h) Birds

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

(1) Landbirds

At least 50 species of migrant and 23 species of resident landbirds breed in the unbroken forests, shrub field and tall riparian shrub habitats that exist on BLM administered lands in the Bay planning area (Handel et al. 1998). The area's migrant land birds winter in the lower 48 states and Central and South America. Land birds play a significant ecological role on both the breeding and wintering grounds, and many species are considered indicators of environmental and ecological changes, including global climate change (Maley et. al. 2003). The demand for landbird species involves a growing public interest nationwide in viewing, field identification and life history of landbirds, as well as ecological research related to habitat conservation. Four migrant species (olive-sided flycatcher, blackpoll warbler, gray-cheeked thrush, Townsend's warbler) occur in the Bay planning area and are considered sensitive species. Although it is not currently on BLM's Special Status Species list, the rusty blackbird has experienced a dramatic decline recently and monitoring is recommended (Hannah 2004, Andres 1999).

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

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

(2) Waterfowl

At least 25 species of migratory waterfowl (ducks, geese and swans) breed or use migration staging areas in the Bay planning area, (Bellrose 1980), and involve consumptive use demands for both resident and non-resident hunters. Wintering areas are in coastal Alaska and Canada, the western and southern United States, and Mexico. Spring and fall migration staging areas for waterfowl include the Goodnews Bay/Carter Spit area and the Kvichak Bay coastal areas. Inland waterfowl breeding wetlands and estuaries are found on large blocks of public lands in the Kvichak River and Alagnak River area and represent some of the highest waterfowl breeding densities in the State (Connant and Groves, 1993) (Figure 3.18).

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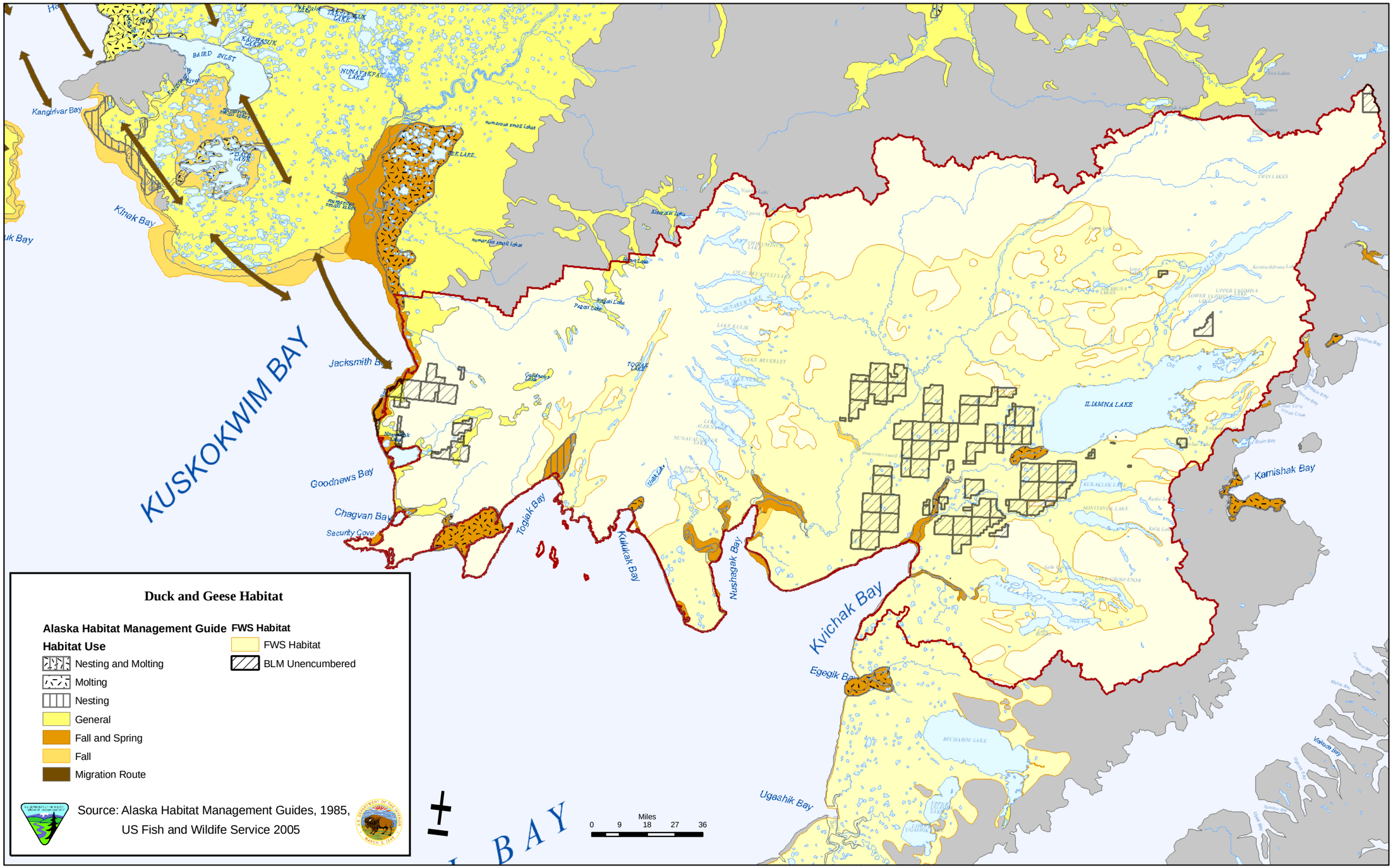

Figure 3.18 Waterfowl Habitat and Activity Areas

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

(3) Upland Game Birds

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

(4) Shorebirds and other Waterbirds

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

There are at least 17 species of shorebirds that breed or migrate within or through the Bay planning area (National Geographic Society 1987), using alpine, tundra and forest edge habitats for breeding and coastal mud flats for foraging, staging and migration. Most shorebird species are long distant migrants, breeding in arctic and sub-arctic habitats in Alaska and wintering in Central and South America, while other species complete transoceanic migrations to islands in the south pacific, Asia and Australia. Few shorebirds are taken for subsistence in Alaska, but birds produced in Alaska are hunted for food on wintering grounds in Central and South America. The numbers of shorebirds produced in the Bay planning area, or the numbers taken on wintering grounds is unknown. The designation of the Western Hemisphere Shorebird Reserve Network sites are within and adjacent to the Bay planning area. The Carter Spit and Goodnews Bay area has been proposed as a regional fall migration shorebird staging site, and the adjacent Kuskokwim Bay has been recognized as a world class hemispheric site for spring and fall shorebird migrations (Meyers et al. 1987).

