause them to move off of their normal course, thereby making them unavailable for subsistence harvest. In this unlikely event, residents would lose an important source of subsistence food as well as face issues of contamination, increased cost and effort to replace lost resources, social disruption due to resource damage and inability to participate in the spring sea mammal harvest, and financial hardship cause by the loss of a major source of subsistence food.

An estimated 89 small spills of crude oil, or 220 small refined oil spills is proposed for analytical purposes. Both of these types of spills would result in a total of less than 500 bbl in each scenario, and would result in the same types of potential impacts discussed above, albeit to a lesser extent. However, an oil spill of any volume into a river system or lake could have effects on subsistence fish harvests. Loss of some portion of the subsistence fish harvest would negatively affect the majority of communities in the planning area.

Oil spills also have the potential to impact subsistence harvest patterns indirectly, in that subsistence users will decrease harvests of a subsistence resource if they fear the resource has been contaminated. Subsistence users would likely also allow for a period of time for the impacted resources or resource area to recover following exposure to oil, effectively reducing the total number of acreage available to them for subsistence harvest.

c) Impacts to Subsistence from Locatable Minerals

Under Alternative B mineral development would occur. However, the development of three to five small placer mines is anticipated to have negligible impacts on subsistence resources. Impacts would be localized in the immediate vicinity of the mines. In these specific areas, wildlife would be displaced and an estimated 10 acres of habitat would be unavailable during the life of the operation, but would not have population level impacts.

Impacts to subsistence use would occur if the placer mining operations were located in traditional harvest areas, resulting in access and possible displacement issues. Implementation of site-specific stipulations and ROPs, such as limitations in the timing or location of the proposed activity, would reduce impacts to resources and subsistence use.

d) Impacts to Subsistence from Mineral Materials

Under Alternative B, the entire planning area would be made available for salable material exploration and development. Impacts to subsistence resources would result due to displacement and/or habitat loss in areas of activity, which could affect wildlife populations, depending on the scope of the development. Traditional harvest areas could be impacted if development was to occur within their boundaries, and access could be affected.

e) Impacts to Subsistence from Recreation Management

For most of the planning area, impacts to subsistence would be similar to those discussed under Alternative A. However, under this alternative, limits would be set on commercial recreational use levels in the Squirrel River, thus lowering the potential impacts to subsistence users in this area. Commercial use would be limited by capping the number of guides allowed to operate within the area during high use periods, thus reducing the competition for subsistence resources. In addition, the rest of the planning area would be managed as an Extensive Recreation Management Area, with a case-by-case review of those activities that require a BLM permit, resulting in the potential to reduce impacts to subsistence.

f) Impacts to Subsistence from Travel Management

Impacts would be similar to those discussed under Alternative A. Although the planning area would be designated as “limited”, the limitations would result in the same types of OHV use that are occurring under Alternative A.

g) Impacts to Subsistence from Lands and Realty Actions

Under Alternative B, large blocks of BLM-managed lands would be retained in Federal ownership, reducing the potential for habitat fragmentation for resources, and allowing for continued Federally recognized subsistence use and management. Alternatively, lands not identified for retention would be available for disposal. Privatization of BLM-managed lands would increase levels of human activity, and would revoke subsistence as the priority consumptive use. Depending upon the location of the parcels, access by subsistence users may be limited, and increased access by non-residents may increase, potentially resulting in the displacement of resources from preferred habitat, or an increase in habitat destruction or degradation. However, disposal of BLM-managed lands are expected to be minimal over the life of the plan and lands would not be disposed of until conveyances are complete.

5. Alternative C

Alternative C emphasizes active measures to protect and enhance resource values, thus limiting the amount of development that could occur in the planning area.

a) Impacts to Subsistence from Livestock Grazing

Impacts to wildlife from livestock grazing would be similar to those discussed under Alternative A. Reindeer would be the only type of livestock authorized, and grazing would be limited to the Seward Peninsula, and the potential for conflicts between subsistence resources and grazing would be reduced slightly by the closure of McCarthy's Marsh, upper Kuzitrin River, the Baldwin Peninsula allotment, and the Buckland River allotments to grazing. These areas include winter caribou range and important winter habitat for moose. Areas where reindeer have been absent for more than 10 years would also be closed to grazing, which may result in the expansion of the WACH into these areas and result in increased access to caribou by subsistence users.

b) Impacts to Subsistence from Leasable Minerals

Impacts to subsistence from leasable minerals would be similar to but less than impacts under Alternative B, as the high potential areas would be closed to leasing. Due to this closure to leasing, the probability of seismic exploration occurring in the planning area would be very low, and effects to subsistence use negligible.

c) Impacts to Subsistence from Locatable Minerals

Impacts to subsistence would be similar to those discussed under Impacts Common to All Alternatives. No mineral development is anticipated under this alternative, even though exploration may occur under a mining notice.

d) Impacts to Subsistence from Mineral Materials

Impacts to wildlife from mineral material disposal would be similar to but less than impacts projected under Alternative B. Two sensitive habitat areas, McCarthy's Marsh and the Kigluaik Mountains would be closed to mineral material disposal, providing additional protection to the habitat in these areas.

e) Impacts to Subsistence from Recreation Management

Under this alternative, limits on commercial use would be established in several areas, including the Koyuk, Inglutalik, Ungalik, Shaktoolik, Buckland, and Agiaupuk rivers, the Nulato Hills, Bendeleben Mountains, and McCarthy's Marsh. This would reduce the potential for impacts to subsistence from recreational activities. Under this alternative, limits would be set on both non-commercial and commercial recreational use levels in the Squirrel River, resulting in benefits to subsistence users as a result of the decrease in competition for subsistence resources.

A Salmon Lake-Kigluaik Mountain SRMA would be established and managed as a semi-primitive motorized area. Management would focus on enhancing the recreational experience while protecting natural resources. Over the long-term, management of this area for recreation may result in increased visitor use and a greater potential for disturbance impacts to wildlife, including impacts to subsistence access and use. However, this allowable use may also serve to alleviate impacts to subsistence in other areas, by providing an area specifically designated for recreational use.

f) Impacts to Subsistence from Travel Management

Under this alternative, the entire planning area would be limited to designated trails, and guides and outfitters would not be permitted to use ATVs during the summer. This would provide beneficial impacts to subsistence use, in that wildlife would not be displaced due to unchecked OHV activity and wildlife habitat would not be degraded.

g) Impacts to Subsistence from Lands and Realty Actions

Under this alternative, several ACECs would be designated including: the WACH calving and insect relief habitat, and core winter habitat in the Nulato Hills; and moose, caribou and waterfowl habitat in McCarthy's Marsh and upper Kuzitrin River. Constraints on realty actions within these ACECs would provide additional protection to wildlife habitats within these areas, reducing the potential for habitat degradation, fragmentation, and reducing the potential for disturbance impacts to subsistence resources. ANILCA provides for the opportunity for subsistence use on all Federal lands, and, therefore no restriction to subsistence use would apply as a result of the creation of the ACECs. By creating ACECs to protect the habitat of key subsistence species, future subsistence use of these resources is also protected.

6. Alternative D

Alternative D emphasizes a moderate level of protection, use, and enhancement of resources and services. Constraints to protect resources would be implemented, but would be less restrictive than under Alternative C.

a) Impacts to Subsistence from Livestock Grazing

Impacts to subsistence from grazing would be similar to Alternative A.

b) Impacts to Subsistence from Leasable Minerals

Impacts to subsistence from leasable minerals would be similar to those described under Alternative B, but would be lessened as a result of additional required operating procedures and special stipulations in place for the Nulato Hills, Kivalina River, and WACH calving and insect relief habitat.

c) Impacts to Subsistence from Locatable Minerals

Impacts to subsistence would be similar to Alternative B but slightly lesser in extent. Under this alternative, it is anticipated that 3-5 placer mines of approximately 10 acres each would be developed, resulting in localized impacts to subsistence use. Additionally, the 300-foot setback (ROP FW-7a) from the banks of active stream channels on the Kivalina, Ungalik, Shaktoolik, Inglutalik, Koyuk including the East Fork, Tubutulik, Kuzitrin, Agiapuk, Pah, and Noatak rivers would protect fisheries and subsistence use along these rivers

d) Impacts to Subsistence from Mineral Materials

Impacts to subsistence from mineral materials disposal would be the same as Alternative B.

e) Impacts to Subsistence from Recreation Management

Under Alternative D, 726,000 acres of the Squirrel River would be designated as a Special Recreation Management Area, with specific management controls regarding use effective upon plan approval. For example, the number of guiding permits allowed in the Squirrel River SRMA will be limited, and air transporters will now be required to obtain permits from the BLM. Future recreational use levels in the Squirrel River would be established through a RAMP to be developed within three years of plan approval, with significant input from local communities and users. In addition, an Extensive Recreation Management Area has been developed the remainder of the planning area, and will provide interim management goals, including management controls on commercial use. These measures all serve to reduce impacts to subsistence use as a result of decreased competition for resources, as well as benefits to subsistence resources due to a reduction in impacts to habitat.

f) Impacts to Subsistence from Travel Management

Impacts to subsistence from travel management and OHV management would be same as Alternative B; however, there would be less of an impact to subsistence in designated ACECs, RNAs, and SRMAs where OHV use may be limited.

g) Impacts to Subsistence from Lands and Realty Actions

Impacts to subsistence would be the same as Alternative B.

G. Cumulative Impacts

The National Environmental Policy Act (NEPA) and its implementing guidelines require an assessment of the proposed project and other projects that have occurred in the past, are occurring in the present, or are likely to occur in the future, which together may have cumulative impacts that go beyond the impacts of the proposed project itself. According to the Act (40 CFR Sec.1508.7 and 1508.25[a][2]):

A **cumulative impact** is the impact on the environment that results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. In addition, to determine the scope of environmental impact statements, agencies shall consider cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement.

The analysis of cumulative impacts is a four-step process that follows guidance provided in Considering Cumulative Effects under NEPA (CEQ 1997).

1. **Specify the class of actions whose affects are to be analyzed.** Activities allowed under the RMP and advances in technology are considered in the analysis. The assumptions and scenarios used by the resource specialists in the analyses of the cumulative impacts include those identified for the planning area in Analysis Assumptions beginning on page 4-5.
2. **Designate the appropriate time and space domain in which the relevant actions occur.** For some resources and uses, the area of which an effect could be felt would be the “footprint,” but for others the effect may extend well beyond that space. For example, noise effects to wildlife can extend beyond the footprint of the development. For purposes of this analysis, the spatial domain for past, present, and reasonably foreseeable activities is primarily the planning area. However, this document also considers effects to resources that could occur outside of the planning area, primarily to migratory birds and mammals (e.g. activities on the North Slope of Alaska). Due to the difficulty of predicting advances in technology and the need for oil and gas very far into the future, the analysis period which most of the cumulative effects analysis is focused, is 50 years into the future.
3. **Identify and characterize the set of receptors to be assessed.** The set of receptors assessed in the cumulative effects analysis are the physical, biological, and human systems discussed in Chapter III.
4. **Determine the magnitude of effects on the receptors and whether those effects are accumulating**. The potential extent of the total cumulative effects (e.g., number of animals and habitat affected, jobs and revenues created or lost), and how long the effects might last (e.g., population recovery time, duration of income flows) are estimated to determine the magnitude of effects that could accumulate for each resource. Where possible, the assessment of effects on a resource is based on quantitative analysis (e.g., number of miles of gravel constructed; number of animals killed). However, many effects are difficult to quantify (e.g., animal behaviors; human perceptions) and a qualitative assessment of effects is made.

1. Activities Considered in the Cumulative Case

The following are past, present, and reasonable foreseeable future actions either inside or outside of the planning area. Actions outside the planning area include those that could contribute to cumulative effects on resources within the planning area. BLM had issued a Notice of Intent to develop an integrated activity plan for South NPR-A. On May 14, 2007 a decision was made to stop the planning effort for South NPR-A (News Release No. 07-21). No leasing or development of either oil and gas, or hard rock minerals in south NPR-A is anticipated during the life of the RMP.

a) Past Activities

- Oil and gas exploration and development has occurred on the North Slope during the past 80 years. The most intense development activity occurred during the 1970s and early 1980s. It was during this period that the Prudhoe Bay and Kuparuk oil fields were developed, TAPS and the haul road were constructed, and a large portion of the roads, drilling pads, gravel sources, collector pipelines, and production facilities were built. It was also a period of much activity in the National Petroleum Reserve-Alaska (NPR-A), with thousands of miles of seismic lines surveyed and dozens of exploratory wells drilled. Since then, additional development has occurred, but incremental physical disturbance to the environment has been reduced (BLM 2005h).
- Within the NPR-A, nearly 15,000 miles of seismic survey was completed and interpreted between 1974 and 1982. Seismic work was discontinued after1982 and did not resume until 1994 after the discovery of the Alpine Field. The total line-miles of seismic data acquired are not known but include at least 2,615 line-miles (BLM 2005h).
- In the 1980s, 1999, 2002, 2004, and 2006, BLM held oil and gas lease sales for portions of the NPR-A. Leasing in the early 1980s resulted in the drilling of only one industry exploration well, located about 40 miles south-southwest of Point Barrow (BLM 2005h). The BLM re-instituted leasing in the Northeast NPR-A in May 1999 resulting in the leasing of 861,368 acres. The bulk of the leased areas are in the vicinity of Nuiqsut and between Teshekpuk Lake and the Ikpikpuk River. After the 1999 sale, industry began an extensive drilling program in this area. Nine wells were drilled in 2000 and 2001. Additional sales held in 2002, 2004, and 2006 resulted in leasing to the south and west of previously acquired leases. Through 2006, 21 wells have been drilled in NPRA with oil and/or gas discoveries on at least five of the wells. The size of the discoveries has not been made public, but the operators have indicated that the oil reserves are at least equal to those of the Alpine field.

b) Present and Reasonably Foreseeable Future Activities

- The Nome Road System includes approximately 200 miles of gravel road originating in Nome. The Nome-Teller Highway runs northwest from Nome to the village of Teller; the Council Highway runs east and north to the seasonal community of Council; the Taylor Highway runs north of Nome to the Kougarok River.
- The 29 mile Point Hope Multi-Purpose Road, included in the Northwest Alaska Transportation Plan (ADOT&PF 2004), could be constructed during the life of the plan. As of February 2006, $4.5 million was earmarked to upgrade the existing road and possibly begin the extension of the road (Gardino 2006).

- The Rock Creek Project, located on the Seward Peninsula includes two project components: the Rock Creek Mine/Mill Complex about 6 miles north of Nome and the Big Hurrah Mine located 42 miles east of Nome in the Solomon River watershed. The Rock Creek Mill complex will consist of an open pit gold mine, two rock dumps, a gold recovery plant, and tailings storage facility. Expected mine life is about five years. The Big Hurrah component consists of a smaller open pit gold mine and several stockpiles. Mine life is estimated to be four years. These developments are taking place on private lands (Alaska Gold Company 2006).
- As of 2004 the Red Dog Mine reports approximately 1,800 impacted acres on private land. This includes a 220 acre pit, 540 acre tailings impoundment, 300 acre waste dump, 11 acre subore stockpile, and 45 acres for the mill and other facilities. This does not include the haul road or the port facility. Over the life of the mine, the pit alone is expected to expand to three times its present size. Exploration of mineralization in areas adjacent to Red Dog Mine is ongoing. A 52-mile haul road constructed and owned by the State connects the mine to the De Long Mountain Terminal. This is the only industrial road in the region.
- The De Long Mountain Terminal is an existing facility located on State lands at Portsite, north of Kivalina used to receive, store and load ore concentrate from Red Dog Mine. There are plans to upgrade this facility. If the project is approved and funding available, construction could potentially occur 2009-11. The tentatively recommended plan includes construction of an approximately 18,500-foot-long, 53-foot-deep dredged channel leading to a 1,450-foot-long trestle, carrying a roadway and enclosed concentrate conveyor from shore to a deep-draft dock. In addition, the dock would have the capability to offload ocean going fuel tankers, with the fuel being stored in the existing fuel tank farm. The fuel would then be used for operations of Red Dog Mine and Portsite, and would be transshipped through the existing lightering barge dock to coastal and riverine fuel barges to serve numerous villages in northwestern arctic Alaska. The tentatively recommended project would provide the annual capacity for a projected throughput of 1,544,000 short wet tons (swt) of base metal concentrate and import of about 52,700,000 gallons of fuel (U.S. Army Corps of Engineers 2005).
- Improvements to Portsite could result in additional development in the Northwest Arctic Borough or North Slope Borough. Those considered reasonably foreseeable include: expansion of Noatak airport; fuel transfer to communities; road system from De Long Mountain Terminal System to communities; Kivalina relocation; and natural gas exploration near Red Dog Mine (U.S. Army Corps of Engineers 2005).
- There are 25 producing oil fields on the North Slope, with Prudhoe Bay, Kuparuk River, Alpine field, Northstar, Point McIntyre, and Milne Point being the most productive.
- It is assumed for analysis purposes that all oil that is accessible under the Northwest NPR-A ROD will be produced. This approach suggests more development and production than was analyzed in the Northwest NPR-A IAP/EIS (BLM 2003b) and likely greatly overstates the level of development that would occur. To develop the approximately 4,100 MMbbls of oil that is accessible within Northwest NPR-A, BLM anticipates the following amount of development: as many as 94 exploration wells, 71 delineation wells, 6 central production pads (540 acres), 300 satellite pads (300 acres), three staging bases, six pump stations, 300 miles of gravel road, 300 miles of gathering lines, and 295 miles of sales pipelines would be constructed (BLM in prep.). This scenario, assumes a peak oil production of 83 MMbbl per year.
- The Alpine oil field, which began producing on the Colville River Delta in 2000, is the closest oil field infrastructure to the planning area (approximately 300 miles to the east). The Alpine oil field encompasses approximately 890,000 acres of Federal, State, and

private lands near the eastern edge of the NPR-A. Oil is transported through a 34-mile pipeline to the Kuparuk River Unit. Ice roads and bridges provide access during the winter; otherwise there are no overland routes to this isolated field. The existing footprint of the Alpine oil field infrastructure, excluding the pipeline to the Kuparuk River, is approximately 170 acres. The field currently includes four production pads, with plans for an additional three. Pads CD-1, CD-2, CD-3, and CD-4 have been constructed and have come into production. Another production pad on Native Corporation Land (CD-5) is likely to be constructed and come into production in the next few years (Schultz 2007). Plans to construct satellite developments associated with the Alpine field (production pads CD-6 and CD-7) in the eastern portion of the NPR-A are being prepared (BLM 2004e), and construction would likely begin in 2010 or later.

- In the Northeast NPR-A planning area the following exploration and development is assumed for analysis purposes (based on Alternative C): 250 miles of 2-D seismic survey lines, 10, 560 miles of 3-D seismic survey lines, 120 oil exploration wells, 90 oil delineation wells, seven central processing facilities, 32 gravel production pads, seven gravel runways, 320 miles of in-field roads, 320 miles of gathering lines, 182 miles of sales oil pipelines, seven pump stations, four staging bases, and 16 gravel pits. An estimated 7,781 acres of short-term disturbance and 4,649 acres of long-term disturbance would result from this development (BLM in prep).
- State and Native entitlements will be met during the life of the plan. Up to 7 million acres within the planning area may be conveyed out of Federal ownership.
- Land conveyed to the State will fall under management prescribed in the Northwest Area Plan for State Lands (ADNR 1989) or other future plans developed by the State. Under the current State planning document, most state land, will be kept in public ownership and managed for multiple-use. Most state land will be open to mineral entry and coal leasing. All state land will be available for oil and gas leasing.
- Approximately 285,000 acres of State land within the Northwest Arctic Borough (NAB) would be conveyed to the Borough. Most of this land will be acquired in the Kobuk, Candle, Wulik, and Squirrel watersheds. Once conveyed, this land would be managed consistent with the Northwest Arctic Borough's Comprehensive Plan and Title 9 of the NAB Municipal Code. Title 9 NAB provides for a wide variety of activities.
- The North Slope Borough has selected approximately 26,000 acres of State land within the planning area: approximately 5,000 acres on barrier islands in the north and 21,000 acres about 40 miles southeast of Point Hope. However, the North Slope Borough may meet their entitlement (89,000 acres) in other areas of the Borough, outside of the planning area.
- Land conveyed to native corporations would fall under management prescribed by the Native Corporation. Title to the mineral estate under these lands is conveyed to regional Native Corporations and may be available for development in the future.
- The Minerals Management Service (MMS) has produced a hypothetical development scenario as part of the Chukchi Lease Sale 193 Draft EIS (MMS 2006). The scenario assumes an abrupt increase in the level of activity compared to the past. The Chukchi is viewed as one of the most petroleum-rich offshore provinces in the country, with a mean recoverable oil resource of 12 billion barrels (Bbbl). The actual size and location of future oil and gas developments in the Chukchi are uncertain. However, for purposes of analysis, the MMS estimated that one oil field containing 1 billion barrels (Bbbl) would be developed as a result of Sale 193. The scenario for new petroleum development in the Chukchi took into account existing infrastructure on the North Slope because it is likely that future projects in northern Alaska will be tied into these facilities. Under this scenario, production from the Chukchi lease sale area could begin in 2020 with peak oil

production rate from the first offshore field assumed to be approximately 225,000 bbl per day. Leasing to production would take approximately 15 years. The total life-cycle of the offshore project could last 30-40 years with 25 years of oil production.

- Approximately, 100,000 line miles of 2-D seismic data has been collected to date in the Chukchi Sea. Exploration will continue, including 3-D seismic surveys which would take place during the open water season (May-September). Survey times average 20 to 30 days to cover a 200 sq-mi area. The 3-D surveys could begin before the November 2007 lease sale. Up to 4 surveys could take place annually. During seismic surveys, the vessels are largely self-contained and helicopter support flights average one per day (MMS 2006).
- If a commercial discovery is made in the Chukchi Sea as a result of Lease Sale 193, a new shorebase would be constructed. Heavy equipment and materials would be moved to the coastal site using barges, aircraft, and winter ice roads. Transportation activities would be more frequent during the construction phase (three years), beginning about 3 years after the discovery. The overall level of transportation in and out of the shorebase would drop significantly after construction is completed. During production operations aircraft would generally be smaller with less frequent flights (2 per day). Ice road traffic would be intermittent (MMS 2006).
- There is no infrastructure in NPR-A at the present time, so a new large-diameter gathering line would have to be constructed from the Chukchi coast to the Prudhoe Bay area (MMS 2006). The pipeline and communication lines would be constructed on elevated vertical supports during the winter to connect with the western extent of the TAPS pipeline infrastructure (about 300 miles). Pump stations would be needed at about 100-mi intervals and where possible would be co-located with oil field facilities. The size and location of the overland pipeline would be influenced by future discoveries and development in the NPR-A, but it is assumed that it would be oriented west-east in the shortest corridor to TAPs.
- In 2006 Arctic Slope Regional Corporation began a five year coal exploration project on corporation lands south of Point Lay.

c) Speculative Activities

- The Northwest Alaska Transportation Plan (ADOT&PF 2004) outlines the possibility of the development of a Yukon River Highway. If this entire route were constructed, it would create road access from the Elliot Highway west of Fairbanks through the southern edge of the planning area to Nome. The highest priority segments of the Yukon River Highway are located east of the planning area and it is highly unlikely that highway segments in the planning area would be completed during the life of this plan.
- Other road projects in the Northwest Alaska Transportation Plan include inter-village roads within the region, without a connection to the statewide road system. Inter-village roads would provide greater access to boat launch sites, permanent barge operations, gravel sources, and improve community connections. Recommended road projects within the planning area include (ADOT&PF 2004): 19 miles of road in the Northwest Arctic Borough; and 130 miles of road in the Seward Peninsula region.

2. Resources

a) Air Quality and Soil and Water Resources

(1) Cumulative Impacts to Air, Soil, and Water from Minerals

Cumulative effects to soil resources would largely result from surface disturbing activities that degrade the vegetative cover over the ice-rich permafrost soils, resulting in thermokarst erosion and subsidence. This is especially true in wetland soils, along the stream banks, and lakeshores, where the wave action of the water would accelerate the removal of the melting ice-rich soil, resulting in increased sediment erosion and changes to stream channel and bed morphology. Thermokarst erosion could also result from the cumulative effect of seismic and exploration activity when less than ideal snow conditions expose tussock tundra to surface disturbance during winter months. Habitat maintenance and enhancement through adherence to the ROPs and Stips would prevent the unnecessary long-term disturbance to soils.

Cumulative effects to water resources from oil and gas exploration and development in the planning area and across the North Slope could result from: 1) disturbance of stream banks or lake shorelines from oil and gas operations and the possible subsequent melting of permafrost (thermokarst erosion); 2) temporary blockages of natural channels and floodways during construction of roads and pipelines that would result in the disruption of drainage patterns; 3) increased erosion and sedimentation in rivers and lakes; 4) the removal of water from lakes for ice roads and pads; 5) increased use of the tundra for both oil and gas and non-oil and gas activities; 6) an increased amount of seismic surveys; and 7) removal of gravel from riverine pools and lakes. The cumulative case assumes exploration and development for all of the planning area. Thus, the effects on water resources could be several times greater than those estimated under any of the alternatives. The ROPs and Stips provided for each alternative, would reduce impacts from oil and gas exploration and development and keep impacts to water resources at a minor to moderate level. Outside of the planning area, increased use of material sites, use of lakes as a water source for ice roads, and dust created by additional traffic on existing roads could cause impacts to water resources. Adherence to the ROPs and Stips for all permitted operations would prevent the unnecessary long-term sedimentation in streams or lakes. Coordination with FWS, ADF&G, and local agencies would continue to be essential for development that will likely occur across managerial boundaries.

Overall, the cumulative effects of oil spills on water resources on the North Slope, because the spills have been small and cleanup and rehabilitation efforts have generally been successful, have not been significant (NRC 2003). Cumulative effects of North Slope activities on water quality, Section V.C.1 of the Beaufort Sea Planning Area Sales 186, 195, and 2002 EIS (MMS 2002), are incorporated here by reference and summarized below. If a large oil spill were to result from oil and gas development in the Beaufort Sea, the marine environment would be degraded through the release of petroleum hydrocarbons into the water column. Small spills could exceed the acute-toxic level a day or less and chronic criteria could be exceeded for less than a month.

Cumulative air quality impacts may result from the emissions of hydrocarbons and byproducts of combustion. These impacts may be regionally additive (e.g., increased concentrations of specific pollutants) or synergistic (e.g., chemical reactions that form ozone), and could degrade air quality. Ambient air quality on the North Slope of Alaska, however, is relatively pristine even though oil and gas exploration, development, and production have been under way for more than 30 years. Given this expected development would be small compared to the emissions from Prudhoe Bay and Kuparuk oil field production; projected emissions from the alternatives would account for only a small percentage of current and projected emissions.

Arctic haze is a phenomenon resulting from elevated concentrations of fine particulate matter found over the Arctic, primarily in winter and spring. Scientists believe that most of the pollutants contributing to Arctic haze are from combustion sources in Europe and Asia. It is not known to what extent local sources in Alaska contribute to Arctic haze in the area of the Beaufort Sea. However, the arctic haze phenomenon was first observed in the 1950s, long before oil development started on the North Slope. Since oil development from all alternatives would be small compared to the emissions from Prudhoe Bay and oil field production; projected emissions from the alternatives would account for only a tiny percentage of current emissions.

Based on this assumption, the regional greenhouse gas emissions associated with future cumulative production would be small compared to the emissions from Prudhoe Bay oilfields, while greenhouse gas emissions associated with production activities can be reduced by using more fuel-efficient power generating equipment and vehicles and minimizing flaring. While the continued emissions of greenhouse gas to the atmosphere will affect climate, ocean and freshwater chemistry (Caldeira 2005), the cumulative future oil production in the planning area would produce a minimal contribution to global greenhouse gas emissions. Nationwide and global greenhouse gas emissions could be reduced by conserving energy, improving energy efficiency, and developing alternative energy sources.

Despite considerable oil- and gas-related activity since 1969, the overall air quality on the North Slope of Alaska remains relatively pristine. See Resources, Air Quality section in Chapter III for a discussion of the existing air quality in the planning area. Modeling performed for the Lease Sale 144 Final EIS (USDOI, MMS, 1996a) showed that impacts from widely scattered emissions sources on the outer continental shelf (OCS) are small and well within regulatory standards. The Final 5-Year Program EIS for OCS Oil and Gas Leasing Program 2002-2007 (MMS 2002) discusses the cumulative effects of the OCS Program in all areas. The relevant major finding was that no major degradation of onshore air quality is predicted. Air monitoring at a number of sites in the Kuparuk and Prudhoe Bay fields showed that concentrations of nitrogen dioxide, sulfur dioxide, and particulate matter 10 micrometers or less are well within the national ambient air-quality standards. Since any projected development in the planning area would be small compared to the combined Prudhoe Bay and Kuparuk oilfields, there would be very little cumulative interaction between developments under this proposal and other oil-producing facilities.

Potential impacts from future lease sales on the outer continental shelf and on land are difficult to evaluate. However, one can expect that any development would be small compared to Prudhoe Bay and Kuparuk, scattered over a rather large area, and well within existing regulatory standards.

(2) Cumulative Impacts to Air, Soil, and Water from Lands and Realty Actions

Privatization of State or Native corporation lands has the potential to open up areas to private development. There would be a limited demand for State and Federal ownership adjustment through land exchanges. While land use authorizations such as rights-of-way would continue to fluctuate with the degree of economic development, the expected level of development would generally remain low.

(3) Cumulative Impacts to Air, Soil, and Water from Travel Management

Development of regional roads and access would have the single greatest impact to air, soil, and water resources. These impacts would occur along the entire length of road, include soil compaction and thermokarst erosion, stream diversions, impoundments, increased sediments runoff, and increased airborne particulates, especially during construction. Material sites required for road construction would create similar additional impacts. Limiting the length of the roads would have the greatest reduction in impacts to the soil, water, and air resources. The Northwest Alaska Transportation Plan (ADOT&PF 2004) outlines the possibility of the development of a Yukon River Highway. If this entire route were constructed, it would create road access from the Elliot Highway west of Fairbanks through the southern edge of the planning area to Nome. Portions of the highway would likely require a right-of-way authorization by the BLM. The highest priority segments of the Yukon River Highway are located east of the planning area and it is unlikely that the Highway would be completed during the life of this plan.

Other road projects discussed in the Northwest Alaska Transportation Plan include inter-village roads within the region, without a connection to the statewide road system. Inter-village roads would provide greater access to boat launch sites, permanent barge operations, and gravel sources, and improve community connections. Recommended road projects within the planning area include (ADOT&PF 2004): 29 miles of road in the Point Hope area; 18 miles of road in the Northwest Arctic Borough; and 135 miles of road in the Seward Peninsula region. Construction of these projects within the life of the plan would be dependent upon social and economical conditions, some of which may require right-of-way authorization by the BLM. It is not clear which, if any, of these projects would be completed during the life of the plan. These types of roads would have similar types of impacts, but much less in extent than a regional highway.

(4) Cumulative Impacts to Air, Soil, and Water from Ports and Harbors

The Army Corps of Engineers recently released a Draft Environmental Impact Statement for Navigational Improvements De Long Mountain Terminal, Alaska (U.S. Army Corps of Engineers 2005). The De Long Mountain Terminal is an industrial site at Portsite, 80 miles northwest of Kotzebue. Portsite is connected to the Red Dog Mine via a 58-mile road, the only major road in the region. The proposed improvements would allow navigation by bulk freighters and tanker ships, allowing direct offloading of fuel from tanker ships. Improvements to Portsite could result in additional development in the Northwest Arctic Borough or North Slope Borough such as: increased through put from Red Dog Mine; new zinc mining in the De Long zinc belt; other metallic mineral development in the area; coal mining; development of land transportation corridors; new airport at Portsite; trans-shipment of goods to communities; fuel transfer to

communities; road system from De Long Mountain Terminal System to communities; and Kivalina relocation (US Army Corps of Engineers 2005).