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

(5) Raptors

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

(10) Seabirds

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

i) Fish

Throughout the Bay planning area there is a lack of detailed baseline data related on the size of fish populations, fish spawning and rearing areas, and the productive capacity of the waters administered by the Bureau of Land Management. There are five major watersheds in the planning area that include the Goodnews which flows into Goodnews Bay, and the Kvichak, Alagnek, Nushagak and Naknek Rivers that flow into Bristol Bay.

Fish occurring in the planning area include all five species of Pacific salmon and a wide variety of resident species (Table 3.8). Maps (Figures 3.32a, b, c, and d) display known anadromous fish streams within the planning area.

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

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

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

Other species reported to occur in the planning area are smelt, sticklebacks, longnose sucker, the Arctic and Pacific lamprey, and including the ubiquitous slimy sculpin. Smelt and lamprey are subsistence species. Whitefish play an important role in the food chain as prey for other fish, as well as being a popular subsistence fish (ADF&G 2004).

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

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

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

The BLM has significant blocks of land in Southwestern and Southeast portions of the Bay planning area, including areas in the Goodnews, Nushagak, and Kvichak watersheds. Fish distribution is influenced by the physiographic provinces in this planning area.

National Hydrolographic dataset is not available from the U.S. Geological Survey for the Hydrological Unit that comprises streams on BLM in the Southwestern portion of the planning area. Statistics on stream

miles for this area were derived from named streams in the planning area and may not include tributaries. Therefore, the total miles of streams in the BLM Bay planning area are underestimated.

The BLM manages 249 miles of streams in the Goodnews watershed and it manages less than 49 miles of these streams utilized as subsistence or sport fisheries. This includes four miles on the East Fork of the Arolik, 30 miles Goodnews River, eight miles of the Middle Fork of Goodnews River, and eight miles of South Fork of Goodnews River.

Most streams on BLM lands in the Goodnews area are remote with limited access. Exceptions are reaches of the Goodnews River and the Middle and South Forks of the Goodnews River. These reaches are accessible by boat and provide sport and subsistence opportunities for salmon and resident species. Also, the East Fork of the Arolik River is accessible by landing on its headwater lake.

Drainages in the Southwestern portion of the planning block are within the Ahklun Mountains Province. Streams slope gradient over most of the province range between zero and eight degrees (Gallant et al. 1995). Mountains in the province have elevations of approximately 1800 feet and are drained by shallow clear streams dominated with gravel and cobble substrate that flow directly to the Bearing Sea. The Goodnews River, a major drainage, flows into Goodnews Bay. During recent inventories, many first and second order streams were found to provide rearing habitat for coho salmon. Char and sculpin are also common in most of these higher elevation streams. In addition to coho rearing, small schools of adult sockeye salmon were observed spawning in some of the larger third and fourth order streams not associated with lakes. Resident species, char, rainbow trout, and Arctic grayling were also found to inhabit most of the larger streams on BLM lands. These observations were documented on ADF&G Freshwater Fish Inventory website (ADF&G 2005a, 2005b). The maps spatially display the location of sampling locations where fish have been collected or observed and also include electronic field data sheets and sampling location photos.

The BLM manages several large areas in the Southeast of Bay planning area. The physiography of this area is referred to as the Nushagak-Bristol Bay Lowlands and they have a large influence on fish distribution. The lowlands are underlain by outwash and morainal deposits that are mantled with silt and peat. The local relief of the lowlands is 50 to 250 feet and elevation ranges form sea level to about 300 feet with slope gradients of less than 2% (Wahrhaftig 1965, Gallant et al. 1995).

The majority of streams in the BLM Bay planning area lowlands are low gradient, low velocity, silt and peat substrate, and tannic colored water. Results of fish and habitat surveys by BLM and ADF&G of these low gradient streams with silt, sand, and/or small gravel substrate suggest they provide marginal habitat for salmon spawning and rearing (ADF&G 2005a, 2005b). Although, these lowland streams are connected to some of most productive salmon watersheds (Kvichak, Alagnek, Nushagak and Naknek) in the world (Minard et al. 1998) which arise from the mountains and lakes of this eco-region.

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

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

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

6. Special Status Species

a) Special Status Plants

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

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

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

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

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

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

The flora of this region appear to be a blend of coastal and interior floristic elements (Parker 2005). One plant, the Walpole poppy (*Papaver walpolei)*, reported as rare in earlier studies (Lipkin 1996) was found to be present. According to Parker (2005) this tiny white-flowered poppy is often relatively abundant when found. A recommendation to designate the area as an ACEC on the basis of the occurrence of the Walpole poppy at Goodnews Bay was officially accepted in the Southwest Planning Area Management

Framework Plan, signed and published in 1981 based on the information about the poppy at that time. Because of the newer information on the poppy, the poppy as a basis for the ACEC is no longer supported in the current Bay RMP/EIS.

b) Special Status Fish

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

On October 11, 1996, Congress passed the Sustainable Fisheries Act (Act) (Public Law 104-297), which amended the habitat provisions of the Magnuson-Stevens Act (MSFCMA). This 1996 reauthorization of the MSFCMA mandates that Federal agencies assess the effects of Federal programs or projects on essential fish habitat (EFH) for commercial fish stocks in all life stages and associated habitats. This Act also calls for direct action to stop or reverse the continued loss of fish habitats. The Act requires consultation between the National Marine Fisheries Service (NMFS), the Fishery Management Councils, and Federal agencies to protect, conserve, and enhance "essential fish habitat." The Act defines EFH as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Subpart J, Section 600.810 of the Act defines an "adverse effect" to EFH as "any impact, which reduces the quality and/or quantity of EFH."

According to NMFS, the EFH species of concern for the BLM Bay area RMP includes five species of Pacific salmon (Chinook, chum, coho, pink, and sockeye), and EFH habitat includes all of the anadromous waters listed in The State of Alaska, *Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fish* within the BLM Ring of Fire planning area.

c) Special Status Wildlife

(1) Threatened, Endangered, and Sensitive Species

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

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

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

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

Table 3.11. Federally Listed Threatened and Endangered Animal Species Present in The Bay Planning Area

Species Common Name	Species Scientific Name
Eskimo Curlew*	*Numenius borealis*
Steller's Eider	*Polystricta stelleri*
Steller Sea Lion	*Eumetopias jubatus*
Spectacled eider	*Somateria fischeri*
Federally Listed Candidate Species That May be Present in The Bay Planning Area	
Kittlitz's Murrelet**	*Brachyramphus brevirostris*

* Eskimo Curlews have not been seen in Alaska since the mid-1800s.
**Rare in the Bay planning area.

There are no designated Critical Habitats in the Bay planning area. Two threatened species, Steller's eider and spectacled eider, and one candidate species, Kittlitz's murrelet, are found in the Bay planning area. They are listed in accordance with the Endangered Species Act. The Eskimo curlew has not been seen in Alaska since the mid-1800s. The Steller sea lion may be an occasional visitor to the coastal spits of Carter's Bay but there are no known haulouts located on BLM-administered land in the Bay planning area (Table 3.11).

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

Steller's Eider. Steller's eider occurs within the planning area only as a migrant. A few birds may summer in the wetlands of the Bay planning area along the flyway. The Alaska breeding population is listed as threatened (Federal Register 1997). Current breeding distribution includes the Arctic coastal regions of northern Alaska from Wainwright to Prudhoe Bay up to 56 miles inland, and Arctic coastal regions of Russia (Federal Register 1997). Historically, Steller's eider was a common breeder in the Yukon-Kuskokwim Delta but is now rarely found in the area. Preferred nesting habitat is tundra with numerous ponds of various sizes. The are not as closely tied to the coastal areas as the other eider species. A recovery plan has been developed for the species.

Spectacled Eider. The spectacled eider is listed as a threatened species throughout its range in Alaska (Federal Register 1993). Historically, spectacled eiders nested discontinuously along the coast of Alaska from Nushagak Peninsula on Bristol Bay to Barrow and eastward nearly to the Yukon border. Today, spectacled eiders' breeding distribution is mostly on the Yukon-Kuskokwim Delta, just to the north and west of the Bay planning area, but they are found in very low numbers breeding within the Bay planning area or passing through during migration, based on field observations (Seppi 1997). Steller's eiders winter in coastal areas of the Alaska Peninsula, and use the Goodnews Bay area for staging and fall migration (Seppi 1997). A flock of 100 to 150 molting Steller's eiders was discovered in the summer of 2004 on BLM lands on the Goodnews Bay North Spit, in an area where they were vulnerable to harvest (Shaw et al. 2005). These eiders use BLM lands, adjacent lands, and adjacent waters.

The recovery plan for the spectacled eider (FWS 1996) identifies recovery criteria and preliminary management actions needed for delisting. Because of the lack of basic information on spectacled eider distribution, abundance, and population ecology, interim recovery efforts focus on collecting this basic information and targeting known sources of mortality.

Specific guidelines for activities within the breeding range of spectacled eiders have been developed as part of the recovery plan (FWS 1996).

- Habitat in a proposed project area should be assessed to determine if eiders are likely to use the area for nesting or brood rearing.
- Ground level activity (by foot or vehicle) should be prohibited within 656 feet of spectacled eider nest sites from May 20 through August 1.
- Construction of permanent facilities, placement of fill, or alteration of habitat should be prohibited within 656 feet of spectacled eider nest sites.
- Introduction of high noise levels within 656 feet of nest sites (from activities at potentially greater distances) should be prohibited from May 20 through August 1. These may include but are not limited to airports, blasting, and compressor stations.

(3) Candidate Species

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

Kittlitz's Murrelet. Kittlitz's murrelet is a Beringian species that nests along most coastal regions from southwestern to western Alaska (Day et al. 1999). In Alaska, the majority of the summer populations are found in Southeastern Alaska, Prince William Sound, and Cook Inlet (Day et al. 1999).

The scarcity of breeding records makes determination of exact breeding range difficult. Nesting habitat consists of unvegetated scree slopes or steep, rocky slopes. It nests rarely on cliff faces (Day et al. 1999). Nesting sites are most often inland, up to 16 miles from the coast (Kessel 1989). The winter marine range is poorly known. There is no reliable population information at this time. Indications are that a substantial proportion of the world population died as a result of the Exxon Valdez oil spill in 1989. One estimate of this mortality was 5 - 10% (Van Vliet and McAllister 1994). This species is sparsely distributed within the planning area. The only potential nesting area where a risk to the habitat might exist is on the scree-covered slopes of lode-bearing mountains on BLM-administered lands in the Goodnews block. To date no Kittlitz's murrelets have been observed nesting in that area.

(4) State Listed Species

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

(5) BLM Sensitive Species

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

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

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

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

Canada lynx. The Canada lynx (*Lynx Canadensis*) is the only indigenous wild cat in Alaska. Density, abundance, productivity and distribution of Canada lynx populations are dependent and upon the cyclic fluctuations of snowshoe hare and to a lesser degree other small mammal and upland game populations. Canada lynx are now Federally listed as a threatened species in the Rocky Mountains of the lower 48 states. For that reason, BLM Alaska considers the Canada lynx a sensitive species. At the same time, they are considered a furbearer, legal to harvest. Lynx can be found in the Bay planning area in forested habitat, where snowshoe hare populations are present. Hare habitat features grasses, green vegetation, berries, conifers, aspen, alder, and willow. Lynx will be found where they can primarily hunt snowshoe hare, and to a lesser degree, other small animal populations. Lynx populations expand and contract in direct response to snowshoe hare population cycles (Whitaker 1980).

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

Northern goshawk. The northern goshawk (*Accipiter gentilis liangi*) resembles the red-tailed hawk in shape but is gray and white in coloring. It inhabits taiga, the northern coniferous forests. It nests in a tall

tree in dense coniferous forest. It migrates and winters in lowlands as far south as northern Mexico. They feed mainly on grouse and smaller birds (Udvardy 1977).