(5) Cumulative Impacts to Air, Soil, and Water from Oil Spills

Despite considerable oil- and gas-related activity since 1969, the overall air quality on the North Slope of Alaska remains relatively pristine. See Chapter III for a discussion of the existing air quality in the planning area. Modeling performed for the Lease Sale 144 Final EIS (MMS 1996a) showed that impacts from widely scattered emissions sources on the outer continental shelf (OCS) are small and well within regulatory standards. The Final 5-Year Program EIS for OCS Oil and Gas Leasing Program 2002-2007 (MMS 2002) discusses the cumulative effects of the OCS Program in all areas. The relevant major finding was that no major degradation of onshore air quality is predicted. Air monitoring at a number of sites in the Kuparuk and Prudhoe Bay fields showed that concentrations of nitrogen dioxide, sulfur dioxide, and particulate matter 10 micrometers or less are well within the national ambient air-quality standards. Since any projected development in the planning area would be small compared to the combined Prudhoe Bay and Kuparuk oilfields, there would be very little cumulative interaction between developments under this proposal and other oil-producing facilities.

Cumulative impacts to air quality may result from the emissions of hydrocarbons and byproducts of combustion and development of regional roads. These impacts may be regionally additive or synergistic, and could degrade air quality. Oil and gas development under this plan would be small and projected emissions would account for only a small percentage of current and projected emissions on the North Slope.

Cumulative impacts to soil resources would occur from oil spills that adversely impact the vegetation covering the soils. The oil alone would decrease vegetation growth, but oil spills probably would leave the surface organic mat intact. Spill cleanup, however, is more likely to damage soils. Cleanups are not always well controlled; heavy traffic and digging are common, resulting in damaged soils. Oil-spill cleanup mitigates impacts on soils only if cleanup methods and operations are very carefully controlled and they minimize surface disturbance. Thermokarst, or ground subsidence, occurs when the removal of surface cover exposes ice-rich permafrost soils to a higher temperature regime and subsequent melting. The impacts to soil resources from surface disturbing activities during oil-spill cleanup when the tundra is unfrozen may be greater than the impact of the spilled oil, as the area affected may not be limited to that area immediately adjacent to and covered by the spill. The impacts from thermokarst tend to be long and may take years to develop; it could be decades before the impacts to soils are ameliorated.

Cumulative effects to soil resources could result from surface disturbing activities associated with the programs discussed above. Impacts include soil compaction and thermokarst erosion, stream diversion, impoundments, and increased sediment erosion. Impacts from thermokarst may take years to develop and it could be decades before the impacts to soils are ameliorated. Adherance to the Stips and ROPs for all permitted operations would reduce long-term disturbance to soils.

Overall, the cumulative effects of spills on water resources on the North Slope, because the spills have been small and cleanup and rehabilitation efforts have generally been successful, have not been significant (NRC 2003). Cumulative effects of North Slope activities on water quality, Section V.C.1 of the Beaufort Sea Planning Area Sales 186, 195, and 2002 EIS (MMS 2002), are incorporated here by reference and summarized below.

If a large oil spill were to result from oil and gas development in the Beaufort Sea, the marine environment would be degraded through the release of petroleum hydrocarbons into the water column. Small spills could exceed the acute-toxic level a day or less and chronic criteria could be exceeded for less than a month.

Effects on water resources could result from oil spills, increased soil erosion due to surface disturbance, and stream diversions or impoundments from construction of facilities and infrastructure. To date, impacts from oil spills on water resources on the North Slope have not been significant, as spills have been small and cleanup efforts successful.

Potential impacts from future lease sales on the outer continental shelf and on land are difficult to evaluate. However, one can expect that any development would be small compared to Prudhoe Bay and Kuparuk, scattered over a rather large area, and well within existing regulatory standards.

b) Climate Change

Alaska is experiencing significant effects of global climate change, including warmer temperatures, melting glaciers, reduction of pack ice, and changes to its vegetative communities (see Hansen et al., 1999; Barber et al., 2000; Oechel et al., 2000; Serreze et al., 2000; Goetz et al., 2005 and numerous others). Additional potential effects of global climate change in Alaska include increased precipitation, decreased snow cover, rising river flows, rising of sea level, thawing of permafrost, changes in fire frequency and severity, an ice-free shipping lane from Europe to Asia across the Arctic Ocean, changes in wetlands, and shifts in the distribution of wildlife (ACIA 2004). Over the past few decades, average temperature in the Arctic has risen at almost twice the rate as the rest of the world (ACIA 2004). From 1949 to 2005, average annual temperature at Kotzebue and Nome has increased by 3.3°F and 3.2°F respectively (Alaska Climate Research Center 2006). The majority of the warming trend has come during the winter months, where temperatures have increased by 7.2°F and 5.2°F in Kotzebue and Nome, respectively (Alaska Climate Research Center 2006). Most models project that rapid Arctic warming will continue.

These changes will have substantial direct and indirect impacts on people living in the region. For example, coastal erosion from storm surges may be exacerbated due to thawing of permafrost, reduced sea ice extent, and later formation of shore-fast ice. This combined with rising sea levels make it likely that entire towns, such as Kivalina, will have to be abandoned and relocated elsewhere. Villages are already taking these problems into account. The newer buildings in Teller were constructed away from the town center on higher ground to the southeast. This phenomenon has also had direct effects on the oil industry.

Another predicted result of climate change is a shift in vegetation. Projections are that the amount of tundra would shrink to its lowest extent in at least the last 21,000 years (ACIA 2004). Mosses and lichens are among the groups expected to decline as warming increases (ACIA 2004). The timeframe of these shifts will vary. Where suitable soils and other conditions do not exist, changes are likely a century away. However, significant changes in Arctic communities over the past few decades have already been documented (e.g., Sturm et al. 2001).

BLM's long-term vegetation monitoring transects in the Nulato Hills have documented that vegetative communities in the Arctic are changing as well. Lichens and mosses have

significantly declined since 1981 while grasses and shrubs have been increasing (Joly et al. 2007). These changes in Arctic vegetative communities will likely lead to shifts in animal distributions, which would indirectly affect people by altering the patterns of important subsistence species.

Changes in permafrost and resulting changes in lakes due to global climate change may negatively affect waterfowl. Shrinking pond surface areas could become a common feature in the discontinuous permafrost regions as a consequence of warming climate and thawing permafrost (Yoshikawa and Hinzman 2003).

The State of the Arctic Report (Richter-Menge et al. 2006) notes that "many of the trends documented in the Arctic Impact Climate Assessment are continuing, but some are not. Taken collectively, the observations in this report [State of the Arctic Report] indicate that during 2000 to 2005 the Arctic system showed signs of continued warming. However, there are a few indications that certain elements may be recovering and returning to recent climatological norms (for example, the central Arctic Ocean and some wind patterns). These mixed tendencies further illustrate the sensitivity and complexity of the Arctic physical system."

Because climate change must be viewed from a global perspective, the magnitude of emissions potentially contributed by any proposed activities in the planning area needs to be viewed in that context. Activities associated with oil and gas or mineral exploration and development, recreation, or prescribed burning would produce some greenhouse gases. The incremental contribution of greenhouse gases from the proposed alternatives in the planning area would be minor when compared to global greenhouse gas contributions. The required operating procedures (Appendix A) allow for changes in project design in response to changing environmental conditions.

c) Vegetation

Potential increased levels of mining and mineral leasing development on State and private lands, combined with similar activities on BLM-managed lands could result in cumulative surface disturbance with adverse effects on riparian and tundra vegetation over the long-term. Dispersed recreation effects from gradual increases in amount and frequency of OHV travel, remote landing sites for bush aircraft, campsites, plus potential new recreation facilities and trails may have minor adverse and cumulative impacts to riparian and tundra vegetation on BLM-managed lands throughout the planning area. The potential for displacement of native vegetation by noxious and invasive weeds will increase as the level of surface disturbance to once-intact habitat rises.

d) Fish and Wildlife

(1) Fish

A continuation of current water and land use practices, by private, State, and other Federal agencies would continue to affect fish habitat within the planning area. Higher intensity OHV use and mineral development or exploration on lands upstream from BLM-managed lands within a watershed could continue to be a concern due to sediment and water quality issues that influence the quality of fish habitat downstream from the source. Habitat improvement gains through more intensive management of recreation activities as proposed under Alternatives C

and D could be offset or enhanced by regulatory sport-fishing changes made by ADF&G. Coordination would continue to be essential.

Coordinating with regional planning actions and conducting interagency watershed planning efforts could help protect important fisheries values in watersheds such as the Kigluaik Mountains, Kivalina River, and Squirrel River.

(2) Wildlife

The combination of ongoing oil and gas development occurring on the North Slope on both State and Federal lands, future oil and gas development projected for the NPR-A, oil and gas development in the northern quarter of the planning area, ongoing solid mineral exploration and development in the same region, hunting, and climate change would have cumulative impacts on caribou from the WACH. Depending on the location of development, these impacts could include: short or long-term disturbance to caribou insect relief habitat and migratory routes; disruption of caribou movements; stress and disturbance impacts to caribou during all seasons of the year; possible reductions in herd productivity. Because caribou population size fluctuates naturally over time, it is difficult to determine if effects are accumulating at the population level, or just reflect natural shifts in population numbers.

Currently, there is little exploration and no oil and gas development within the core range of the WACH, although some caribou from this herd occasionally winter in areas with ongoing exploration and development. The Kukparuk, Alpine, and Prudhoe Bay fields as well as the trans-Alaska pipeline are located on the easternmost extent of the herd's range. Most of the herd has little to no contact with oil-related structures (Dau 2005). Any new development as considered under Alternatives B and D would result in additive impacts to the herd. If significant activity occurred within the calving grounds or crucial insect relief habitat, these impacts could be significant. It is highly unlikely that any development activity would occur on BLM-managed lands in the calving grounds under this plan. All of the calving grounds within the planning area are Native-selected and/or high priority State-selected lands which are unlikely to remain under BLM management. Much of the land is top-filed by the State, meaning that if it is not conveyed to the Native Corporation, State selections will attach. Selected lands are segregated from mineral entry and leasing until such time as the lands are relinquished or conveyed. Therefore, no mineral exploration or development would occur over the short-term. If conveyed, mineral exploration or development could be authorized by the new land owner. BLM is not aware of any immediate plans for such activities in this area by the State or Native corporations. If not conveyed, no mineral development could occur until BLM lifted the ANCSA 17(d)(1) withdrawals, a process that would take several more years.

Under the RFD scenarios for this plan, oil and gas exploration and development could occur in the insect relief habitat under Alternatives B and D, although it would be unlikely, as the development potential of the area is low and the infrastructure necessary to get the oil or gas to market does not currently exist. The amount, specific location, and timing of such activities are highly uncertain. At most, it is anticipated that one oil field with no connection to the road system would be developed. This field would affect approximately 517 acres of more than a million acres of identified insect relief habitat. Cumulative impacts to caribou would be somewhat less under Alternatives A and C as oil and gas development would not occur on BLM-managed lands in the planning area.

To date, the largest industrial development within the planning area is Red Dog mine. The Final Environmental Impact Statement for the Red Dog Mine Project, Northwest Alaska (EPA 1984),

projected that development and operation of the mine and associated facilities would result in direct and indirect habitat loss, effects on animal movements, construction impacts, and increased human access into wildlife habitats. The EIS noted that the project might have an indirect, localized impact on caribou by displacing some animals from marginal winter range. Another potential impact on caribou was the possible increase in hunting pressure from employees based at the mine. The greatest anticipated impact on caribou from Red Dog mine was the potential for interruption of caribou movement patterns (EPA 1984). The EIS projected that the presence of the road itself and the level of traffic associated with the mine would be unlikely to cause a major shift in caribou movement patterns. However, if the road were open for other uses and high traffic levels resulted, a change in migration patterns might occur.

Red Dog Mine, which went into production in late1989, has impacted approximately 1,800 acres of wildlife habitat, not including the haul road or port facility. The mine is located in caribou migratory habitat, near the southern edge of summer range (Map 3-12). Activities at Red Dog Mine have disturbed much less than 1% of the available habitat. Mining activity will continue for the life of the mine (estimated at 23 years) and is projected to impact several hundred additional acres of habitat.

The 52 mile haul road connecting to the coast crosses an area used by some Western Arctic Herd caribou during migration and resulted in disturbance of approximately 200 acres of habitat. Local residents expressed concern that the road may interfere with caribou migration, and this was a major issue addressed in the EIS for the mine. Map 3-46 shows fall migration by caribou equipped with satellite radio collars from 1989 to 2004. This data shows that some caribou do cross the road. It is possible that some caribou avoid the area by going to the east, around the mine and road. The NANA/Cominco agreement for Red Dog Mine specifically recognizes the possibility of interrupting caribou migration. A subsistence Advisory Committee is empowered to request temporary closure of the haul road during caribou migration to minimize impacts on caribou movements. According to Dau (2005) the Red Dog Mine complex appears to have resulted in only limited and localized effects on the movement and distribution of the WACH.

The Rock Creek Mine Project near Nome is expected to come into production during the life of the plan. This mine would not add to the cumulative impacts on caribou as it is located outside of the defined seasonal ranges of the WACH. It would however add to the cumulative impacts on other wildlife in the vicinity of Nome.

A notice of intent to develop an integrated activity plan (IAP) for South NPR-A was published June 15, 2005. This planning effort was cancelled in May 2007 and no mineral leasing or development is anticipated in south NPR-A during the life of this plan. Therefore, the south NPR-A IAP will not result in additional cumulative impacts to caribou, caribou calving habitat, or other wildlife from development of oil and gas, coal or hard rock minerals. Currently there are no reasonably foreseeable mining activities forecasted for the WACH calving grounds on either State or BLM land.

Ongoing locatable mineral development in the planning area has not resulted in discernable population level effects on caribou to date and has not occurred within the core calving grounds or insect relief habitat. Reasonably foreseeable locatable mineral development on BLM-managed land within the planning area would be limited to five small placer mines of 10 acres each. When added to current and anticipated future development at Red Dog Mine, an estimated 2,500 acres, less than 1% of available habitat, might be impacted. As discussed above, no mineral development is likely to occur within the core calving grounds due to land selection patterns and Red Dog Mine is located outside of the insect relief habitat. Therefore,

very little if any mineral activity is anticipated within either the calving or insect relief habitats. The incremental contribution of impacts on caribou and other wildlife from locatable mineral development authorized under this plan would be minor and would not result in population level effects.

Reported harvest by both recreational and subsistence hunters in 2002 and 2003 was 14,700 and 11,600 caribou respectively (Dau 2005). This constitutes 2-3% of the population. Reported harvest is substantially lower than actual harvest, which likely ranges from 15,000 to 20,000 caribou annually. The WACH is still very large. However, indications are that the herd could decline in the foreseeable future (Dau 2005). At this point, there is no evidence that any single factor is limiting the size of the herd.

Privatization of State or Native Corporation lands within the planning area would have the potential to negatively affect wildlife and wildlife habitat by opening up areas to private development. Under the current Northwest Area plan (ADNR 1989), the State limits land sales to two disposal areas in the Kobuk Unit with maximum disposal of 350 acres of land and approximately 900 acres in four areas in the southwest Seward Peninsula Unit, out of approximately 11 million acres of State land considered in the plan. In general, there is little public support for State land sales within the planning area and minimal disposal of BLM-managed land is anticipated under any alternative. Cumulative impacts to wildlife would not be significant.

Conveyance of BLM land to the State and Native corporations includes conveyance of the mineral estate. There is potential that some industrial development of these lands could occur after they are conveyed. However, because no activities on these lands are currently proposed, assuming any level of development or effect would be purely speculative.

Development of regional roads within the planning area would have the potential to negatively affect wildlife, particularly caribou and other big game species. These impacts would include habitat fragmentation, increased access into wildlife habitats, increased disturbance impacts, increased potential for mortality (road kills) and possible alteration of behavior or movement patterns of wildlife. Construction of major road projects would be dependant upon social and economical conditions and it is not clear which if any of these projects would be completed during the life of the plan. Because regional road construction and the level of development projected through this plan is so minimal, no cumulative impacts to wildlife are anticipated.

In summary, the activity authorized by BLM with the most potential for cumulative impacts on wildlife is mineral development on the North Slope. There would also be cumulative effects on wildlife due to increased human activity, increased recreational use, subsistence harvest, sport hunting, and changes in habitat due to climate change. Wide ranging species such as caribou and migratory birds could be exposed to increased human activity and development throughout a large portion of their range. Although the additional impact of oil development under Alternatives B and D of this plan would be minor, it is predicted to occur in sensitive habitat areas for the WACH. However, the total area of impact is minor compared to the size of the sensitive area, and while it may impact individuals, the effects are unlikely to accumulate and result in population effects. Current and expected development have resulted in no measurable population effects. The additional development described in the RFD under all alternatives represents a minimal amount of the total area even when potential disturbance effects are included. The proposed development described in the RFD when added to the other cumulative effects may result in greater impacts to individuals or more individuals being impacted, but the incremental addition is not expected to result in measurable population impacts.

e) Special Status Species

(1) Special Status Plants

The widely scattered nature of special status plant populations and incomplete knowledge of their distribution and range complicate efforts to predict cumulative impacts. However, current and potential increased levels of mining and mineral leasing development on State and private lands, combined with that on BLM-managed lands, could result in cumulative, adverse effects on sensitive status plants and habitats over the long-term. Dispersed recreation effects from gradual increases in amount and frequency of OHV travel, remote landing sites for bush aircraft, campsites, and hiking may have minor adverse and cumulative impacts to sensitive status plants and habitats on BLM-managed lands.

(2) Special Status Fish

Effects would be the same as those described in the Fish section on page 4-53.

(3) Special Status Wildlife

The widely scattered nature of special status wildlife populations and incomplete knowledge of their distribution and range complicate efforts to predict cumulative impacts. Current and potential increased levels of oil and gas development on State and private lands on the North Slope combined with that on BLM-managed lands, and ongoing human activities would result in cumulative, adverse effects on Steller's and spectacled eider, and polar bears and their habitats over the long-term. The addition of one oil and gas field under either Alternative B or D, would result in minimal addition to cumulative impacts to these species due to their very limited distribution within the planning area and on BLM-managed land.

The following information on cumulative impacts to listed eiders is incorporated from the Endangered Species Act, Section 7, Biological Opinion for the Northwest National Petroleum Reserve-Alaska Integrated Activity Plan /Environmental Impact Statement (FWS 2004b), which is incorporated by reference. The Northwestern (NW) portion of the National Petroleum Reserve-Alaska (NPR-A) contains important breeding habitat for over 70% of spectacled eiders and over 90% of Steller's eiders on the Arctic Coastal Plain, and both species are known to occur or nest at comparatively medium to high densities within BLM defined areas of high geologic potential.

A small portion of the Steller's and Spectacled eider potential breeding range has been altered by oil and gas exploration/development on the North Slope. Future development in the NW portion of NPR-A may result in disturbance impacts to eiders. The number of listed eiders that would be exposed to oilfield activity is variable depending on the location of oilfield infrastructure within NPR-A. Disturbance from aircraft traffic, watercraft support, and exploration/delineation activity could adversely impact Steller's eiders by: 1) displacing adults and/or broods from preferred habitats during pre-nesting, nesting, brood rearing and migration; 2) displacing females from nests, exposing eggs or small young to inclement weather or predators; and 3) reducing foraging efficiency and feeding time. Some birds may be displaced with unknown physiological and reproductive consequences.

The biological opinion (FWS 2004b) did not forecast population-level effects to listed eider species from the following activities in NW NPR-A: aircraft overflights, watercraft activity in marine environments, seismic camps and exploration/delineation activities, habitat loss due to oil field activity, collisions with oil field structures, increased predator populations due to edible refuse associated with oil field development, increased subsistence activity due to additional road access, and terrestrial oil spills.

The FWS anticipates the proposed development in NW NPR-A will likely result in the take of 117 spectacled eiders and 9 Steller's eiders as a result of habitat loss/disturbance and fatal collisions with oilfield structures over a period of 30 years (FWS 2004b). The take is expected to be in the form of harm, harassment and/or killing. The FWS determined that this level of anticipated killing is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat. The FWS concluded that the proposed oilfield activities in NW NPR-A may adversely affect individual listed eiders. However, their low nesting densities combined with the limited amount of proposed oilfield infrastructure/activity suggests that few individuals would likely be adversely impacted.

In addition to projected exploration and development of oil, human population growth in North Slope Borough communities has also resulted in localized habitat loss due to construction activities and off-road vehicle use. Lead or other sources of contamination of habitat or prey species are possible in localized areas within the range of both Steller's and spectacled eiders. Increased densities of arctic foxes and glaucous gulls associated with human development, particularly landfills, have been noted at Barrow and Prudhoe Bay and common ravens have expanded their breeding range into these areas. There is very little information on predation of Steller's and spectacled eider nests throughout most of the species' range in Alaska. Listed eiders may be adversely affected by increased numbers or altered distribution of predators. Although information showing a direct link between oilfield activities and waterfowl nest predation rates is lacking, the FWS believes that actions that artificially enhance predator populations are a potentially large adverse impact to listed eiders (FWS 2004b).

Sport hunting for Steller's and spectacled eiders was closed in 1991. However, in 2003, a spring subsistence hunting season for migratory birds in Alaska was initiated. Although killing listed eiders is not permitted by the spring hunting regulations, accidental take of prohibited species may occur. Accurate information on current harvest rates is not available, but hunter surveys and other observations indicate that both intentional and unintentional shooting of Steller's and spectacled eiders likely continues in Northwest Alaska (Paige et al. 1996, Georgette 2000, Wentworth 2001).

Steller's eider research conducted in the Barrow area is also a source of disturbance, because those activities are oriented toward locating nests and broods. Research efforts unrelated to listed eiders also result in disturbance impacts. Field research typically occurs during the summer months, but numbers, locations, and type of activities remain speculative because data quantifying this activity has not been collected. The FWS has provided project applicants with recommendations and restrictions intended to minimize impacts of oilfield research on listed eiders, including timing restrictions and buffers around known nest. Estimating impacts from field research is difficult because many researchers are unaware of the requirement to consult. Without a better understanding of the extent of research activities in NPR-A, it is difficult to determine whether the cumulative effects of field research may result in take.

Both Steller's and Spectacled eiders occur in the planning area at low densities. The reasonably foreseeable development scenario is for one Alpine type oil and gas field. Given land ownership patterns, this field would not be located in nesting habitat for listed eiders. The level of activity forecasted is much lower than that occurring in NW NPR-A, as are densities of eiders. Therefore the incremental addition of impacts from activities approved under this RMP would be very small, and the cumulative effects to listed eiders are not expected to significantly affect the population.

f) Fire Management and Ecology

Under the current mix and match of fire management strategies being implemented across the planning area there are few if any anticipated cumulative impacts on BLM-managed lands. There is one large area of the WACH winter range in the Modified Management Option. This area will have to be monitored closely for the effects of fire exclusion.

Wildland fire management is done on an interagency basis and across administrative boundaries. There are several areas in that are in the Full and Critical Management Options that are adjacent to BLM-managed lands. These areas will have to be monitored in conjunction with our interagency partners, for the effects of fire exclusion.

g) Cultural Resources

Cumulative impacts to cultural resources could occur through incremental degradation of the resource base from a variety of sources which reduce the information and interpretive potential of historic and prehistoric properties, or which affect traditional cultural values important to Native Americans. Much of the anticipated development within the planning area would occur on lands that are not covered by Federal cultural resource laws. As a result, there could be losses to the regional resource base that could potentially limit or change management options within the planning area.

h) Paleontological Resources

Cumulative impacts to paleontological resources in the planning area could result from development on non-BLM managed lands as well as BLM-managed lands, and from natural agents and unauthorized uses throughout the area.

i) Visual Resources

Continued development of OHV trails, roads, recreational facilities, mining activities, overland explorations, and wildland and prescribe fire may lead to changes to existing visual resources by altering basic visual elements of form, line, color, and texture at the landscape level. These changes will influence the design of similar projects on adjacent BLM lands where repeating these basic elements is an objective of the visual resource management class.

j) Wilderness Characteristics

In addition to the impacts described under Alternative B, the construction of additional long-term or permanent facilities such as power lines, permanent roads, gravel pads, material sites, or other structures not necessarily related to oil and gas development and/or placer/hard rock mining would result in cumulative impacts to solitude, naturalness, or primitive/unconfined recreation. Short-term or transient loss of the area's naturalness and solitude from such impacts as green pads/trails and noise from aircraft and equipment would not accumulate as would impacts from permanent facilities. In that respect, their contribution to the cumulative impacts would be "momentary."

Under Alternative B, long-term impacts would be expected to affect an area of approximately 108,000 acres (this includes oil and gas and hard rock development). This represents only 1% of BLM-managed lands in the planning area. Considering past, present, and future development across the planning area, total cumulative impacts could affect an area maybe one to three times greater. This would depend on many factors, some of which are unforeseen at this time. Cumulative impacts along rivers such as the Squirrel River and other popular rivers in the planning area, would be seen as far more significant than impacts elsewhere.

Short-term impacts, such as green trails and disturbance from noise and other activities would not accumulate. Impacts from long-term or permanent facilities such as roads, major trails, pipelines, and gravel road/pads, would accumulate and would result in the long-term loss of solitude, naturalness, or primitive/unconfined recreation.

3. Resource Uses

a) Forest Products

Ongoing spruce beetle damage and the potential for more intense wildland fires may shift forest stand composition towards higher percent of young trees, and a more diverse mix of tree ages within stands. Early seral shrub-dominated plant communities may increase, interspersed with recovering forest communities. The overall amount of mature forest timber will likely decrease during the life of the plan.

The expected slow, steady increase in number and sophistication of OHVs traveling both on and off designated trails, able to access more difficult terrain will result in a small amount of continued damage to naturally revegetating or colonizing tree seedlings and saplings.

As rural village populations gradually rise and maintain their strong reliance on a subsistence lifestyle, the use of firewood and house logs will also show a slow, steady increase.

Increased mineral development on adjacent State and Native-owned lands may result in conversion of forested plant communities to tundra landscapes of sparse grasses, sedges, forbs, or shrublands. This could shift subsistence and wildlife use of forest product resources more strongly towards BLM-managed forest habitats.

b) Livestock Grazing

Management changes that are implemented on BLM-managed lands, in any of the proposed alternatives, are likely to have little cumulative impacts on grazing.

c) Minerals

(1) Leasable Minerals

(a) Fluid Leasable Minerals

The cumulative impacts to oil and gas resources would be the removal of the resources by producing wells on leases with the fewest restrictions and lowest operating costs. Production of oil and natural gas from one geologic reservoir would not affect the recovery of oil and/or natural gas from other geologic reservoirs. The production of natural gas and oil is a beneficial irretrievable commitment of the resource as the produced natural gas or oil no longer would be available for future use. The amount of oil, gas, or heat produced would vary depending on the number of wells drilled in the field and the ability to recover the resource.

The cumulative impact to Federal leases would be a reduction in lease value resulting from the application of ROPs, stipulations and regulations. The cumulative impacts to lease developments would result from a reduction in wells drilled on leases encumbered with stipulations, an increase in wells drilled on leases with minimal constraints, and an increase in operating costs because of land use decisions, lease stipulations, and regulations. Restrictions on Federal leases could impact the leasing and development of adjacent non-Federal leasable minerals. If an exploration company cannot put a block of leases together because of restrictions on Federal leasable minerals, the private or State minerals may not be leased or developed either. Leasing of Federal minerals on the other hand, could encourage the leasing of private or State minerals.

Oil and natural gas activities could be located in parts of the planning area where other mineral resources are mined or potentially could be mined. However, the production of oil and natural gas resources is not expected to be a significant impact on other mineable mineral resources within the planning area. A potential conflict exists between coal and CBNG. Should coal resource development precede CBNG development in a specific area, the biogenic gas would be displaced. Similarly, if CBNG were to occur first, coal development would be delayed which could affect economics. The long-term aerial extent of the RFDs (e.g., the acreage affected) for petroleum activities is small relative to the planning area. After abandonment of the facilities and wells, exploitation of the other minerals still can occur.

Cumulative impacts would be greatest under Alternatives B and D as no leasing will occur in Alternative A, and high potential areas are closed in Alternative C. Under Alternatives B and D, larger acreages of fluid mineral estate would be made available from the revocation of ANCSA (d)(1) withdrawals. However, exploration and development is not anticipated on BLM lands as indicated by the low-development potential assigned to the resource locations in the RFD (BLM 2005j). Lands with the greatest resource potential are owned by other entities or are on State- or Native-selected lands. In the case of selected lands, mineral activity would be hindered by segregation until the ownership status is finalized. If development were to occur, it is expected to take place on non-BLM-managed lands. CBNG exploration and development is projected in

the RFD scenario (BLM 2005j) on State or private lands. Up to 11 CBNG wells could be drilled with produced gas piped to a nearby village.

Roads resulting from mineral exploration and development (leasable, locatable, and salable) including community related activity, would add infrastructure to a region largely without and could increase interest in fluid leasable exploration on BLM-managed lands by reducing logistics costs. However, these types of benefits to industry could be offset by restrictions. An area on the cusp of showing economical development could become non-profitable by imposing restrictive guidelines. This would result in the displacement of mineral activities to adjacent landowners.

(b) Solid Leasable Minerals

Cumulative impacts to coal exploration and non-energy leasable mineral prospecting could occur through development of infrastructure by adjacent land owners. Infrastructure would be provided if CBNG exploration and development were to occur on non-BLM lands. According to the RFD scenario, up to 11 CBNG wells could be drilled on non-BLM lands with the produced gas piped to a nearby village.

(2) Locatable Minerals

Impacts to locatable minerals that are individually minor may cumulatively reduce exploration and production of commodities from public lands. Factors that affect mineral extraction and prospecting include, but are not limited to, such things as permitting and permitting delays, regulatory policy, public perception and concerns, travel management, transportation, mitigation measures, proximity to sensitive areas, low commodity prices, taxes, and housing and other necessities for workers. BLM has no control over many of these issues, but could improve in areas such as issuing permits in a more timely fashion or having sensitive areas already identified. If these issues result in additional costs and/or permitting delays, it can individually or cumulatively add additional costs to projects.

Public land that currently has no access could reduce the amount of mineral exploration and development that may occur. Mineral resources in other ownerships may not be developed if the adjacent public lands are withdrawn from mineral entry because the deposit may not be economically feasible to develop if it crosses ownerships and only a portion is available for development.

Overall, Alternative C would be the most restrictive to mineral developments and could result in the most cumulative impacts. While existing withdrawals instituted for general purposes would be revoked, they would be replaced with withdrawals specifically for closure to mineral entry and location. It proposes the most acres be withdrawn from mineral entry, the most areas limited or closed to motorized travel, and the highest protection to other resources to the preclusion of use of any locatable mineral deposits, both placer and hard rock, on BLM-managed lands.

(3) Mineral Materials

Under Alternative C the closure of two ACECs to sale/permit of mineral materials as well as the additional restriction on types of mineral material deposits that may be mined would essentially close all BLM-managed land to mineral materials development and production.

d) Recreation Management

The planning area currently provides a diversity of recreation experiences, provisions that are expected to continue over the planning period regardless of the alternative selected. The largest influence on recreation experience within the planning area is use of OHVs. Without management and some limitations on OHV use, the general trend, in OHV-accessible topography, is for recreation experiences to trend towards semi-primitive motorized and roaded natural experiences. However, much of the planning area is dominated by steep topography, wetlands, dense vegetation and remote settings with no road infrastructure, making it inaccessible to most OHVs (unless flown into a destination). These areas provide for primitive and generally inaccessible recreation experiences, regardless of which alternative is selected. Helicopter-supported commercial recreation ventures and winter snowmachine use have the potential to alter experiences in some of these areas.

There continues to be a need for facilities to provide positive recreation experiences for motorists traveling the Nome Road System. The State continually struggles with funding to support construction and especially maintenance of such facilities as waysides and outhouses for the motorist. Facilities for remote and dispersed recreation safety and comfort (such as remote cabin facilities) are also in need. Alternatives C and D may address these needs, but without a well-funded State or Federal recreation program, this rapidly growing need would not be met.

e) Travel Management/OHV

The planning area currently provides a tremendous diversity of OHV use within the current maximum 2,000 pound GVWR limit. However, OHV use and travel is restricted due to this limit and limits on State land. There continues to be a need for areas where OHVs larger than 2,000 pounds can be used without obtaining a permit.