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

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

Olive-sided Flycatcher. The olive-sided flycatcher, *Contopus cooperi/borealis,* inhabits and breeds in low densities in coniferous boreal and coastal forests of Alaska. Their North American breeding range extends into Canada and the lower 48 states. They migrate from Alaska in early August and winter primarily in South America. Their current density, population trends, and distribution on BLM lands in the Bay planning area are not known; however, the species has been recorded in breeding bird surveys on BLM lands in the Alagnak and Iliamna blocks of the planning area (USFWS 1997), and in the adjacent Katmai National Park (USDI National Park Service 1995). Olive sided fly-catchers prefer to nest in spruce trees (Wright 1997) and are likely found in forested and riparian bottoms of the Bay planning area. Breeding bird survey data provide strong evidence for population declines of the species over most of its breeding range (Handel et al. 1998).

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

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

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

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

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

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

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

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

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

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

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

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

7. Fire Management and Ecology

a) Wildland Fire and Fuels

The Wildland Fire and Fuels Management program supports identified land use and resource management objectives and wildland fire is used to protect, maintain, and enhance natural resources and, as nearly as possible, function in its natural ecological role. Wildland fire management options recognize fire as an essential ecological process and natural change agent of many Alaskan ecosystems and provide for the protection of human life and site-specific values. In areas where the objective is to exclude fire or minimize fire size, vegetation manipulation by various methods is a resource management tool to safeguard identified sites and maintain species diversity.

(1) Fire Policy in Alaska

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

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

These plans provide a cost effective, coordinated, statewide, landscape scale approach to fire management. Each plan contains a description of the local environmental and socioeconomic conditions, natural and cultural resources, fire history and behavior, and local subsistence activities. The plans also provide a consistent interagency approach to operational procedures and the identification and prioritization of values to be protected. The four management options defined in the plans are flexible enough to allow different agencies to manage fire on their lands according to policies and mandates exclusive to their agencies.

In order to comply with the National Fire Plan and the 2001 Review and Update of the 1995 Federal Wildland Fire Management Policy (IFWFPR Working Group 2001), the BLM Alaska amended all of its land use plans in July 2005. the Land Use Plan Amendment for Wildland Fire and Fuels Management for Alaska (BLM 2004, 2005) identifies land use and resource objectives, wildlalnd fire suppression options, and fuels (vegetation) management activities that achieve those objectives. Management options as

defined in the interagency plans were incorporated. The amendment is applicable to all BLM-managed lands in Alaska until such time as new RMPs are completed.

(2) Fire Management

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

Fire management practices within the Bay planning area are directly tied to the interagency program. The four management options (Critical, Full, Modified, Limited) defined during the 1980s planning effort have been assigned (Table 3.13) in collaboration with adjacent land managers, to all BLM-managed lands (Figures 3.34a, 3.34b and 3.35). The management option classifications establish priorities for allocating fire-fighting resources and are based on values to be protected, resource management objectives, policies, and mandates. Fires are suppressed at minimum cost considering firefighter and public safety, benefits, values to be protected, and consistency with resource objectives. If a wildland fire is not contained by initial response forces, a Wildland Fire Situation Analysis is jointly completed by the suppression initial response forces, a Wildland Fire Situation Analysis is joint document completed by the suppression agency and field office staff to identify suppression alternatives and management constraints.

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

Table 3.13. Fire Suppression Classes

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

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

(3) Fuels Management

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

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

(4) Fire History

Fire history can be found in Figures 3.34a, 3.34b, and 3.35.