The planning area suffers from lack of public access. There is little in this plan that will help alleviate this issue. While a small road system outside of Nome exists, it accesses largely private and State lands. Visitors use would increase with increased access such as new roads, trails, and developed airstrips.

Common to all alternatives, access to public lands would become more difficult as Native corporation entitlements are met and they exercise their private property rights. The BLM would maintain existing 17(b) easements and would extend those easements across Native-selected lands where trails currently exist to ensure reservation of easements when conveyance occurs. Future access is somewhat contingent on the resolution of State-recognized R.S. 2477 routes, particularly where they cross Native lands. Whether or not access routes to public land would be maintained in the long-term as a result of those determinations cannot be resolved in this planning effort.

f) Renewable Energy

No cumulative impacts from renewable energy are anticipated under any alternative.

g) Lands and Realty Actions

Effects from disposal, acquisition, and exchange proposals described for BLM-managed lands in any alternative are minor compared to conveyances to Native corporations and the State of Alaska. The recently signed Alaska Lands Transfer Acceleration Act (P.L. 108-452) will facilitate the conveyance process, with a target of completing conveyances by 2009. Once entitlements are met, land exchanges may be considered to consolidate land ownership patterns.

The number of land use authorizations, particularly rights-of-way and permits, is a function of demand for these uses. Additional future development of adjacent Federal, State, and private lands would likely result in additional requests for and approval of land use authorizations for facilities such as roads, utilities, and communication sites.

4. Special Designations

a) Areas of Critical Environmental Concern and Research Natural Areas

Cumulative impacts could have a wide range of effects on the different resources that are intended to benefit from the various ACECs proposed. These impacts largely stem from actions that are not guided by BLM management decisions. Management within certain ACECs could be significantly diminished by cumulative impacts in the unlikely scenario in which numerous development projects occur singularly within their bounds. Cumulative impacts to ACECs would be greatest under Alternatives B and D.

b) Iditarod National Historic Trail

No cumulative impacts to the INHT are anticipated under any alternative.

c) Wild and Scenic Rivers

No cumulative impacts to the Wild and Scenic Rivers are anticipated under any alternative.

5. Social and Economic

a) Public Safety

No cumulative impacts are anticipated under any alternative.

b) Social and Economic Conditions

(1) Social and Economic

The onshore and offshore oil industry in and near Prudhoe Bay is anticipated to decline. An authoritative source, DOE's Energy Information Administration (DOE 2001a), projects North Slope oil production to decline from 1.084 million barrels per day (MMbpd) in 2005 to 0.208 MMbpd in 2034. This decline encompasses oil exploration, development, and production and associated direct employment.

Associated indirect employment in Southcentral Alaska, Fairbanks, and the North Slope Borough (NSB), and revenues to the Federal, State, and NSB governments are also anticipated to decline. Fluctuations in Alaska's economy from 1975 to 1995 directly tracked fluctuations in oil prices and other industry factors (McDowell Group 1999b). Even though the Alaskan economy currently is not nearly as dependent on the oil sector as it was in the mid-1980's (when a major crash in the Alaska economy occurred), the oilfield development in northwest Alaska would generate employment, economic opportunity, and benefits to the cash economy of Alaska.

The effects below are expressed (in most cases) in annual averages for the sake of simplicity. However, the effects generally would be higher in the early years and lower in latter years, corresponding to the decline in production.

Cumulative effects have been addressed in other recent documents, including the Northwest National Petroleum Reserve-Alaska IAP/FEIS (USDOI 2003), and in the Alpine Final Development Plan FEIS (USDOI 2004). These are herein incorporated by reference and summarized in this section.

(a) Impacts to State and Local Revenues

The Conoco Phillips Project would generate the following revenues:

- $7 million revenue average annual to the North Slope Borough,
- $40 million average annual to the State, and
- $17 million average annual to the Federal Government.

Other reasonably foreseeable actions could generate the following additional annual revenue:

- $15 million as the State share of royalty receipts,
- $7 million as State income tax,
- $4 million as State spill and conservation tax
- $41 million as the Federal share of royalty receipts, and

- $56 million as Federal income tax.

In total, the cumulative effects would generate the following additive average annual revenues:
- $7 million to the North Slope Borough,
- $66 million to the State, and
- $114 million to the Federal government.

Oil development in northwest Alaska, outside of NPR-A would generate additional revenue to the Boroughs, the State of Alaska, and the Federal government. This is discussed in the analysis of Alternative B under effects to the Regional Economy. Other developments in the planning area resulting from forestry, recreation, grazing, and mining are considered to have little cumulative economic effect.

In 2000, revenues for the NSB were $245 million, the 2001 State operating budget was $4.3 billion, and 2001 Federal receipts of all types of $1.7 trillion.

(b) Impacts to Employment and Personal Income

The cumulative gains in direct employment would include additive jobs in petroleum exploration, development, and production, plus oil-spill cleanup activities. The direct employment would generate indirect and induced employment and associated personal income for all the workers. The cumulative effects are projected to generate additive employment and personal income increases as follows (USDOI 2004):

- 232 jobs annual average for NSB residents during development, declining to 40 during production. These include direct oil industry employment, indirect and induced employment.
- $16.3 million in total average annual personal income for workers residing in the NSB during development, declining to $3.7 million during production.
- 7,480 jobs annual average during development, declining to 3,750 during production. These jobs are for workers on the North Slope who reside in Southcentral Alaska and Fairbanks. These include direct oil industry employment and indirect and induced employment.
- $443 million in total average annual personal income for workers residing in Southcentral Alaska and Fairbanks during development, declining to $240 million during production.
- 60-190 jobs for 6 months for cleanup of unlikely oil spills in the Beaufort Sea.

In addition to the North Slope workers who reside in Southcentral Alaska and Fairbanks, additional workers commute to residences outside the state. As much as 30% of the North Slope workforce in the classification of oil and gas workers commutes to locations outside the State. However, the workers commuting to residences outside the state would not generate economic effects of indirect and induced employment or expenditure of income in the state and would have a negligible effect on the economy of the rest of the United States. Total NSB employment exclusive of oil workers in 1998 was 4,651. The projected employment for workers on the North Slope residing in Southcentral Alaska and Fairbanks is in comparison to 1998 NSB employment in mining (assumed to be all oil employment) of 4,753. Of these, 70% (3,329) reside in the rest of Alaska outside the NSB, primarily in Southcentral Alaska and Fairbanks. Employment projections can also be compared to the total number of workers in Southcentral Alaska and Fairbanks in 2002 (284,000).

Aggregate personal income in 1999 was $200 million for the NSB and $13.2 billion for Southcentral Alaska and Fairbanks.

(2) Environmental Justice

Alaska Iñupiat Natives, a recognized minority, are the predominant residents of northwest Alaska, the area potentially most affected by activities under Alternative B and D and other activities associated with cumulative projects on the North Slope and northwest Alaska. Environmental Justice effects on Alaska Natives could occur because of their reliance on subsistence foods, and potential effects could impact subsistence resources and harvest practices. Potential cumulative effects from noise, disturbance, and oil spills on subsistence resources and harvest practices and sociocultural patterns would focus on the Iñupiat communities throughout the planning area.

It is acknowledged that cumulative sociocultural impacts have occurred on the North Slope and that Iñupiat culture has undergone a noticeable change. The influx of money from wage employment has added benefits and raised the standard of living, but may result in an array of social pathologies. Expanded oil and gas development in North Slope or northwest Alaska, on both Federal and State leases, would expand the extent of disturbance effects on subsistence species and harvest patterns. While each individual project would likely be a small incremental increase, the cumulative effect would eventually become more and more repressive to the subsistence lifestyle. In addition to potentially diverting, deflecting, or disturbing subsistence species, oil and gas development could affect subsistence harvest by causing subsistence hunters to avoid certain areas because of concerns about firearm safety, and perhaps for aesthetic reasons. The North Slope still has vast undisturbed areas, yet the general subsistence hunting environment continues to change in response to increased development.

Transportation facilities and activities would also contribute to cumulative effects to subsistence resources and, consequently, to the Native population.

Contamination and oil spills could affect the food chain in the area of development and subsistence harvest. If this were experienced, the effects would fall largely on indigenous people.

6. Subsistence

In combination with ongoing oil and gas development occurring on the North Slope on both State and Federal lands, and the future oil and gas development projected for the NPR-A, oil and gas development in the northern quarter of the planning area under Alternatives B and D would have cumulative impacts on caribou from the WACH. As a result, subsistence would also be affected, as all communities within the planning area rely on the WACH as their primary source of terrestrial meat.

Privatization of State or Native corporation lands would have the potential to negatively affect wildlife, wildlife habitat and subsistence use by opening up areas to private development.

Development of regional roads within the planning area would have the potential to negatively affect wildlife, and thus affect subsistence. These impacts would include habitat fragmentation, increased access into wildlife habitats, increased disturbance impacts, increased potential for mortality (road kills) and possible alteration of behavior or movement patterns of wildlife. If the proposed road(s) linked small or regional communities to the already existent road system within Alaska, then increased competition for subsistence resource would likely result, as non-local hunters would be able to access the area with little effort. This may also result in an increase in tourist traffic and recreational use of the area, causing additional impacts to wildlife.

Small roads that connect communities within the planning area may aid subsistence users in accessing their traditional harvest areas. However they may also concentrate hunting efforts along the road corridor, thus depleting resources from the area, and potentially altering harvest from currently-used traditional harvest areas.

Currently, the only moderately deep port in the Region is Nome. The creation of additional ports could result in an increase in barge and ship traffic, resulting in impacts to marine mammal harvesting by residents of the planning area.

In summary, mineral development, privatization of land, and development of regional infrastructure would have cumulative impacts on subsistence. These activities have the potential to negatively affect wildlife and thus subsistence. Development of regional infrastructure such as roads, may improve access for non-local hunters, increasing competition for subsistence resources. Improved access may concentrate hunting efforts, depleting subsistence resources and potentially altering harvest.

H. Irreversible or Irretrievable Commitment of Resources

Only those programs or resources that would have irreversible or irretrievable commitment of resources are included here.

1. Resources

a) Air Quality and Soil and Water Resources

The only reasonable foreseeable activity that would cause irreversible or irretrievable commitment of soil and water resources would be large scale oil and gas development, placer mining, open pit mining, and the material site operations required for these large ventures. These activities are likely to occur only under projections for Alternatives B and D. These activities all require extensive material site excavation for gravel sources for road, pad, and airstrip construction. Impacts include soil compaction and thermokarst erosion, stream diversions, impoundments, and increased sediment runoff. These impacts would likely persist for the duration of the development, which once constructed, would continue for the foreseeable future. These impacts could be mitigated, but not entirely removed.

b) Vegetation

Irreversible loss of vegetation and habitat may occur as a result of placer mines and gravel extraction sites, and placement of infrastructure to support oil and gas development (gravel pads, drill sites, roads, etc.). Pre-project botanical inventory and associated habitat mitigation would minimize but not eliminate these harmful impacts to vegetation in the planning area.

c) Fish and Wildlife Management

(1) Fish

Actions that alter an aquatic community sufficiently enough to change the potential of a particular stream could represent an irreversible or irretrievable commitment of resources. The only reasonable foreseeable activity that would occur within the range of alternatives considered would be placer mining or large scale open pit mining, which is more likely to occur under Alternatives B and D.

(2) Wildlife

Under Alternatives B and D some irretrievable and irreversible loss of wildlife habitat could occur from the placement of gravel for oil and gas infrastructure, road construction, and other surface disturbing activities. Loss of wetland habitat occupied by waterfowl and shorebirds

could be particularly important. In most cases, alternate habitats would be available adjacent to development, and any habitat loss would have a minor effect.

d) Special Status Species

(1) Special Status Plants

Irreversible impacts to special status plants may occur as a result of surface disturbing activities such as mineral extraction and communication sites, right-of-way or other project construction and maintenance. Pre-project botanical inventory and associated mitigation would minimize but not always eliminate these impacts to sensitive plant species.

(2) Special Status Fish

Loss or decline in quality of aquatic habitat occupied by BLM sensitive status fish (Kigluaik arctic char) could cause a population to die out, representing an irreversible or irretrievable commitment of resources. This is not anticipated under any alternative.

(3) Special Status Wildlife

Under Alternatives B and D some irretrievable and irreversible loss of habitat could occur from placement of gravel infrastructure for oil and gas facilities in Steller's eider nesting or brood-rearing habitat. This loss of habitat could be permanent unless habitat restoration was planned and implemented during field abandonment. Because alternate habitat would likely be available in areas adjacent to proposed development and because the density of eider nesting within the planning area is so low, any habitat loss would have a minor effect on eiders.

Both Steller's and spectacled eider mortality could result from collisions with vehicles or structures during the life of the oil and gas field. Any losses of individual eiders through collision with facilities or structure would be irretrievable, but would not affect eiders at the population level.

e) Fire Management and Ecology

Areas that are in the Critical, Full, or Modified Management Options have the potential to lose key ecosystem components due to fire exclusion and move from condition class 1 to condition class 2 or 3. Based on desired conditions for land use and resources objectives, these conditions may be mitigated through fuel management projects or a change in management option. If the areas were not treated fire size and severity would increase and resources could be adversely impacted.

f) Cultural Resources

Mitigation through data recovery investigations at archaeological sites would recover information pertinent to current research concerns, but would also permanently remove the resource from future research and interpretive use at evacuated sites, which would constitute an irretrievable and irreversible commitment of these resources. Any management actions that cause the inadvertent destruction of a cultural resource or make them susceptible to illegal collection could

lead to the loss of these resources and would also be an irretrievable and irreversible commitment of these resources.

g) Paleontological Resources

Mitigation through data recovery investigations at significant paleontological sites would recover information pertinent to current research concerns, but would also permanently remove the resource from future research and interpretive use at evacuated sites, which would constitute an irretrievable and irreversible commitment of these resources. Any management actions that cause the inadvertent destruction of a significant paleontological resource or make them susceptible to illegal collection could lead to the loss of these resources and would also be an irretrievable and irreversible commitment of these resources. There would continue to be impacts on paleontological resources associated with unauthorized activities such as OHV use, dispersed recreation, and illegal collecting.

h) Visual Resources

Activities identified in this planning area under all alternatives by direct, indirect and cumulative effects analysis may affect the visual resources within the planning area by the changes in the existing landscape character. Actions by the following activities may affect visual resources: OHV use, timber harvest, mining activities, exploration, recreation, industrial development, research projects, and private land ownership. These activities may adversely affect the visual resources, and in some cases may be irreversible and irretrievable.

i) Wilderness Characteristics

There would be no irreversible and irretrievable commitment of wilderness characteristics. Proper rehabilitation and removal of development pads, mining areas, etc. would restore the perception of a natural environment. Wilderness characteristics would be forgone in those areas affected by development for the duration of the development, rehabilitation, and recovery.

2. Resource Uses

a) Forest Products

In the unlikely event of limited commercial logging within the planning area, harvest of timber would reduce the available timber resource. Re-growth would exceed the planning period, and would be considered an irretrievable commitment.

b) Livestock Grazing

Loss of native forage to invasive species, although not necessarily permanent, would be an irretrievable loss of the resource because of the number of years needed to restore native vegetation. The incremental degradation of rangeland within the planning area from the effects

of climate change, over-utilization, and the spread of invasive plant species could be an irreversible loss of the resource.

c) Minerals

(1) Leasable Minerals

The production of oil and gas, results in the irretrievable and irreversible loss of those natural resources. Most, if not all, surface disturbance and use can be restored through proper reclamation techniques.

(2) Locatable Minerals

The removal of minerals from public lands results in the irretrievable and irreversible loss of those non-renewable natural resources. However leaving these mineral resources in place serves no purpose as they neither add nor detract from the natural environment. While their extraction causes impacts to the natural environment, this extraction produces a positive impact to the limited cash economy and ultimate well being to the residents of the region.

The maintenance of withdrawals that prevent locatable mineral entry and location would cause an irretrievable, but not irreversible, loss of mineral extraction during the life of the plan. Some proposed withdrawals fall in high and moderate mineral potential areas.

(3) Mineral Materials

The extraction of mineral materials from the natural environment within the planning area would be an irreversible and irretrievable commitment of those extracted mineral material resources. Similarly as for locatable minerals, leaving these resources in the ground neither adds nor detracts from the natural environment. Their extraction causes impacts to the natural environment but their use provides positive impacts to the limited cash economy and improves the quality of life for the residents of the region.

d) Renewable Energy

Lands developed for renewable energy projects would no longer be available for various other purposes.

e) Lands and Realty Actions

Lands transferred out of public ownership generally stay in private hands unless they are subsequently acquired for a public purpose. The right-of-way avoidance areas in Alternatives C and D would limit the issuance of new rights-of-way in these locations

3. Social and Economic

Increases in employment and personal income would occur over the life of the exploration, development, and operation activities. Employment in oil and gas related activities represent a loss of opportunity for workers to pursue employment in other fields. Investment by the lessees and operators in oil and gas exploration and development activities in the planning area represents a loss of opportunity to invest those monies elsewhere. Revenue increases to the NSB and the State and Federal governments that would occur during production years would result in the irreversible and irretrievable commitment of those revenues. Development would result in new infrastructure that would be removed at the end of production.

Long-term population and productivity effects to the WACH from oil and gas development in calving and critical insect-relief areas could produce irreversible and irretrievable effects to the herd and to the subsistence caribou hunt to most villages in the planning area.

I. Unavoidable Adverse Impacts

Unavoidable adverse impacts are either impacts that remain following the implementation of mitigation measures or impacts for which there are no mitigation measures. Some unavoidable adverse impacts occur as a result of proposed management under one or more alternatives, others are a result of public use of BLM-managed lands. Only those programs or resources that would have unavoidable adverse impacts are included here.

1. Resources

a) Air Quality and Soil and Water Resources

Unavoidable adverse impacts to soil and water occur from road construction and material site excavation. Gravel roads, airstrips, and pads destroy soil structure through compaction and thermokarst erosion, block natural drainage patterns, create stream flow diversions, impoundments, and increase sediment runoff that impairs water quality. By limiting the length of the roads and requiring that all permanent facilities have an approved drainage plan, a reduction in adverse impacts is possible but not avoidable (Walker et al. 1987). Limiting development on floodplains and wetlands would insure ensure compliance with Executive Orders 11988 and 11990 that direct Federal agencies to minimize the destruction, loss, or degradation of floodplains and wetlands.

As noted earlier, a very large crude oil spill could have serious adverse impacts to soil and water resources. While the petroleum residue from a spill could be flushed from most streams within a few years, the impacts to lakes, ponds, and wetlands could persist for decades.

b) Vegetation

While recognized as a natural part of northern ecosystems, occasional large, intense wildland fires will temporarily destroy vegetation and priority habitats (such as lichen-rich plant communities). Recovery would be expected, but not always during the life of the plan. Scarring of the landscape could also result from unauthorized cross-country travel.

c) Fish and Wildlife

(1) Fish

Natural erosion processes, unauthorized travel, in addition to permitted land use activities, may increase sedimentation into fish bearing streams with the possible resultant adverse effects described in the Impacts to Fish from Mineral Exploration and Development section. These unavoidable impacts are not expected to be significant over the life of the plan.

(2) Wildlife

Some disturbance and disruption of wildlife under all alternatives, and some habitat alterations from mineral development under alternative B and D are unavoidable. Displacement or reduced habitat use by wildlife are likely to be local (within one-half to 2½ miles of development or activity). Disturbance and displacement from most activities occurring in the planning area would be short-term (a few hours to a few weeks). Disturbance and displacement due to mineral development would be long-term and would persist over the life of the development. Most unavoidable adverse impacts to wildlife would be short-term and localized, and would not substantially affect populations.

d) Special Status Species

(1) Special Status Plants

While a natural part of the landscape, occasional large, intense wildland fires or sporadic light burns may destroy sensitive status plant individuals or populations, and associated habitat. Recovery would be expected, but not always during the life of the plan. Small populations of sensitive status plants are vulnerable to grazing and trampling by caribou, muskox, Dall sheep, and reindeer, or by herbivory from small mammals such as ground squirrels, voles, and mice. Impacts could be localized and severe, but eventual recovery would be expected.

(2) Special Status Fish

The primary threat to the BLM Sensitive Status Kigluaik Mountain arctic char is increased fishing pressure from increasing recreational use of the Kigluaik Mountains. If it is determined that the BLM Sensitive Status fish populations are being threatened, fishing regulations can be made more restrictive through proposals to the State of Alaska Board of Fish. Therefore, adverse impacts to the fish can be mitigated and are not considered unavoidable.

(3) Special Status Wildlife

Unavoidable adverse impacts to special status species would be similar to those discussed above under wildlife. Under Alternatives B and D some disturbance to spectacled and Steller's eiders, or other sensitive status bird species by routine activities associated with oil and gas exploration and development are unavoidable. These include temporary disturbance effects such as displacement of incubating females from nests or broods, or disturbance of foraging, molting and migrating birds. Eiders could habituate to some disturbances or move to alternate habitats for foraging, nesting, and brood-rearing. Lease Stips and ROPs would effectively mitigate many of the effects of disturbance to spectacled and Steller's eiders, but some impacts could be unavoidable. There would also be a permanent loss of eider habitat associated with the construction of oil and gas related facilities. Most disturbances of endangered and threatened species associated with routine activities would be minimized or avoided through compliance with mitigation measures developed through the Section 7 consultation process. In addition, the distribution of eiders in the planning area is very limited, further reducing the possibility of unavoidable adverse impacts.

e) Fire Management and Ecology

Large landscape scale high severity fires could occur in portions of the planning area. Fire suppression activities pose a risk to other resources. Fire suppression impacts have the potential to be long-term in nature and high impact. Dozers can cause severe soil erosion and increase silt load into streams and rivers. Cultural resources could be damaged or lost. ROP FM-1d prohibits the use of fire retardant except in special cases. In these circumstances use of fire retardant may be unavoidable. Fire retardant drops into streams, rivers and lakes can cause fish kills and adversely impact other aquatic resources.

f) Cultural Resources

While measures are in place to identify threats to cultural resources and prioritize management actions, some impacts would be unavoidable. There would continue to be impacts to cultural resources from dispersed recreation activities, OHV use, vandalism, and other types of activities not authorized by the BLM. Natural processes such as erosion and natural decay or deterioration could also result in unmitigated damage to cultural resources.

g) Paleontological Resources

While measures are in place to identify threats to significant paleontological resources and prioritize management actions, some impacts would be unavoidable. There would continue to be impacts to paleontological resources from dispersed recreation activities, OHV use, vandalism, and other types of activities not authorized by the BLM. Natural processes such as erosion and natural decay or deterioration could also result in unmitigated damage to paleontological resources.

h) Visual Resources

Natural disasters or wildland fires could have unavoidable, adverse impacts to visual resources.

i) Wilderness Characteristics

Adverse effects to solitude, naturalness, and primitive/unconfined recreation from oil and gas exploration and hard rock development, and developed trails are unavoidable. These effects would be direct result of exploration and development activities and facilities such as drill pads and pipelines, mining overburden and trails. Recent and future technological advances may make green trails and pads an avoidable impact.

Short-term use of portions of the planning area for oil and gas and hard rock development could adversely affect the long-term use and values of the wilderness resources. Rehabilitation and removal of pads, roads, airstrips, and facilities would not restore the original condition of the land or its original wilderness characteristics, especially naturalness.

2. Resource Uses

a) Forest Products

Spruce beetle infestations, present in some forested regions of the planning area, and given current climate trends towards warmer, drier summers and milder winters, may continue to intensify and spread to currently unaffected areas. Standing dead and fallen timber will increase. The potential for larger, more intense fires and other detrimental forest insects and diseases may also increase (*Ips* bark beetle, aspen leaf miner, etc.). The volume of live, mature timber will most likely decrease during the life of the plan. Alteration of forest habitat from placer mine development would result in long-term loss of trees in limited areas.

b) Livestock Grazing

Decreases in the quantity and quality of forage could also result from Mineral-Locatable activities (placer mining activities), though they should be relatively minor. Authorized and unauthorized travel off roads via OHVs could cause scarring of the landscape, soil compaction, reduction in reindeer forage, and loss of protective vegetative cover, thereby increasing soil erosion. Weeds introduced by these and other management activities could cause a reduction in forage, though again the chance of this minimal. Any facility developments, including but not limited to recreation sites, range improvements and utility and road facilities, which are not properly restored even after mitigation measures are applied could result in increased soil erosion. Changes in the amount of recreational use, including hunting, visitation, subsistence, and associated duration and patterns of use could result in increased conflicts between users and unanticipated changes in resource conditions. Large-scale wildland fires that may occur within the planning area over the life of the plan could quickly change the amount of available winter forage for reindeer.

c) Recreation Management

Changes in the amount of recreational visitation and associated duration and patterns of use could result in increased conflicts between users and unanticipated changes in resource conditions. These resource conditions may include declines in fish and game resources through over harvest and environmental degradation from increased localized use.

d) Travel Management/OHV

Regardless of the alternative, access to public lands will become more difficult as Native corporation entitlements are met. As public lands become private lands, net access is lost even if the BLM reserves 17(b) easements. The seasonality and weight restrictions on these easements also diminishes the access previously afforded the public.

A mix of OHV opportunities is not provided in this plan due to the current maximum 2,000 pound GVWR limit imposed in all but Alternative B and only during the cold winter months.

Roads are not expected on BLM-managed lands but development of roads on State and private lands (especially Native corporation lands) will increase the need for the BLM to plan for increased access and travel management.

e) Renewable Energy

Mitigation measures would reduce the potential, but not eliminate the possibility, of bird strikes on wind turbines.

3. Special Designations

a) Areas of Critical Environmental Concern and Research Natural Areas

Changes in the amount of recreational visitation and associated duration and patterns of use could result in increased conflicts between users and unanticipated changes in resource conditions. Wildland fires within the planning area could quickly change the value of the ACECs without regard to objectives. Scarring of the landscape and damage to resources could also result from unauthorized cross-country travel.

b) Iditarod National Historic Trail

There may be impacts to the Iditarod National Historic Trail (INHT) from dispersed recreation activities, OHV use, and other types of activities not authorized by the BLM. Natural processes such as erosion and natural decay or deterioration could result in unmitigated damage to the INHT.

4. Social and Economic

Most economic effects of oil and gas leasing, exploration, development, and production in the planning area would be considered positive effects by many people. Increases in employment and associated personal income would occur over the life of the exploration, development, and production activities. Revenue increases to the NSB, NAB and to the State and Federal Governments would occur during production years. However, these increases would be short-term (less than 30 years). They would occur only for the duration of the activities. Development activity would establish infrastructure that could enhance the future productivity of oil and gas exploration, development, and production.

The Environmental Justice Executive Order includes consideration of potential effects to Native subsistence activities. The only substantial source of potential unavoidable environmental justice related effects on Native communities from oil and gas exploration and development in the planning area would occur from displacement of caribou as a result of exploration and development in calving or insect relief areas. The Native communities throughout northwest Alaska harvest caribou from the WACH. Noise and disturbance from routine activities would be

unavoidable, but not expected to produce disproportionate, high adverse Environmental Justice impacts on the Alaskan Native minority populations in any community.

5. Subsistence

Unavoidable adverse impacts that would affect fish and wildlife would also affect subsistence. These include: sedimentation of fish-bearing streams by natural erosion, unauthorized travel, and possible development; small amounts of habitat alteration; and temporary and localized disturbance and/or displacement of subsistence species. These unavoidable impacts are not expected to be significant during the life of the plan, and would not substantially affect populations or access to resources by the subsistence user.

Under all alternatives, some amount of competition by non-local hunters could occur on public lands, unless the subsistence priority was enacted by the Federal Subsistence Board. However, this competition is expected to be minor, and should not affect the opportunity for the subsistence user to harvest resources.

J. Short-Term Uses vs. Long-Term Productivity

This section discusses the short-term effects of the potential use of portions of the planning area for development activities, versus the maintenance and enhancement of potential long-term productivity of the planning area's environmental resources. The only significant development projected to occur under this plan is oil and gas development. It is assumed that one oil field could be developed during the life of the plan.

Short-term refers to the total duration of development activities, such as mineral development. Long-term refers to an indefinite period beyond the termination of development activities. The specific impacts vary in kind, intensity, and duration according to the activities occurring at any given time. For example, Initial activities related to oil and gas, such as seismic surveying and exploration drilling, result in short-term, localized impacts. Development drilling occurs sporadically throughout the life of an oil or gas field, but also results in short-term, localized impacts. Activities during the production life of a field may result in chronic impacts over a longer period of time (25 to 35 years), potentially punctuated by more severe impacts as a result of accidental events. Pad reclamation is also a short-term activity with localized impacts; the impacts of site clearance may be longer lasting.

Until more reliable data become available, the long-term effects of oil spills cannot accurately be projected. In the absence of these data, it must be assumed that chronic spills or a major large oil spill could result in decreased long-term productivity.

The long-term effects due to climate change are being predicted and some changes are already occurring within the planning area. Short-term uses could exacerbate or accelerate changes in the natural environment over the long-term.

1. Resources

a) Air Quality and Soil and Water Resources

Short-term degradation of air quality related to construction, placement, and operation of exploration and production facilities under Alternatives B and D would impact air quality for the duration of the project. Air quality is a renewable resource; and, when activities that produce emissions cease, the local air quality returns to its original condition.

The long-term impact on soils will be very limited in extent. Soils potentially affected by exploration and development activities cover much less than 1% of the planning area, although several thousand acres of soil could be directly impacted due to mineral development activities projected to occur under Alternatives B and D. Additional soil could be lost if new gravel sources are developed. The formation of soils is a very slow process and soils lost through the construction of permanent facilities would essentially be permanent.

Activities authorized under this plan would result in both short-term and long-term effects to water resources. Construction activities associated with road and pad construction; culvert and bridge work in streams and lakes that disturbed stream banks or shorelines; blockages of natural channels and floodways that disrupted drainage patterns; and removal of gravel would all cause short-term increases in erosion and sedimentation. Water removal could cause short-term changes in aquatic habitat. Permanent gravel roads and pads, airstrips, pipelines, and facilities constructed adjacent to or crossing streams and lakes would have long-term effects on water resources. Removal and remediation of these structures after production ceased would restore drainage patterns and natural sedimentation processes. Long-term changes could occur where thermokarst erosion caused major changes in stream banks, and lake shorelines, and altered natural drainage patterns. Oil spills would have both short- and long-term impacts, especially to fish-bearing lakes and streams. Degradation of water quality from construction and operation of oil field(s), winter ice roads, and spills could have a long-term effect on isolated water bodies.

b) Vegetation

The effects on vegetation from most activities authorized under this plan would be short-term. However, the construction of gravel pads and roads, mining of gravel, removal of the vegetative mat, and the most severe impacts caused by vehicles during overland moves and seismic exploration as projected under Alternatives B and D, would cause long-term effects on vegetation. All effects of oil-field construction on vegetation would be long term, though new oil spills, and dust and gravel spray from vehicular traffic on the gravel pads would not occur after field abandonment. The recovery time for vegetation from a spill could last several years (Jorgenson 1997, McKendrick 2000), but it is not known how long changes to plant communities as a result of dust effects would persist. Although research indicates that natural plant communities can be restored to gravel pads (McKendrick 1997), especially if some silt-loam soil is added to the substrate, the time until recovery of natural canopy cover would be so long that the impacts might be considered permanent from a human perspective.

The long-term productivity of these localized areas would be reduced; however, these areas represent less than 1% of the planning area. Placement of gravel drilling pads, roads, airstrips,

staging areas, and docks, as well as construction of pipelines or the use of gravel mine sites, would permanently disturb or destroy vegetation unless sites were reclaimed.

c) Fish and Wildlife

(1) Fish (including special status fish)

Impacts to fish resources and habitat would occur from mineral exploration and development under Alternatives B and D. Most impacts would be short term and confined to small segments of habitat and localized components of the fish population. Disturbances would be unlikely to result in decreased long-term productivity of fish populations, if they are confined to small segments of habitat. If surface disturbing activities are allowed throughout productive fish habitat, particularly placer mining activities, long-term productivity will be lost. A further example of long-term loss of productivity would involve an oil spill or other contamination in a waterbody with no migration pathways. Losses in a specific waterbody would be permanent if all individuals of a species were killed. This is a particular concern for the BLM Sensitive Species Kigluaik arctic char (Salvelinus alpinus) inhabiting the nutrient-poor marginal habitat of select Kigluaik Mountain range lakes.