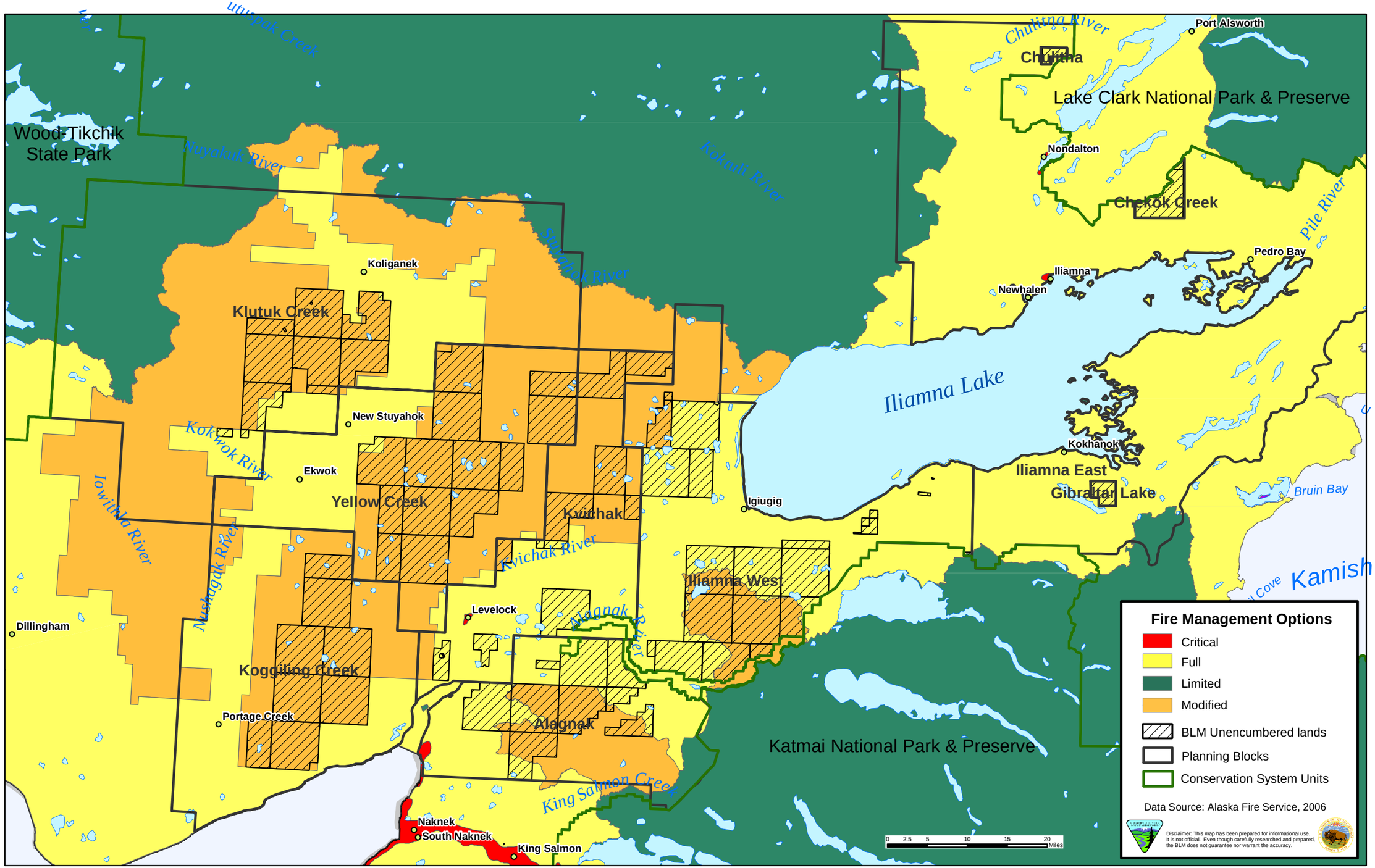

Fig. 3.34a - Fire Management Options in Bristol Bay/Iliamna Region

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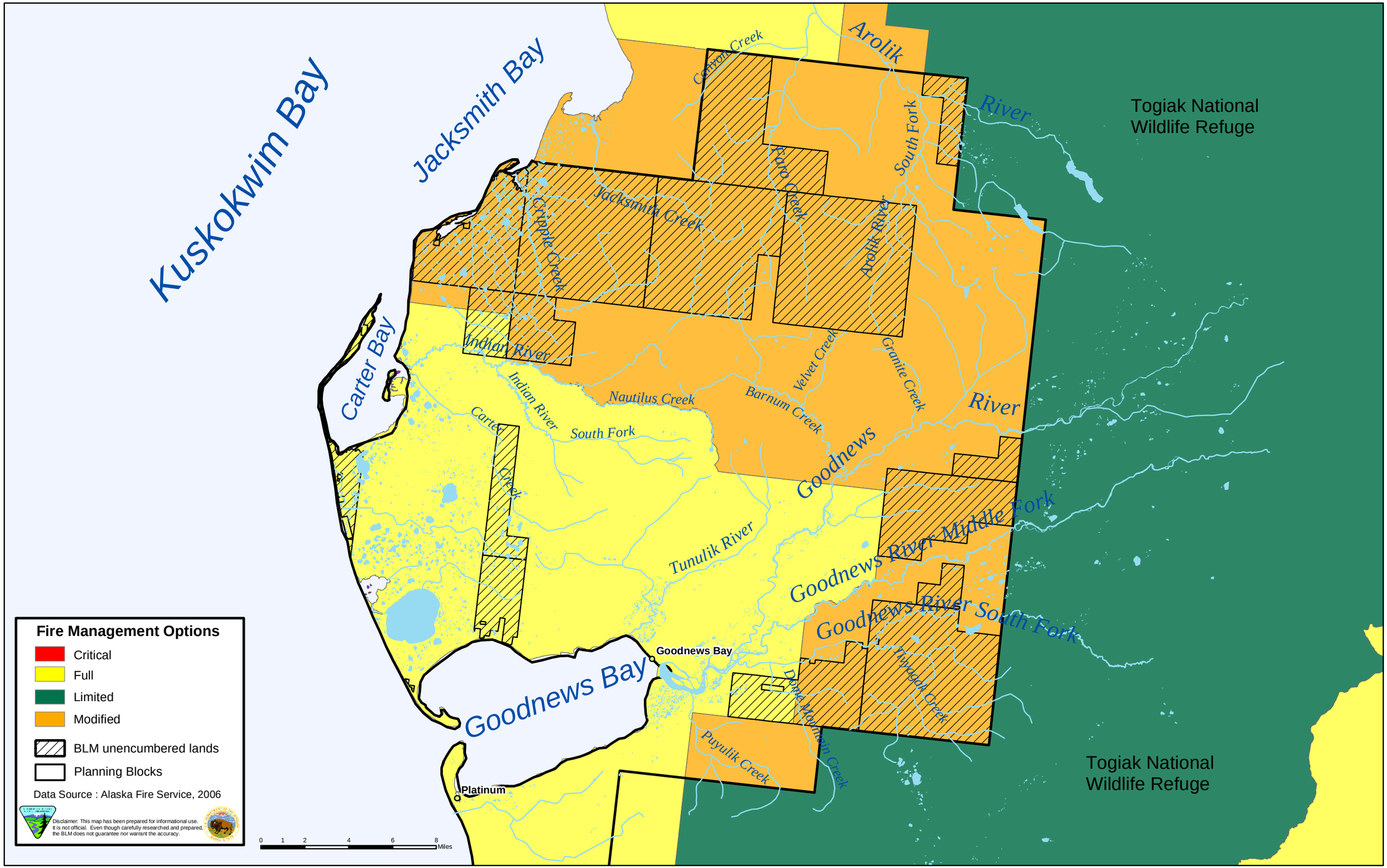