(2) Wildlife

Birds may experience short-term effects from any factors or activities that disturb their normal daily and seasonal pattern of activities. Of the routine activities associated with oil and gas exploration and development as projected under Alternatives B and D, aircraft traffic would have the greatest potential for disturbing birds. Although much of the potential effect of air traffic could be avoided through compliance with lease stipulations and ROPs, aircraft could be required to fly at lower altitudes during inclement weather. Under these conditions, disturbance of birds along the flight path could occur. Disturbances that affect survival rates of birds could have long-term effects on populations. The other sources of disturbance related to roads and facilities would result from vehicular traffic, heavy equipment use, routine maintenance activities, oil spill response training activities, and pedestrian traffic. These disturbances would likely impact birds during the life of the project, but would not continue after project completion; the effects of habitat loss or alteration may continue for the long-term.

Most effects on terrestrial mammals and their habitats would be short term and localized. Potential effects include mortality of individuals, physiological stresses in surviving individuals, reduction in the number of changes in behavior or migration patterns. Long-term, cumulative effects could occur if recovery from the short-term effects extended beyond the life of the project. The potential effects of noise disturbance and terrestrial habitat alteration could also include short-term, localized effects such as mortality, stress, decreases in or redistribution of populations or species, and changes in survival patterns. Effects of oil and gas development projected under Alternatives B and D on terrestrial mammals and their habitats would be long term (beyond the production life of the field); population level effects would be minor to non-existent. Long-term biological productivity could be lost from areas used as facility sites. However, these sites are very small and represent much less than 1% of the available habitat.

d) Special Status Species

(1) Special Status Plants

Impacts to special status plants could occur from mineral exploration and development under Alternatives B and D if located in habitat for these species. Sensitive plant species that could be affected include: Erigeron muirii (Muir's fleabane), Mertensia drummondii (Drummond's bluebell), Potentilla stipularis (stipulated cinquefoil) and Poa hartzii ssp. alaskana (Alaskan bluegrass). Three additional species categorized as rare could also be affected: Smelowskia johnsonii (Johnson's smelowskia), Rumex krausei (Cape Krause sorrel), and Trisetum sibiricum (Siberian oatgrass).

Most impacts would be short term and confined to small segments of habitat and localized components of the plant populations. Surface disturbing activities that destroyed the soil or removed the vegetative mat could result in long-term destruction of habitat. Impacts would be reduced by implementing ROP SS-1e, which requires that measures be taken to protect populations or individual sensitive status plants using site-specific buffers or management prescriptions.

(2) Special Status Animals

If a project were sited in habitat for Spectacled and Steller's eiders, these birds could experience short-term effects from any factors that disturb their normal daily and seasonal pattern of activities and these would continue for the life of the project. These effects would result from disturbances related to aircraft traffic. In addition, disturbance effects related to roads and facilities would result from vehicular traffic, heavy equipment use, routine maintenance activities, and pedestrian traffic. These disturbances may impact birds during the life of the project, but would be unlikely to continue after project completion. Aircraft and ground-based research activities could impact threatened eiders. Many of these activities would likely discontinue after project abandonment, although some aerial surveys, to conduct long-term monitoring, would most likely continue.

The effects of eider habitat loss or modification adjacent to roads and pads would likely be short term, although loss of habitat due to gravel placement would have a long-term effect that would last well beyond project abandonment, unless habitat restoration was planned and implemented. Although nesting or brood-rearing habitat loss in the footprint of gravel infrastructure would have a long-term effect, other suitable habitat is widespread, and the effect on threatened eider populations would be minimal.

Potential eider mortality could result from collisions with vehicles or structures and would continue for the life of the project. Long-term effects could result if structures were not removed during project abandonment. However, eider mortality due to collisions with vehicles or structures has not been a major source of mortality in North Slope oil fields and would be unlikely to affect threatened eiders at the population level.

If a project were sited in suitable habitat for polar bears, bears could experience short-term effects from activities that disturb their normal daily or seasonal pattern of activities. Since polar bears spend the majority of their time off-shore on the pack ice, impacts to bears would generally be short-term. If impacts were substantial enough to result in reduced productivity, then long-term impacts would result. Past oil and gas development on the North Slope appears to have had minimal impact on polar bears. Given the low level of activity possible under Alternatives B and D of this plan and the paucity of bears within the planning area, long-term impacts to polar bear productivity are not anticipated. Any impacts resulting from this plan would be in addition to other stressors such as global climate change.

e) Cultural Resources

Because cultural resources are nonrenewable, there is no difference between short-term and long-term impacts. Cultural resources cannot recover from most types of effects. Historic structures could benefit from preservation and stabilization efforts. However, once disturbed, an archaeological deposit could never be returned to its original context. Any destruction of cultural resource sites would represent long-term losses. Salvage archaeology to recover remaining site data would generally result in the total destruction of the site, although the recovered data would effectively mitigate for loss of the site. Any discoveries of cultural resources made during surveys required prior to development of a project would enhance knowledge of the history and early inhabitants of the region and help to mitigate further potential effects of activities in the area. These impacts would be most likely under Alternatives B and D, but would occur to a lesser extent under the other Alternatives.

f) Paleontological Resources

Because paleontological resources are nonrenewable, there is no difference between short-term and long-term impacts. The resource cannot recover from some types of adverse impacts. Once disturbed, the materials and information of paleontological deposits may be permanently compromised. Any destruction of paleontological sites, especially ones determined to have particular scientific value, would represent long-term losses. Furthermore, once paleontological deposits are disturbed and exposed, then natural erosion could accelerate the destruction of fossils. Exposed fossils also are vulnerable to unauthorized collecting and digging. Any discoveries of paleontological resources as a result of surveys required prior to development of a project would enhance long-term knowledge of the area and these resources. These impacts would be most likely under Alternatives B and D, but would occur to a lesser extent under the other Alternatives.

g) Visual Resources

Short-term use of portions of the Planning Area for mineral development or recreational use (OHV) could affect the long-term value of visual resources. Rehabilitation, removal, and revegetation of pads, roads, and facilities would eventually cause the viewshed to resemble a more natural condition. However, it is possible that the full value of the original scenic quality and viewshed would not be regained. Visual resources could still be negatively impacted by any remnants of development activities and by changes from the original landscape. Established OHV trails would affect the visual resources over the long-term, as the trail would not

rehabilitate, and may continue to widen and degrade, if under continued use. These impacts would be most likely or widespread under Alternatives B and D, but would occur to a lesser extent under the other Alternatives.

h) Wilderness values

Short-term use of portions of the Planning Area for mineral development or recreational use (OHV) could impact wilderness values over the long-term. Removal and rehabilitation of pads, roads, and facilities would not restore the original condition of the land or its original wilderness value over the short-term. If facilities were not removed or rehabilitated, scenic quality, naturalness, and primitive and unconfined recreation opportunities, which are essential to wilderness values, would continue to be negatively impacted until such facilities were removed and the area restored. OHV use in the planning area would result in long-term impacts to scenic quality and naturalness along routes that continued to be used over time. These impacts would be most likely under Alternatives B and D, but would occur to a lesser extent under the other Alternatives.

2. Resource Uses

a) Forestry

Short-term use of the Planning Area for leasable mineral development would have no impact on forest resources as the areas with oil and gas development potential are not forested. The recovery time for forest vegetation from other types of surface disturbing activities would take decades even with reclamation. If disturbance occurred, the long-term productivity of these areas would be reduced. However, the potential for large surface disturbing activities to occur in forested areas is very low and it is anticipated that less than 1% of the forested land within the planning area would be impacted by any type of development activity. These impacts would be most likely under Alternatives B and D, but could occur to a lesser extent under the other Alternatives.

Authorization of a commercial timber sale under Alternatives B or D would have long-term impacts as it would take many decades to replace the timber removed. Given the low timber volume, low productivity, scattered locations of timber stands and long distances involved in timber transport, commercial logging is not likely to occur in the reasonably foreseeable future.

b) Livestock Grazing

Short-term use of the Planning Area for leasable mineral development as projected in Alternatives B and D would have no impact on livestock grazing as the areas with oil and gas development potential are not open to grazing. The effects on grazing from most other activities authorized under this plan would be short-term. However, the construction of gravel pads and roads, mining of gravel, removal of the vegetative mat, and the most severe impacts caused by vehicles during overland moves would cause long-term affects on vegetation and thus affect the availability of forage for livestock over the long-term. As discussed above under “Vegetation” recovery of the natural vegetative cover, particularly of the lichens favored by reindeer, would be

so long that impacts might be considered permanent from a human perspective. The long-term productivity of these localized areas would be reduced; however, these areas represent less than 1% of the land available for grazing.

c) Recreation Resources

Short-term use of portions of the Planning Area for mineral development under Alternatives B and D could affect the long-term use and value of recreation resources. Rehabilitation and removal of pads, roads, and facilities would be unable to restore the original condition of the land or its original recreation and wilderness value. If airstrips or roads were not removed or rehabilitated, recreation opportunities could be enhanced by increasing access for the long-term. However, scenic quality, naturalness, and primitive recreation opportunities would be negatively impacted by the presence of the airstrip.

3. Special Designations

a) Area of Critical Environmental Concern

Mineral exploration, development, and production activities under Alternatives B and D would constitute a short-term commitment of resources that could impact the values for which the areas were designated as ACECs. Mineral development could have long-term impacts on certain resources depending upon the location and extent of the development and the resource affected. These impacts are discussed under “Fish and Wildlife”, “Special Status Species”, and “Vegetation”.

b) Wild and Scenic Rivers

Mineral exploration, development, and production activities under Alternatives B and D would constitute a short-term commitment of resources that could impact river values. The short-term commitment of resources would not affect the finding of suitability or nonsuitability on the eleven river segments considered under this plan. The non-suitability determination on these rivers is based on lack of local support for designation and the ability to maintain outstandingly remarkable values without designation. River values that are non-renewable, such as cultural and paleontological resources might be affected for the long-term.

4. Social and Economic

a) Subsistence

The short-term redistribution, reduction, or displacement of subsistence species could affect regional subsistence-harvest patterns. Such short-term effects would not be expected to have long-term consequences unless chronically imposed on the subsistence resource base of the region. Habitat destruction could cause a local reduction in subsistence species, a potential long-term impact to communities affected by such reductions. Under Alternatives B and D land

used for infrastructure and development would slightly reduce the amount of area suitable for subsistence hunting. Roads would increase access and competition for resources over the long-term and could further affect subsistence harvests. Increasing human populations would require that more resources be harvested over wider areas to maintain the subsistence way of life. The potential for user conflicts could increase in areas where current uses overlap.

Short-term recreational use in the Squirrel River and other areas has resulted in user conflicts on a seasonal basis. Development of a recreation area management plan for the Squirrel River and other proposed management in the Extensive Recreation Management Area would likely reduce conflicts in these areas for the life of this plan.

b) Sociocultural Systems

Increased population, industrial activity, and minor gains in revenues and employment under Alternatives B and D could potentially disrupt individual family units in Native communities for the short term; however, it is unlikely that these minor changes would cause community-wide changes to the sociocultural system. Income and employment allocation disparities could increase, causing intra-community conflict. Any long-term effects on subsistence resources could disrupt social systems (i.e., the sharing network, or the passing on of hunting traditions), especially if they resulted in a substantial reduction to a key resource, such as caribou. Short-term effects from oil and gas development that impacted key resources could also lead to a disruption of social systems, especially if these effects were to occur repeatedly (chronic) throughout the projected lifetime of oil and gas activities in the Planning Area. As a result, sociocultural values and cultural institutions would be affected. Activities or policies that act against the values of the Iñupiat residents of the region would increase social stress and concerns in the community, and could also lead to changes to social systems.

c) Environmental Justice

Any impact on subsistence resources that would have a chronic effect on the sociocultural system or subsistence resources over the lifetime of oil and gas activities (about 30 years) would disproportionately affect the Iñupiat people. Such an effect would only be expected to occur in the event of long-term population and productivity effects to caribou, fish, or water birds.

d) Economy

Economic benefits would accrue from production of oil and gas from federal lands as projected under Alternatives B and D. Economic benefits, including any decrease in the Nation's dependency on foreign oil, would be short term. Increases in employment and associated personal income would occur over the life of the exploration, development, and operations activities. Revenue increases to borough, state and federal governments would occur during the production years. However, these increases would occur only for the duration of the activities. Development activity would result in infrastructure that in the short-term could enhance future productivity of oil and gas exploration, development, and production.

Chapter V: Consultation and Coordination

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Chapter V: Consultation and Coordination

A. Introduction

This chapter describes the public participation opportunities made available through the development of the Proposed RMP/Final EIS and the formal consultation that has occurred to date. It also lists the preparers of the document and the agencies and organizations that received copies of the Proposed RMP/Final EIS for review.

There have been and will continue to be many ways for the public to participate in the planning process for public lands under the jurisdiction of the Fairbanks District Office and the Anchorage Field Office. The Kobuk-Seward Peninsula RMP/EIS was prepared by an interdisciplinary team of specialists from the Fairbanks District Office and the Alaska State Office of the BLM. Technical review and support were provided by Anchorage Field Office, Fairbanks District Office, and State Office staffs. The State of Alaska has participated in the development of the document. Table 5-1 at the end of this chapter lists the preparers of the document. Members of the planning team have consulted formally or informally with numerous agencies, groups, and individuals in the RMP development process. Consultation, coordination, and public involvement occurred as a result of scoping and alternative development meetings and reviews, meetings and briefings with State, Tribal, and local government representatives, and informal meetings and individual contacts.

B. Public Participation Opportunities

Several steps of the planning process require that the public be provided the opportunity to participate. Major public participation events are described below.

1. Scoping

Scoping for the Draft RMP/EIS was initiated with publication of a Notice of Intent in the Federal Register on January 30, 2004. Besides identifying issues of concern, nominations for special management areas such as ACECs and Wild and Scenic Rivers were requested during scoping. The formal scoping period concluded on April 29, 2004, although comments received after that date were also considered.

During scoping, nine public meetings were held in nine locations to explain the planning process and gather input (March-April 2004). Scoping meetings were held in Fairbanks and Anchorage as well as seven communities within the planning area. Meetings were held in both Kotzebue and Nome as these are the two major hubs for the planning area. Village meetings focused on villages that were close to large blocks of BLM-managed land. Village meetings were held in Buckland, Kiana, Kivalina, Koyuk, and Shaktoolik. News releases to local and regional media sources advertised the times and locations of the scoping meetings. A total of 92 people attended these meetings.

2. Draft RMP/EIS Public Meetings and Subsistence Hearings

On May 5, 2006 a Notice of Availability for the Kobuk-Seward Peninsula Draft RMP/EIS was published in the Federal Register by the Environmental Protection Agency (Federal Register 2006a). This began a 90-day comment period on the Draft RMP/EIS. Based on requests from the public and local government, the comment period was extended until September 15, 2006 for a 132-day comment period. Between May 22 and July 19, 2006 BLM held public meetings in Shaktoolik, Koyuk, Nome, Buckland, Kotzebue, Kivalina, Noorvik, Kiana, Ambler, Point Hope, Anchorage, and Fairbanks. Several of these meetings had to be rescheduled due to weather or other emergency situations.

The first part of the meeting consisted of a PowerPoint presentation summarizing the alternatives in the Draft RMP followed by an informal question and answer session. BLM staff were available to answer questions and discuss alternatives. After this informal discussion, a formal hearing was held. The meeting format varied slightly based on the size of the group and their desire to ask questions or give spoken testimony.

The purpose of the formal hearings held at the end of each meeting was to gather testimony on the impacts to subsistence from alternatives presented in the Draft RMP. The ANILCA Section 810 Analysis, presented in Appendix D of the Draft RMP/EIS concluded that both the No Action Alternative (Alternative A) and the cumulative case would significantly restrict subsistence uses and therefore required that subsistence hearings be held in the area affected by the proposed action. Alternative A was found to significantly restrict subsistence use and needs in the Squirrel River area due to the impacts to subsistence users by increased competition in this heavily used area, as well as the associated displacement of resources and OHV issues. This finding applied to the communities of Kiana, Kotzebue, Noorvik, and possibly Ambler. The Final Section 810 Analysis can be found in Appendix D of this document.