Fig. 3.34b Fire Management Options in Goodnews Planning Block

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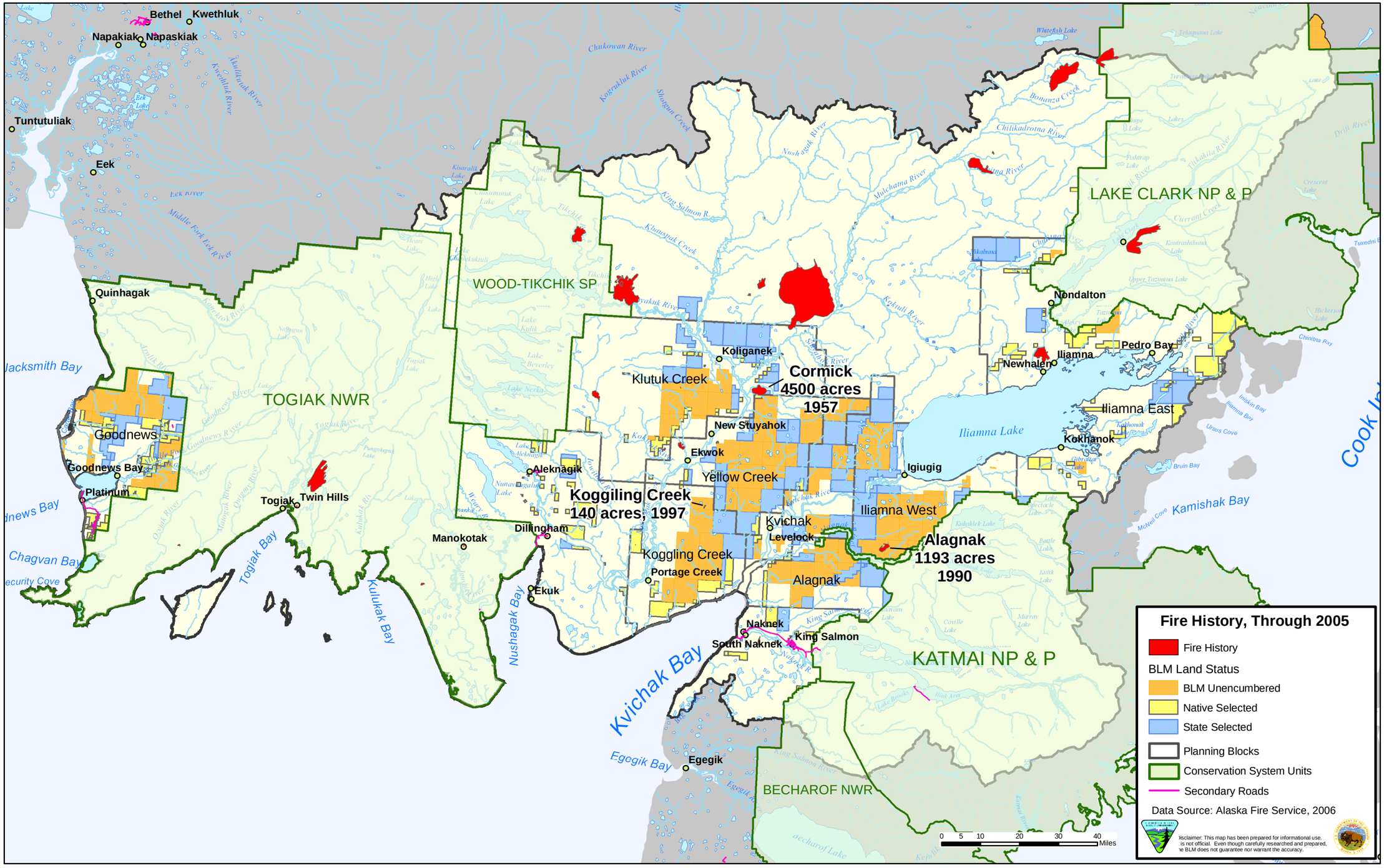

Fig. 3.35 - Fire History through 2005

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Alagnak Block
Since 1950 when fire records started being kept no fires have occurred within this block.
If a fire should occur it would be a rapid wind driven fire due to the tundra community dominating this block.

Goodnews Block
This block falls within two different vegetative classifications, Bering Tundra North to the west and Ahklun Mountains Tundra to the east. The vegetation ranges in the west from wet grasses along the coast with woody plants found in the transition between the coast and the mountains. In the eastern portion of the block, Alpine tundra dominates in the mountains. Black spruce maybe found on ridges and hills while a mixture of hardwoods and white spruce may be found on higher points along major rivers. The vegetation and maritime influence have kept fires from occurring on unencumbered lands within the block.

Iliamna Blocks
Fire as an environmental factor is insignificant due to the maritime influence and the tundra type vegetation. Fire occurrence on BLM lands within the block is very low, when fires do occur they are generally fast moving and of low intensity. The majority of fires are small, human-caused, and associated with recreational activities (AWFCG 1988). Fires have been ignited by lightening but these are not the norm. Only one recorded fire has occurred on unencumbered BLM lands.

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

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

Chulitna River, Chekok Creek, and Gibraltar Lake Blocks
These small isolated blocks of land in the northeast corner of the Bay planning area have not had any fires. The maritime influence dominates here; however, this is a transition zone where vegetation varies between open tundra, mixed deciduous, and spruce forests, transitioning to other types as the elevation rises on the slopes of the Aleutian Range.

Klutuk Creek Block
This planning block falls within the same vegetative classification as the other blocks within the general region. This block has had one fire; however, this fire burned on the border of this block and the Yellow Creek block and is part of the Yellow Creek discussion.

Koggiling Creek Block

This block is comprised of the same type of vegetation: tundra, grasses and dwarf shrubs. This area is also under a maritime weather influence. One fire has occurred in the Block.

Koggling Creek 2 Fire (7104542), Point of origin was in Modified and burned 140 acres in 1997.

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

Yellow Creek Block
In 1957 a small amount of land burned on unencumbered BLM lands.

Cormick Fire (005), there was not a point of ignition identified. The total fire burned 4500 acres.

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

Fire management practices within the planning area are directly tied to the AIWFMP. BLM and other lands administered by the BLM have been assigned the appropriate management option. These management options are Critical, Full, Modified and Limited. As the landscape changes so may the options in any given area. The options are based on Intent, Policy, Objective, Operational Considerations and Operational Procedures and are described fully within the AIWFMP. At present, Wildland Fire Use is permitted in the planning area.

8. Cultural Resources

a) Introduction

The cultural resources program is responsible for the identification, monitoring, and protection of all historic and prehistoric resources on BLM administered lands within the boundaries of the Anchorage Field Office (AFO). The cultural resources within this planning area are extremely varied in respect to age, culture, function, and physical remains.

The planning area spans three linguistic groups: central Yup'ik, Alutiiq and Dena'ina (Figure 3.33). The following sections present an overview of the prehistory and history of each area and the current status of cultural resources work on the BLM managed-lands within these areas. A general overview can be seen in Table 3.14 and a timeline for the historic period in the planning area can be seen in Table 3.15.

(1) Central Yup'ik Area Prehistory and History

Overview of Archaeological Data from the Region and the General Area

The oldest sites of human occupation in this area (6000-3000 B.C.) occur in two phases both representing a focus upon caribou or large land mammal hunting. The earlier Paleoarctic is represented by a blade-making tradition; the later Northern Archaic contains diagnostic corner-notched projectile points (Ackerman 1980, 1985; Dumond 1987). A somewhat later tradition, the Arctic Small Tool tradition (2000-1000 B.C.) also appears to focus primarily upon land mammal hunting. This phase is distinguished by fine microblades and microblade cores.

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

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

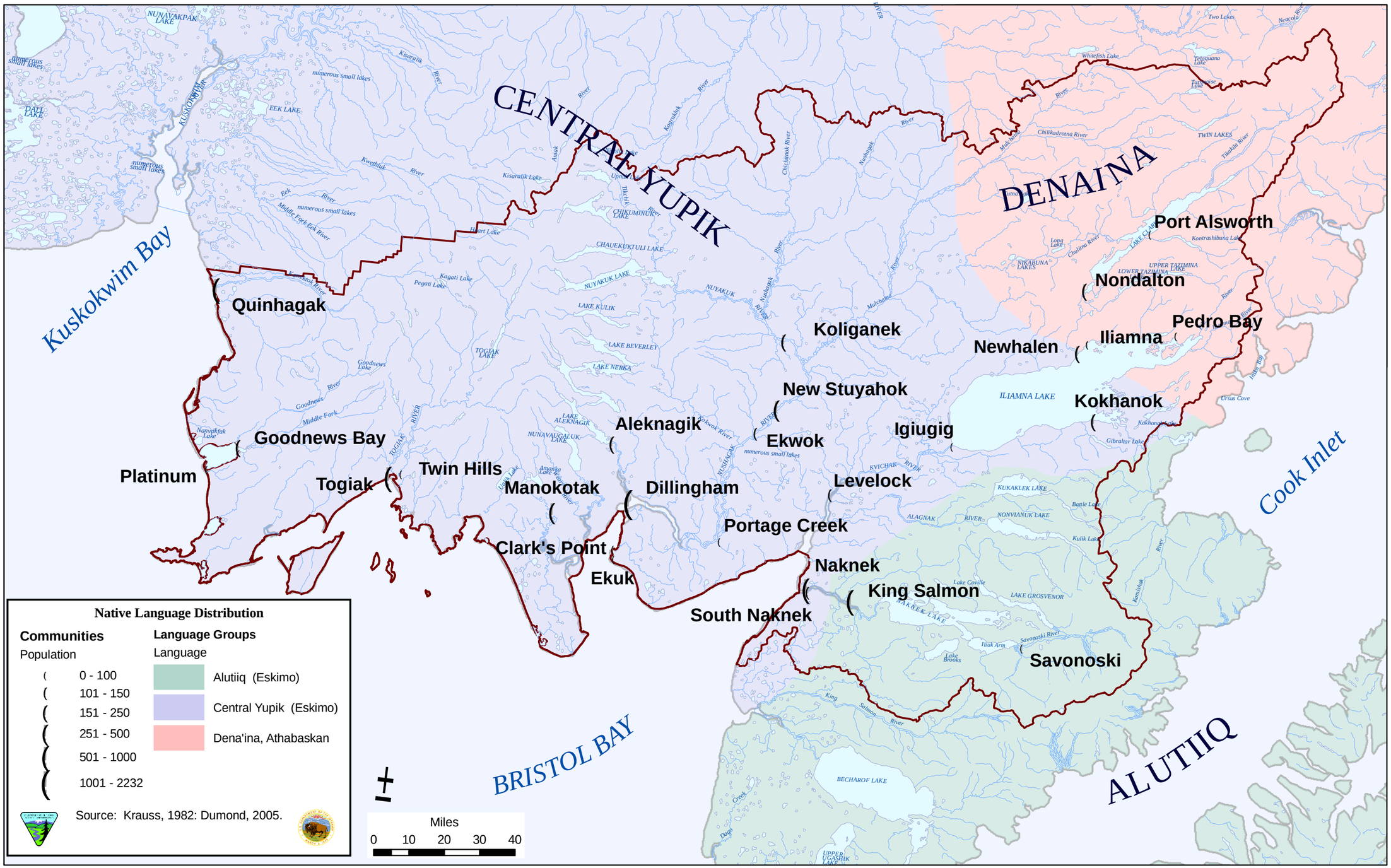

Figure 3.33. Native Languages in the Bristol Bay Area

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Table 3.14 . Cultural Contexts for the Bay Planning Area

Dates	Location	Theme	Diagnostic Cultural Features, Artifacts
7000 - 9500 B.C.	Kisarilik River, Nukluk Mountain	Earliest Human Occupation of the larger Region	Narrow, wedge-shaped microblade cores, microblades, Donnely-like burins, blade-like flakes
6000-5500 B.C.	widespread	PaleoArctic/PaleoIndian tradition	Microblade technology
3000-2000 B.C.	Coastal, river drainages	Archaic/Pacific Coastal	side-notched points, unifacial scrapers
2000-1000 B.C.	widespread	Arctic Small Tool tradition	Finely flaked small stone tools, microblades, microblade cores
1000AD - 300BC	Along coast and major rivers, some isolated finds inland	Norton tradition	Constructed houses, fiber tempered pottery, first ground stone, net sinkers
AD 1800 - AD1000	Primarily coastal	Thule tradition	Kayaks, toggling harpoons, floats, dog traction, gravel tempered pottery

Table 3.15. Timeline for Historic Period

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

Historic People

Oswalt (1990) presents a breakdown of language subgroups for this area during the historic and late prehistoric periods. The Bristol Bay area was occupied by the Tuyuruaniut; the inland Wood-Tikchik Lake and north to the Kuskowim area inhabited by the Kiatagmiut; the Quinaghak area on the eastern side of

Kuskokwim Bay was occupied by the Caninermiut; and the Nushagak River drainage was occupied by the Aglemiut (Aglurmiut). These groups were by no means permanently fixed through time. Just prior to the Russian arrival in the area, the Aglemiut had moved to the Nushagak Bay and River as a result of warfare on the Yukon-Kuskokwim delta.

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

Russian Period

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

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

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

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

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

American Period

The sale of Alaska in 1867 brought the end to the Russian American Company. Its assets were sold to Hutcheson Kohl, a company based in San Francisco. Hutcheson Kohl later became the Alaska Commercial Company which continues to this day as one of the major commercial sources in the region.