Formal hearings were planned for all ten public meetings held within the planning area. In a few cases, none of the meeting participants wanted to provide public testimony and thus no hearing was held. Spoken testimony from village elders and subsistence users were taken at meetings in Shaktoolik, Koyuk, Nome, Noorvik, Kiana, Ambler, and Point Hope. No hearings were held in Fairbanks or Anchorage. Additional comments on impacts to subsistence were given to BLM through written comments.

3. Other Outreach Efforts

A Web site was established for the RMP in January 2004. The purpose of the Web site was to provide the public with information about the planning process, schedule, and planning area, to post maps and planning documents as they became available, and to provide the public with contact information. RMP team members were listed on the Web site with their e-mail addresses. A scoping report, summarizing public comment and the results of scoping was posted on the Web site in August 2004. Unfortunately, due to security concerns, the Kobuk-Seward Peninsula RMP/EIS Web site was not available to the public from April 8, 2005-January 2006. The Draft RMP/EIS was posted for viewing on the Web site on May 5, 2006. The Proposed RMP/Final EIS was posted for viewing on the Web site after publication of the Notice of Availability by the Environmental Protection Agency. Currently, the Web site can be accessed at http://www.blm.gov/ak/ksp.

Throughout the development of the RMP/EIS and Proposed RMP/Final EIS, all individuals and organizations on the mailing list received copies of the Kobuk-Seward Peninsula RMP newsletter. This newsletter summarized where the BLM was in the process and how the public could become and stay involved in development of the plan. The mailing database developed over the life of the plan currently contains over 400 names.

Briefings on the Draft RMP/EIS were conducted for governments and organizations upon request or at regularly scheduled meetings. The Alaska Miners Association was briefed on the Draft RMP/EIS before release. The Northwest Arctic and Seward Peninsula Regional Advisory Committees were updated on the status of the plan at each of their regularly scheduled meetings. The Northwest Arctic Borough and Alaska Congressional Delegation were briefed shortly after release of the Draft. The BLM Resource Advisory Committee was updated at regularly scheduled meetings and consulted during development of the Proposed RMP/Final EIS. The State of Alaska was provided an opportunity to comment on the preliminary Draft RMP/EIS. Both the State and Northwest Arctic Borough were given an opportunity to review the BLM's response to comments on the Draft and a prepublication copy of the Proposed RMP/Final EIS.

C. Consultation

1. U.S. Fish and Wildlife Service and National Marine Fisheries Service

Consultation with the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) is required under Section 7 of the Endangered Species Act of 1973 prior to initiation of any project by BLM that may affect any federally listed or endangered species or its habitat. This RMP/EIS is considered to be a major project and this document defines potential impacts to threatened and endangered species as a result of management actions proposed in the RMP.

Informal consultation was initiated with a request for a list of Federally listed threatened or endangered plant, animal, or fish species or habitats present in the planning area on July 8, 2004. The FWS identified two listed species that may be affected by activities within the planning area: Steller's eider and spectacled eider. The planning area includes breeding and molting range for the spectacled eider. Steller's eider breeds and winters outside the planning area but likely migrates through the area. On December 27, 2006 the FWS proposed to list the polar bear as a threatened species under the Endangered Species Act (Federal Register 2006), initiating a 12 month review to assess the current status and future of the species. Polar bears may occur within the planning area, along river drainages north of Cape Thompson that drain to the ocean, particularly within 25 miles of the coast.

The Draft RMP was submitted to the FWS for comment and informal consultation. During the public comment period, BLM met with FWS to discuss the process for further consultation on Steller's and spectacled eider.

Concurrent with the development release of the Proposed RMP/Final EIS a biological assessment was developed and submitted to the FWS for consultation on Steller's eider,

spectacled eider, and conference on polar bear. The results of the Section 7 consultation will be incorporated into the Final RMP/EIS and Record of Decision.

The NMFS is responsible for the administration of the Endangered Species Act as it applies to listed cetaceans and pinnipeds in Alaska. These include seven species of endangered whales, the threatened eastern population of Stellar sea lions, and the endangered western population of Stellar sea lions.

Informal consultation was initiated August 2, 2004, when the BLM described the planning process and requested a list of Federally listed threatened or endangered marine mammals and critical habitats present in the planning area. On December 30, 2004, NMFS responded with a letter stating that "No endangered marine mammals, nor designated critical habitats, for which the National Marine Fisheries Service (NMFS) bears responsibility under the Endangered Species Act are likely to occur within the project area."

On January 25, 2005, a second letter was submitted to NMFS to initiate consultation on Essential Fish Habitat (EFH). The planning area includes Essential Fish Habitat for all five species of salmon. An analysis of effects on Essential Fish Habitat is contained in Chapter IV, section (B)(3)(a) Fish of this document. The Draft RMP was submitted to NMFS for comment and, if necessary, additional consultation. Policy and management direction for EFH is contained in Chapter II, section (B)(1)(c)(3)(d) Essential Fish Habitat. A description of EFH in the planning area is included in Chapter III, section (B)(7)(a)(2) Fish Habitat Description.

Based upon comments submitted by the FWS, the Service's Marine Mammal Office was informally consulted during development of the Proposed RMP/EIS regarding walrus and polar bears. Additional information was included in the Proposed RMP based on this consultation.

2. Tribal Consultation

In recognition of the government-to-government relationship between tribes and the Federal government, letters were sent to 25 tribal governments to inform them of the planning process and to request government-to-government consultation. The letters also requested their input on issues and concerns to be considered during the planning. Representatives of tribes were invited to the public scoping meetings held in the planning area. Letters requesting input on issues and concerns were also sent to both the regional Native corporations and the non-profit Native corporations within the planning area.

A copy of the Draft RMP/EIS was sent to all tribal entities for review and comment. Five tribes commented during the public comment period. A copy of the Proposed RMP/Final EIS will be sent to all tribal entities.

D. Collaborative Efforts

1. Cooperation with the State of Alaska

Because of the high percentage of State-selected lands within the planning area, the BLM has involved the State of Alaska from the beginning of this planning process. A joint BLM-State staff

position was created, with that person acting as liaison between the State of Alaska and the BLM in this planning process. This has been effective in facilitating information exchanges and reviews of draft materials by State personnel. The State reviewed the BLM's draft alternatives, preliminary draft RMP, response to comments, and preliminary Proposed RMP/Final EIS. These reviews produced a preferred strategy on management of State-selected lands. The State provided formal comments on the Draft RMP/EIS and these have been incorporated into Appendix J "Response to Comments."

The State was given an opportunity to review the pre-publication version of the Proposed RMP/Final EIS.

2. Other Collaborative Efforts

A variety of public involvement strategies have been implemented throughout this planning process to improve communication and promote an understanding of the issues and the process in developing the RMP/EIS. A subgroup was formed by the Alaska Resource Advisory Council (RAC) under the provisions of the RAC charter to assist the BLM in addressing planning issues.

The RAC is a 15-member advisory panel that provides advice and recommendations to the BLM on resource and land management issues. Membership includes Alaskans from around the state who represent the energy industry, tourism, commercial recreation, environmental interests, archeological interests, elected officials, Alaska Native organizations, and the public-at-large. The RAC as a whole was kept informed of progress on the plan through briefings at quarterly meetings. Members of the RAC's Kobuk-Seward Peninsula plan subgroup were kept informed through e-mail and newsletters. RAC members were also invited to review the BLM's draft alternatives. In December 2006, the RAC was briefed on the number and type of comments received and planned changes to the Preferred Alternative (Alternative D) in response to comments. RAC members provided comments on the recreation management issue in the Squirrel River. In February 2007, the RAC was updated on progress on the Proposed RMP/Final EIS.

BLM provided the Northwest Arctic Borough a briefing on the Draft RMP/EIS in May 2006 at the beginning of the public comment period. A Borough staff member attended most of the public meetings held within the planning area. Both the Northwest Arctic Borough and the North Slope Borough were given an opportunity to review the pre-publication version of the Proposed RMP/Final EIS.

E. Plan Distribution

Since initial scoping, the BLM has maintained a mailing list of individuals, businesses, special interest groups, and Federal, State, Tribal, and local government representatives interested in the development of the Kobuk-Seward RMP/EIS. In an effort to reduce printing costs, notices were mailed to everyone on the mailing list in March 2007 to remove those no longer interested in the process. In addition, copies of the Proposed RMP/Final EIS were also made available on CD-ROM rather than in paper format. Copies of the Proposed RMP/Final EIS are also available for public inspection at the following locations:

- BLM Fairbanks District Office
- BLM Anchorage Field Office
- BLM Alaska State Office, public room, Anchorage
- BLM Nome Field Station
- Noel Wein Library, Fairbanks
- Keyoayah Kozga Library, Nome
- Chukchi Consortium Library, Kotzebue
- Anchorage Municipal Library, Anchorage
- Alaska State Library, Juneau
- Northwest Arctic Borough, Kotzebue
- Tuzzy Consortium Library, Barrow
- Selawik National Wildlife Refuge Headquaters, Kotzebue

The Proposed RMP/Final EIS is available electronically at the Kobuk-Seward Peninsula RMP Web site: http://www.ak.blm.gov/ksp.

Concurrent with the distribution of the Proposed RMP/Final EIS, a Notice of Availability was published by the Environmental Protection Agency in the Federal Register to mark the beginning of the 30-day protest period. BLM also published a Notice of Availability in the Federal Register announcing the availability of the Proposed RMP/Final EIS.

Hard copies or CD-ROMs when requested of the Proposed RMP/Final EIS have been distributed to the following organizations, agencies, and individuals who requested them, or as required by regulation or policy.

Federal Government Agencies
U.S. Environmental Protection Agency – Region 10, Seattle Office
USDA Natural Resources Conservation Service, Nome
USDI U.S. Fish and Wildlife Service, Fairbanks
USDI U.S. Fish and Wildlife Service, Anchorage
USDI U.S. Fish and Wildlife Service, Selawik National Wildlife Refuge
USDI U.S. Fish and Wildlife Service, Office of Subsistence Management
USDI National Park Service, Western Arctic Parklands
USDI National Park Service, Bering Land Bridge
USDI Office of Environmental Policy and Compliance
USDI Bureau of Land Management, Alaska State Office
USDI Bureau of Land Management, Washington Office, Planning Group
USDI Bureau of Indian Affairs, Juneau
National Marine Fisheries, Alaska Region, Anchorage

State Government Agencies and Organizations
Alaska Department of Commerce and Economic Development
Alaska Department of Environmental Conservation
Alaska Department of Fish and Game
Alaska Department of Natural Resources
Alaska Department of Public Safety
Alaska State Historic Preservation Office

Alaska Department of Transportation and Public Facilities
Honorable Frank Murkowski, Governor of Alaska

Local Governments and Committees
City of Ambler
City of Brevig Mission
City of Buckland
City of Deering
City of Elim
City of Golovin
City of Kiana
City of Kivalina
City of Kobuk
City of Kotzebue
City of Koyuk
City of Nome
City of Noorvik
City of Point Hope
City of Selawik
City of Shaktoolik
City of Shishmaref
City of Shungnak
City of Teller
City of Wales
City of White Mountain
Northwest Arctic Borough
North Slope Borough
USDI, BLM, Resource Advisory Council (RAC)
Seward Peninsula Regional Advisory Committee
Northwest Arctic Regional Advisory Committee

Native Corporations
Arctic Slope Native Association
Arctic Slope Regional Corporation, Barrow
Bering Straits Native Corporation, Nome
Iñupiat Community of the Arctic Slope
Kawerak Inc., Nome
Maniilaq Association, Kotzebue
NANA Regional Corporation, Kotzebue
Shaktoolik Native Corporation
Shishmaref Native Corporation
Sitnasuak Native Corporation
Solomon Native Corporation
Teller Native Corporation
Tigara Corporation
Wales Native Corporation
White Mountain Native Corporation

Tribal Governments and Committees
Ambler Traditional Council
Chinik Eskimo Community, Golovin

Kiana Traditional Council
Kotzebue IRA Council
Mary's Igloo Traditional Council
Native Village of Brevig Mission
Native Village of Buckland
Native Village of Council
Native Village of Deering
Native Village of Elim
Native Village of Kivalina
Native Village of Kobuk
Native Village of Koyuk
Native Village of Notatak
Native Village of Point Hope
Native Village of Point Lay
Native Village of Shaktoolik
Native Village of Shishmaref
Native Village of Shungnak
Native Village of Wales
Native Village of White Mountain
Nome Eskimo Community
Noorvik Native Community
Selawik IRA Council
Solomon Tribal Council
Teller Traditional Council

Congressionals
U.S. Representative Donald Young
U.S. Senator Lisa Murkowski
U.S. Senator Ted Stevens

State Legislators
Senator Donald Olsen, Senate District T
Representative Reggie Joule, House District 40
Representative Richard Foster, House District 39

Non-governmental Organization and Businesses
Arctic Research Commission
Alaska Audubon
Alaska Coalition
Alaska Miners Association
Alaska Outdoor Access Alliance
Alaska Quiet Rights Coalition
Conoco Philips Alaska Inc.
Dowl Engineers
Mactec Engineering and Consulting
Midnight Sun Adventures
National Parks Conservation Association
Northern Alaska Environmental Center
Kawerak Reindeer Herders Association, Nome
Tryck Consulting
Trustees for Alaska

Usibelli Coal Mine, Inc.
Western Arctic Caribou Herd Working Group

Other Interested/Affected Individuals
The Kobuk-Seward Proposed RMP/Final EIS was also mailed to individuals who requested either a hard copy or a CD version. Additional copies of the plan will be mailed out upon request.

F. List of Preparers

The Proposed RMP/Final EIS was prepared by an interdisciplinary team of specialists and included expertise from outside the Fairbanks District Office. Table 5-1 lists the members of the planning team and their area of expertise. Abbreviations for BLM offices and agencies include Fairbanks District Office (FDO), Anchorage Field Office (AFO), Alaska State Office (ASO), and Environmental Careers Organization (ECO).

Table 5-1. Kobuk-Seward RMP/EIS Planning Team

Name	Agency	Area of Expertise
Carol Belenski	BLM-ASO	Visual Information Specialist
Boyce Bush	BLM-FDO	Realty Specialist
Rob Brumbaugh	BLM-AFO	Leasable Minerals
Jeanie Cole	BLM-FDO	RMP Project Lead, ACEC, Wildlife
Jim Deininger	BLM-FDO	Locatable Minerals, Mineral Materials
Roger Delaney	BLM-FDO	Wilderness
Caron Gibson	BLM-ASO	Writer/Editor
Cindy Hamfler	BLM-FDO	GIS Specialist
Shelly Jacobson	BLM-FDO	Central Yukon Field Office Manager
Kyle Joly	BLM-FDO	Livestock Grazing, ACEC, Wildlife
Mike Kasterin	BLM-ASO	Social and Economic Conditions
Lon Kelly	BLM-FDO	Wild and Scenic Rivers
Ben Kennedy	BLM-FDO	Soil, Water, and Air
Thomas Lonnie	BLM-ASO	BLM Alaska State Director
Stacie McIntosh	BLM-FDO	Subsistence, Section 810 Analysis
Craig McCaa	BLM-FDO	Public Affairs Specialist
Mark Meyer	BLM-ASO	Locatable Minerals
Randy Meyers	BLM-FDO	Forestry, Vegetation, Special Status Plants
Dave Parker	BLM-FDO	Fisheries, Special Status Fish
Gary Reimer	BLM-AFO	Anchorage Field Office Manager
Robert Schneider	BLM-FDO	Fairbanks District Manager
Crystal Schiffbauer	ECO	GIS Specialist, Fire Regime Condition Class
Bill Hedman	BLM-FDO	Cultural and Paleontological Resources
Tom Sparks	BLM-AFO	Recreation, Travel Management, OHV
Doug Stockdale	BLM-FDO	Public Affairs Specialist
Wayne Svejnoha	BLM-ASO	Hazardous Materials
Skip Theisen	BLM-FDO	Fire Management
Cal Westcott	BLM-FDO	Recreation, Visual Resources