The American government did not take an active interest in its new purchase for several decades–at least not in this area of Alaska. In 1868 Captain J. W. White in the United States Revenue steamer *Wayanda*

made a cursory visit to the area stopping long enough at Nushagak to make a description of the old Alexandrovsky Redoubt (VanStone 1967)

With the sale of Alaska to the United States, the Russian Orthodox Church was in a quandry. The Russian American Company had supported church efforts during their tenure but with their departure also went not only most of their support but some personnel. With fewer clergy some areas received fewer or no visits.

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

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

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

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

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

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

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

When Andrew Olsen and Walter Culver met on the train between Seward and Anchorage in the spring of 1933 the biggest platinum mine in the United States was born. Olson was on his way to Flat where he

and his brother and partners operated a dragline operation. Culver was planning a prospecting trip to Goodnews Bay. By the spring of 1934 a dragline and elevated sluice box were on their way to Goodnews Bay. The operation was so successful that a dredge was in operation by 1937 (Johnson 1940).

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

Current Status

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

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

(2) Alutiiq Area Prehistory and History

Overview of Archaeological Data from the Region and the General Area

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

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

Historic Native People

From excavations on Kodiak Island archaeologists believe that the Alutiiq descended smoothly from the end of the Katchamak tradition (Jordan and Knect 1988). The Thule migrations from the north may have displaced Alutiiqs, especially within the plan area on the north side of the Alaska Peninsula. Dumond's

(1987) work shows prehistoric Alutiiq occupation on the upper course of the Nakek River and on the Savonovski River for approximately 4,500 years with the first 500 years primarily hunting (most likely caribou) and last 4,000 with heavy focus on fishing.

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

Russian Period

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

American Period

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

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

Current Status

No BLM unencumbered land lies within the area traditionally inhabited and used by the interior Alutiiq. Fairly extensive survey and excavation has occurred along the length of the Naknek drainage.

(3) Dena'ina Area Prehistory and History

Overview of Archaeological Data from the Region and the General Area

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

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

Historic Native People

The Dena'ina living in the Iliamna and Lake Clark area as well as those of the upper Mulchatna and Stony rivers are grouped together as the Interior Society. This is one of three societies within the Dena'ina.

The Interior Society has a subsistence focus upon salmon. They also rely upon large land mammals, waterfowl, fresh water fish, and berries in season. The group around Iliamna Lake harvests seals since this is one of the few freshwater lakes in the world with a resident sea population. The Iliamna group also travels to Cook Inlet to hunt beluga (Townsend 1965; 1981).

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

Russian Period

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

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

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

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

American Period

As elsewhere in this region, the American period started slowly. The 1867 purchase of Alaska did not immediately result in much attention or change in the lives of the people living in this area. In the1880's commercial fish traps set at mouth of Kvichak River resulted in so little escapement that people at Nondalton faced starvation and had to rely on "backup" drainages for fish like the Kuskokwim River (Ellanna and Balluta 1992). Other shortages resulted because of similar blockages on other rivers connecting with Iliamna and Lake Clark (Townsend 1981). A reindeer herd was established at Iliamna in 1905 to help the economy. Some Dena'ina became herders but this endeavor was never very successful and herding had almost disappeared by the 1940's (ibid). Like the Central Yup'ik and Alutiiq, the Dena'ina were eventually able to participate in the commercial salmon fishery during the 20th century after

breaching the barriers to local employment. Their continued participation in that industry is an important part of the local cash economy today.

Current Status

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

9. Paleontological Resources

a) Introduction

The paleontology program is responsible for the identification, evaluation, monitoring, and protection of fossil resources on BLM-managed lands within the boundaries of the Anchorage Field Office.

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

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

(b) Nushagak/Iliamna/Naknek Region

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

(c) Goodnews Bay Region

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

10. Visual Resources

a) Visual Resources Management Introduction

Scenic quality is an essential component of most recreation activities. In Alaska, the opportunity to experience a natural environment that has been, for the most part, undisturbed by modern human influence, creates a romantic image that appeals to recreationists across the globe. The wide-open spaces, and relatively few public roads throughout the state, make recreating in Alaska an appealing destination (Brown 2002). BLM uses Visual Resource Management (VRM) on BLM-managed lands within the Bristol Bay planning area to manage the quality of the landscape. Management objectives include minimizing potential impacts to visual resources resulting from development activities.

The visual resources of BLM-managed lands within the Bristol Bay planning area were inventoried and classified in accordance with procedures outlined in BLM Handbook 8410-1 (BLM 1984). It involved identifying the visual resources through a photo inventory process and use of data collection sheets, and then assigning the areas to Visual Resource Inventory classes. These classes did not establish management direction, but were used as part of the information to establish VRM Management classes. The four different VRM classes identify the objectives for managing visual resources. The class assignments take into consideration the value of the visual quality and anticipated future land uses, and define the maximum amount of landscape alteration and surface disturbance that could occur.

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

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

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

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

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

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

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

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

b) Description of Bay Visual Resources

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

Goodnews Block.

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

Nushagak/Kvichak Area

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

Iliamna Area

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

c) Condition and Trend

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

The quality of visual resources directly impacts the quality of a resident's everyday life as well as a given visitor's overall Alaskan experience. Visual resources are therefore very important to the residents, to the visitors who recreate in the planning area, and toss to the many commercial businesses that serve them.

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

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

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

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

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

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

d) Visual Resource Management Classes

The 1984 Southwest Management Framework Plan (MFP) addresses VRM considerations, but covers only a portion of the actual land within the Bay planning area. Objective VR-1 states "Allow only very limited visual change in areas designated "Wild" portions of Wild and Scenic Rivers." These areas are to be designated VRM Class I which provides for primarily natural ecological changes in visual resources, but does not preclude limited management activities.

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

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

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

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

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

There currently are no mineral development proposals on the table for BLM lands in the planning area. However, the development and associated infrastructure of new and revitalized mining activities may affect visual resources in the Bay planning area. The unique geological nature of the Goodnews Bay area holds good potential for future development of mineral resources as does the proposed Pebble Mine project, located on state land north of Illiamna Lake. A string of potentially mineral-rich plutons trend southwest of the Pebble project under BLM lands near the lower Kvichak and Nushagak drainages. Future exploration and development of these deposits may also affect the visual landscape in these areas.

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

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